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THE PERCEIVED VALUE-ADDED OF VENTURE CAPITAL INVESTORS

Evidence from Finnish Biotechnology Industry

This study is part of Etna research project entitled *Biotekniikka-alan kehitys Suomessa* (The Development of Biotechnology Industry in Finland), funded by the National Technology Agency (Tekes). The study is also part of a European research project on Venture Capital, entitled Venture Fun, within PRIME Network of Excellence, which is funded from the Sixth Framework Program of the EU.

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ABSTRACT: This study focuses on the non-financial value-added of venture capital investors (VCs) as perceived by the CEOs of Finnish biotechnology companies. It pays attention to differences in the value-added between informal venture capitalists, private sector venture capitalists and public sector venture capital organizations. In addition, this study pays attention to value-adding mechanisms which venture capitalists use in developing their portfolio companies and factors which influence the perceived value-added.

In general, venture capitalists in Finnish biotechnology companies were found to be rather active hands-on investors, especially in terms of frequent contacts. In addition, their non-financial support was in most cases perceived as important for the success of the Finnish biotechnology companies. The VCs provide value-added indirectly through screening and signaling, and directly through monitoring and providing non-financial support in variety of business areas, for example, in strategic planning and in obtaining additional financing. The value-adding of the VCs was found not to be merely vested in the VCs role in the investee's board of directors, as the VCs were found rather often to be in contact with their investee companies outside the board meetings. The value-adding profile of each VC type was found to differ somewhat from one another. Of all VC types, informal VCs were perceived to provide value-added the most and were the most active in other respects. The public sector VCs stood out as most active providers of indirect value-added through signaling, while private sector VCs were characterized by being actively involved in implementing proper corporate governance.

As predicted, the perceived value-added was found to be greater when the relationship with between the CEO and the lead VC was close and there were no tensions inside the investee company resulting from the involvement of VC. The results showed also that short experience of the CEO in investee company's industry increased the perceived value-added.

Keywords: Venture Capital, Biotechnology

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

1	INTRODUCTION	1
1.1	THE AIM OF THE STUDY	1
1.2	RESEARCH PROBLEM	2
1.3	SCOPE AND LIMITATIONS	3
1.4	STRUCTURE OF THE STUDY	5
2	RESEARCH CONTEXT	6
2.1	BIOTECHNOLOGY COMPANIES IN THE EYES OF VENTURE CAPITALISTS.....	6
2.1.1	<i>Characteristics of Biotechnology Companies</i>	6
2.1.2	<i>Special Characteristics of Bio-Pharmaceutical Companies</i>	7
2.2	DIVERSE GROUP OF VENTURE CAPITALISTS	8
2.2.1	<i>Who is Venture Capitalist?</i>	8
2.2.2	<i>Public Sector Venture Capitalists</i>	10
2.2.3	<i>Corporate Venture Capital Companies</i>	12
2.2.4	<i>Private Sector Venture Capital Companies</i>	13
2.2.5	<i>Informal Venture Capitalists</i>	13
3	BUILDING THE FRAMEWORK OF THE VALUE-ADDING.....	16
3.1	REVIEW ON PREVIOUS VALUE ADDED RESEARCH	16
3.1.1	<i>What is Value Added and How to Measure It?</i>	16
3.1.2	<i>Main Streams of Value-added Research</i>	18
3.2	THE VALUE-ADDING MECHANISMS OF THE VENTURE CAPITALISTS	20
3.2.1	<i>Screening the Most Promising Investment Opportunities</i>	20
3.2.2	<i>Monitoring the Portfolio Company</i>	21
3.2.3	<i>Signalling about the Firm's Quality</i>	25
3.2.4	<i>Non-Financial Support</i>	26
3.3	FACTORS INFLUENCING THE PERCEIVED VALUE-ADDED.....	31
3.4	SUMMARY OF THE FRAMEWORK OF THE VALUE-ADDING.....	35
4	METHODOLOGY AND DATA	37
4.1	STUDY POPULATION	37
4.2	INTERVIEW PROCESS AND QUESTIONNAIRE	39
4.3	STATISTICAL METHODS	39
4.3.1	<i>Regression Analysis</i>	40
5	RESULTS.....	43
5.1	DESCRIPTIVE ANALYSIS OF THE INVOLVEMENT OF THE VENTURE CAPITALISTS	43
5.1.1	<i>Firms in the Study Population</i>	43
5.1.2	<i>Screening</i>	47
5.1.3	<i>Monitoring</i>	50
5.1.4	<i>Signalling</i>	55
5.1.5	<i>Areas of Involvement</i>	58
5.1.6	<i>Relationship with Venture Capital Investor</i>	64
5.2	FACTORS INFLUENCING THE PERCEIVED VALUE-ADDED.....	67
6	DISCUSSION AND CONCLUSIONS	70
6.1	MAIN RESULTS	70
6.2	PROFILES OF EACH VC TYPE	71
6.2.1	<i>The Value-Adding of Informal Venture Capitalists</i>	71
6.2.2	<i>The Value-Adding of Private Sector Venture Capitalists</i>	72
6.2.3	<i>The Value-Adding of Public Sector Venture Capitalists</i>	73
	REFERENCES.....	74
	APPENDICES.....	79
	APPENDIX 1: VARIABLE CONSTRUCTION FOR REGRESSION ANALYSIS	79
	APPENDIX 2: RELIABILITY AND VALIDITY ANALYSIS	83

LIST OF FIGURES

FIGURE 1 : THE FOUR STAGES OF VENTURE CAPITAL PROCESS (ELABORATED BY THE AUTHOR BY SEPPÄ 2000, P. 43 AND GOMPERS AND LERNER 2004, P. 3)	16
FIGURE 2: THE MODEL OF VC VALUE-ADDING.....	35
FIGURE 3: TOTAL NUMBER OF VC OWNERS IN PRIVATELY AND PUBLICLY HELD FINNISH BIO-TECHNOLOGY COMPANIES (N=42) BY VC TYPE IN DECEMBER 2005.....	46
FIGURE 4: THE SHARE OF ALL VENTURE CAPITALISTS AND THEIR REPRESENTATIVES IN THE BOARD OF DIRECTORS OF VC-BACKED FINNISH BIOTECHNOLOGY COMPANIES (N=38).....	51
FIGURE 5: INVESTMENT CONTRACTS INCLUDING VETO RIGHTS FOR VC BY VC TYPE.	53
FIGURE 6: AGREEMENTS MADE UPON A FOLLOW-ON INVESTMENT WITH THE LEAD INVESTOR BY VC TYPE.....	54
FIGURE 7: MENTIONING THE NAME OF DIFFERENT TYPES OF VCS IN ORDER TO IMPROVE COMPANY IMAGE WHEN ACQUIRING RESOURCES.....	56
FIGURE 8: ACTIVITY AREAS, IN WHICH THE LEAD INVESTOR HAS PROVED MOST HELPFUL AND WOULD BE MOST HELPFUL.	61
FIGURE 9: FULFILLMENT OF CEOs' EXPECTATIONS (N=38).	62
FIGURE 10: PERCEIVED CLOSENESS OF THE RELATIONSHIP BETWEEN THE CEOs AND THE VCS (N=38).	64
FIGURE 11: TENSIONS INSIDE THE COMPANY CAUSED BY THE ACTIVE INVOLVEMENT OF THE LEAD INVESTOR BY VC TYPE (N=38).	65
FIGURE 12: PERCEIVED VALUE-ADDED OF VC BY VC TYPE.....	67

LIST OF TABLES

TABLE 1: THE MAIN STREAMS OF RESEARCH ON VALUE-ADDED.....	18
TABLE 2: ACTIVITIES WITH MOST VENTURE CAPITAL INVOLVEMENT	28
TABLE 3: ACTIVITIES WITH MOST VENTURE CAPITAL INVOLVEMENT (CONTINUED)	29
TABLE 4: SUMMARY OF THE RESEARCH ON THE FACTORS INFLUENCING THE VALUE-ADDED	34
TABLE 5: RESPONSE PATTERN IN THE SURVEY.....	38
TABLE 6: VARIABLES USED IN THE OLS REGRESSION MODELS.....	41
TABLE 7: DESCRIPTION OF THE FIRMS IN THE STUDY POPULATION.	44
TABLE 8: CHARACTERISTICS OF THE CEOs OF FIRMS IN THE STUDY POPULATION (N=38).....	44
TABLE 9: CHARACTERISTICS OF VENTURE CAPITAL OWNERSHIP IN THE FIRMS IN THE STUDY POPULATION (N=38).....	45
TABLE 10: VENTURE CAPITAL INVESTORS IN FINNISH BIOTECHNOLOGY COMPANIES (N=42) IN THE END OF 2005.	47
TABLE 11: IMPLEMENTATION OF PRE-INVESTMENT DEVELOPMENT ACTIVITIES IN BIOTECHNOLOGY COMPANIES MERELY IN ORDER TO MAKE THE COMPANY MORE ATTRACTIVE FOR VCS. DISTRIBUTION OF RESPONSES BY VC TYPE.	48
TABLE 12: PRE-INVESTMENT DEVELOPMENT ACTIVITIES IMPLEMENTED BY COMPANIES IN ORDER TO MAKE THE COMPANY MORE ATTRACTIVE FOR DIFFERENT TYPES OF VCS (IN PERCENTAGE WITHIN EACH VC TYPE).	48
TABLE 13: NUMBER OF SEATS THE LEAD INVESTORS OR THEIR REPRESENTATIVES HOLD IN THE INVESTEES' BOARD OF DIRECTORS.	50
TABLE 14: THE FREQUENCY OF BOARD MEETINGS.....	51
TABLE 15: THE FREQUENCY OF DIRECT AND INDIRECT CONTACTS WITH THE INVESTEES COMPANY BY VC TYPE.	52
TABLE 16: MILESTONES INCLUDED IN THE CONTRACTS CONCERNING THE FOLLOW-ON INVESTMENTS.	54
TABLE 17: RESOURCES THAT HAVE BEEN TRIED TO ACQUIRE WITH THE HELP OF THE SIGNALING EFFECT OF VC.....	57
TABLE 18: AVERAGE NUMBER OF AREAS, IN WHICH DIFFERENT TYPES OF VCS ARE SERVING AS A SOUNDING BOARD AND ARE RESPONSIBLE FOR IMPLEMENTATION MORE THAN THE MANAGEMENT TEAM.....	58
TABLE 19: AREAS OF ACTIVITY, WHERE THE LEAD INVESTOR SERVES AS A SOUNDING BOARD TO MANAGEMENT TEAM.	59
TABLE 20: AREAS OF ACTIVITY, WHERE THE LEAD INVESTOR IS, ON AVERAGE, MORE RESPONSIBLE FOR THE IMPLEMENTATION THAN THE MANAGEMENT TEAM (N=17).....	60
TABLE 21: THE EXPECTATIONS OF THE CEOs ON THE VC INVOLVEMENT THAT HAD NOT BEEN FULFILLED.....	63
TABLE 22: TENSIONS CAUSED BY THE ACTIVE INVOLVEMENT OF THE VC.....	66
TABLE 23: RESULTS FROM OLS REGRESSION ANALYSIS OF PERCEIVED VALUE-ADDED.	68
TABLE 24: SUMMARY STATISTICS OF THE INDEPENDENT AND CONTROL VARIABLES.....	82
TABLE 25: CORRELATIONS OF THE VARIABLES USED IN THE OLS REGRESSION.....	85

1 INTRODUCTION

1.1 The Aim of the Study

Since 1990s, biotechnology sector has been one of the priorities of Finnish innovation policy, which has aimed at repeating the success in the ICT sector. As a result, the number of Finnish biotechnology companies has risen 300 percent in just a decade.

However, in order to create jobs, establishing new businesses is not enough – they have to grow, and preferably fast. Before generating cash flow to finance all their functions, all start-up companies need financing, the amount of which depends on the technology pursued, the time needed for product development and the nature of the markets that the company is trying to conquer. When biotechnology companies are in question, the investment needed is, therefore, large.

Obtaining debt financing is not easy for a new high-technology company before it has reached a certain level of maturity and profitability. This kind of firm is characterized by severe informational asymmetries about its quality, with complex technology and no history, reputation or assets in place to back up their debt and to reduce the risk of the debt securities they issue. This is particularly the case with Finnish biotechnology growth companies (Tahvanainen & Hermans 2004, p. 93).

Besides capital, new technology based companies usually lack business know-how, i.e. the recipe how to make their business as to grow, as the founders are usually highly research-orientated innovators. Within these settings, one of the most attractive alternatives for a growth-oriented biotechnology company is to turn to the parties who promise to provide them with advice on how to grow, to control their progress, and to offer equity financing, with risk more or less as their profession - business angels and venture capitalists (VCs)¹.

This study aims at finding out, whether these providers of risk capital have in reality managed to provide non-financial value-added to Finnish companies in a demanding industry, especially from the viewpoint of the investors, such as biotechnology. The main objective of this study is to provide recent results of the involvement of different types of venture capital investors for Finnish biotechnology companies and the whole economy to be used in the decision making. Understanding the differences VCs have in their involvement in their portfolio companies can be helpful to entrepreneurs in their search of capital increasing their chances of selecting the most suitable VC investor for their needs (Elango et al. 1995. p. 157).

¹ According to The National Venture Capital Association venture capital is “money provided by professionals who invest alongside management in young, rapidly growing companies that have the potential to develop into significant economic contributors” (NVCA 2006).

1.2 Research Problem

This study is first of its kind in Finland. Most research on venture capital has treated the industry of portfolio companies as homogenous suggesting that the VC involvement depends only on the characteristics of the portfolio companies (Elango et al. 1995, p.158). However, this study aims to contribute to the understanding of the relationships between different types of venture capital investors and their portfolio companies. Although there are a few studies on the differences between informal investors and venture capital companies (e.g. Harrison & Mason 1992, Erlich et al. 1994) the differences between the involvement of public and private sector venture capital companies are known less well.

Even though biotechnology companies have been included in study populations of other research in the field of venture capital as well, most research in value-adding of venture capital has examined the issue from the economical perspectives or from the viewpoint of venture capitalists or portfolio companies (i.e. investee companies or target companies) in high technology industries in general (e.g. Sapienza et al. 1996). In this study the value-adding of venture capitalists is examined from the perspective of Finnish biotechnology growth companies, which enables taking into consideration the special challenges of this industry.

The main research problem of this study can be defined as a question:

What non-financial value-added do the different types of venture capital investors bring to Finnish biotechnology growth companies?

In order to tackle the research problem it is broken into three more specific research questions, which are all employed separately later on this study. The first challenge is to understand how venture capital investors provide non-financial value-added to their portfolio companies. Therefore, the first specific research question is:

1. What value-adding mechanisms do the venture capital investors use in developing the portfolio companies?

Besides understanding what the VCs do in their portfolio companies, it is important to understand how the investee companies perceive the contribution of their VCs, and what factors influence their perceptions. Therefore, the second specific research question is:

2. What factors influence the perceived value added by venture capital investors?

Finally, the last specific research question is derived from the special orientation of this study, the heterogeneous nature of VC investors. If the characteristics of the VCs are

diverse, it is interesting to find out whether they still operate alike. Therefore, the third specific research question is:

3. Does the involvement differ by type of venture capital investor?

1.3 Scope and Limitations

In this study, venture capital is defined strictly as a subset of private equity and it refers to equity investments made to early stage (seed and start-up), or expansion of a business, whereas private equity in general provides equity capital to enterprises not quoted on a stock market (EVCA 2006).

The study does not address the actual financial performance of the venture capital backed biotechnology companies compared to non-VC-backed companies. Neither does this study aim at giving any other easily comparable financial key figure for the value-added of the venture capitalists. Obtaining comparable and reliable data on the financial performance of venture capital backed companies is extremely difficult unless the company is publicly-held, which is not yet common in Finnish biotechnology industry. In addition, most of the companies are at their early stages of development, with low turnover and profitability, which makes a study of economic performance even more irrelevant. Regardless of the relevance of financial performance when evaluating the value-added of the venture capitalists in other circumstances, this study finds merit in addressing issues related to the involvement of the venture capital investors in the everyday business of their portfolio companies.

In this study, the role of the venture capitalist who serves as a lead investor is studied. The reason for this is the fact that not all venture capital investors who syndicate their investments implement an active hands-on participation strategy in their portfolio companies. Often in syndicates of several investors, one or two are informally serving as the lead and are in charge of arranging the financing and are, usually, most actively involved in the overall project (Gorman & Sahlman 1989, p. 235). Therefore, the focus of this study is the relationship between the lead investor and the portfolio company.

This study does not require risk capital investors to be driven by classic financial return principles in order to qualify as venture capitalists. In this study, also individual investors driven by their private missions or publicly owned entities driven by economic-policies can qualify as venture capitalists, as long as they employ the venture capital process (Seppä 2000, p. 39, discussed further in chapter 3.1.1). Neither does the study require that the venture capitalist is operating via company, as she can also be a private individual investing from her personal account. The definitions of different venture capitalists in this study are discussed further in chapter 2.2.

Despite the fact that the heterogeneous nature of VCs has been taken into consideration, this study tackles the research problem only from one side of the relationship, from the perspective of the investee company. Moreover, to be more precise, the involvement of the lead investor is studied from the viewpoint of the CEO of the portfolio company, which renders the outcomes rather subjective.

In this study, investee companies are defined as Finnish, privately held, venture capital backed biotechnology growth companies. In order to fully understand this limitation this group needs to be further defined since biotechnology industry does not exist as an individual entity in any official statistical classification (Hermans 2004, p. 4). In this study biotechnology is defined in the manner of the OECD's provisional definition¹ as: "the application of science and technology to living organisms, as well as parts, products and models thereof, to alter living or non-living materials for the production of knowledge, goods and services" (OECD 2005).

The object of this study consists of high technology companies which aim at fast growth when measured by quantitative standards: amount of sales and number of employees, as this brings forward the need for external funding to finance the growth in addition to the product development itself. Even though, being a growth-oriented company is not limited to small companies large companies have different ways of dealing with growth (Rasila 2004, pp.46–47). Therefore, in this study, only small and medium-sized companies are analyzed².

Finally, to exclude mature companies without high growth prospects, only the companies established since 1986 are included in the study population. New Technology Based Firms are classically defined as firms less than 25 years old, independent of larger companies and established to exploit inventions or innovations (Bertoni & Colombo 2005, p. 2). Even though 25 years seems in today's business environment rather a long time it is important to notice that the product development periods of biotechnology firms may also be long, in drug development even 10 to 15 years (Hermans 2004, p. 13). Therefore, to exclude clearly mature companies, in this study, the maximum age of companies is 20 years (see Chapter 2.1). In addition, to be included in the research

¹ OECD complements the single definition with indicative list of biotechnology techniques functions as an interpretative guideline to the single definition.

The techniques include: DNA/RNA, proteins and other molecules, cell and tissue culture and engineering, process biotechnology techniques, gene and RNA vectors, bioinformatics, and nanobiotechnology. However, although widely used, this definition is not exhaustive and it is expected to change over time as data collection and biotechnology activities evolve. The full OECD definition is available in [http://www.oecd.org/document/41/0,2340,en_2649_34537_1933994_1_1_1_1,00.html].

² To be more precise, SMEs in this paper are defined according to official definitions of the EU excluding firms with over 250 employees and additionally at least one of the following criteria: the annual turnover is less than 50 million euro or the balance sheet total is less than 43 million euro. In addition, to be referred as SME, a company needs to be independent of larger companies. The full Recommendation 2003/361/EC of European Commission is available in [http://europa.eu.int/comm/enterprise/enterprise_policy/sme_definition/index_en.htm]

population, the companies needed to be established to exploit Finnish-based inventions/innovations.

1.4 Structure of the Study

As discussed earlier, the involvement of different types of venture capital investors in their portfolio companies is rather an unexplored phenomenon, especially in the context of Finnish biotechnology industry. This study aims at filling this research gap by describing and explaining the current stage of the phenomenon in this specific context. This is done by gathering qualitative and quantitative empirical evidence from the research population with a survey instrument constructed on the basis of a theoretical model of the value-adding process. Therefore, the study is descriptive by nature, and it consists of theoretical and empirical parts.

The rest of the report is structured as follows. Section 2. describes the research context, first by explaining the special features of biotechnology companies in the viewpoint of VC investors and then by shedding light into different types of VC investors and their objectives to be in the business.

In section 3, a theoretical framework of value adding process is built by conducting a thorough literature review of relevant research. Even though there is little research into the value-added provided by venture capital investors for companies in biotechnology industry, there is quite a lot of research into relatively similar contexts, the relationships between venture capitalists and portfolio companies in high technology industries. At the end of the chapter, the findings are incorporated into a general model of the value-adding process of the venture capitalist.

The theoretical framework is tested empirically in the context of Finnish biotechnology industry. Due to the nature and objectives of this study, i.e. provide evidence of the value adding of VCs for Finnish biotechnology companies, the empirical part can be seen the most important part of this report. The methods and data used in the analysis are described in section 4 thoroughly.

In section 5, the results of the empirical research are represented. First, descriptive statistics of the nature of the firms included in the sample, the value-adding mechanisms that the venture capitalists use and the relationship between the VCs and their portfolio companies is shown. Second, the results from the regression analysis on the factors influencing perceived VC value-added are represented. Finally, in section 6, the main findings of the study are discussed, and conclusions are drawn.

2 RESEARCH CONTEXT

2.1 Biotechnology Companies in the Eyes of Venture Capitalists

2.1.1 Characteristics of Biotechnology Companies

Venture capital investors evaluate their investment proposals both in terms of the risks and the expectations of the potential outcomes, which could be, depending on the investor, direct financial or indirect strategic outcomes. Without doubt, the global health care markets, in which the majority of Finnish biotechnology companies operate, are one of the most promising areas for a VC to make great profits, in case a portfolio company enables to conquer the markets. The challenging task for the investors is to find the potential winners among hundreds of investment proposals.

Historically, the venture capitalists, especially from private sector, have preferred investing in more developed biotechnology companies that have already products on market and are making turnover (Luukkonen et al. 2004, p. 14). However, in Finnish biotechnology industry there are plenty of young companies with small number of products on market, low turnover, and high operating losses. Due to the lack of track record of start-up companies the investors estimate the present value of a company based on the expectations of its future returns (Hermans 2004, p. 15). Moreover, the growth options are further emphasized in firm valuation, when the assets of a company are mainly intangible, which is the case in companies operating in high technology industry like biotechnology (Gompers 1995, p. 1462). However, the growth expectations of young biotechnology companies are pointed far into the future (Hermans 2004, p. 19), which makes the industry even more challenging to venture capital investors.

Finnish biotechnology companies are evidently highly technologically oriented as compared to other industry sectors, when measured by, for example, research and knowledge-intensity (Luukkonen et al. 2004, pp. 16–18). In order to fully appraise the business of biotechnology companies, the venture capitalists are, therefore, required to have special knowledge in biotechnologies and bio-business.

Nathusius (2002, p. 7) identifies five characteristics that early stage high-tech companies typically exhibit, which makes the evaluation of expectations of their future returns difficult, therefore, making them challenging investment targets for providers of finance:

- 1) High technological orientation, which may cause difficulties in comprehension by the financier of the business concept, product or activity.

- 2) Poor market/customer focus.
- 3) Management team lacks entrepreneurial, distribution, financial and operative experience – its technological focus makes it unbalanced.
- 4) Inadequate network of national/international contacts.
- 5) High time pressure to compete with other young business to be among the first on the market.

The lack of comparative data on companies in biotechnology and other technology fields restricts making any strong generalizations of the nature of Finnish biotechnology companies concerning the above statements. Furthermore, it is important to keep in mind that the group of companies active in the biotechnology sector is rather heterogeneous and, therefore, financing needs, growth potential, and risks associated with the companies vary a lot.

As discussed earlier, the pharmaceutical industry is one of the main sectors that have successfully applied biotechnology techniques in its product development. Additionally, in the pharmaceutical sector, profit expectations regarding drugs that are able to break through successfully onto the global market are high, which makes the sector extremely lucrative for venture capitalists. Therefore, it is important to evaluate the special characteristics of the pharmaceutical industry in order to be able to conceptualize the business environment, in which many of the Finnish biotechnology companies operate.

2.1.2 Special Characteristics of Bio-Pharmaceutical Companies

Biotechnology companies operating in pharmaceutical industry have three special characteristics from the venture capital investor's point of view: the length of product development, high costs of product development and marketing, and stringent regulation. Due to these characteristics, drug development entails considerable risks for the financiers of the R&D work and innovative businesses.

The time from the initial product innovation until the launch of the final product on to the market can take as long as 10–15 years, as drugs have to go through extensive tests including pre-clinical tests on animals and clinical tests on people (Hermans 2004, p. 13). In industrial countries, the approval of new drugs is heavily regulated by the authorities, which also lengthens the time-to-market (Hermans et al. 2005, p. 3). A large share of the total costs of drug development are realised in the third phase of clinical tests, after which money is needed for expensive international marketing. It has been estimated that bringing a successful drug

into markets costs, on average, \$ 500–800 million, which is more than double the amount of financing in Finnish SMEs in bio-pharmaceutical sector as a whole. (Hermans 2004, p. 14).

However, the biotechnology companies active in the pharmaceuticals are usually responsible for only a small part of the development process, taking, for example, care of the initial phases of the development and then licensing out the product concept to big pharmaceutical companies for further development. Even though this reduces the risks associated with the total drug development process that a small biotechnology company is bearing, the larger partners will also receive a big share of the profits in case the drug breaks through.

2.2 Diverse Group of Venture Capitalists

Over time, as the venture capital industry has developed, the definition has also evolved. Classically, venture capital has referred to temporary hands-on equity participation in novel technology based, entrepreneur-driven start-up ventures by individual capitalists (Seppä 2000 pp. 37–38). Currently a lot wider phenomenon is encompassed under the term venture capital. Today, venture capital investment periods may range from a few months to decades and similarly the capital investments may range from straight common stock to convertible bonds or warrants. In addition, the investment portfolio of a VC may include, besides technology-based start-ups, also established large corporations in mature businesses led by hired managers and everything in between. Even the venture capitalists themselves form nowadays a heterogeneous group of professionals utilizing complex contractual arrangements and institutional corporate structures. (ibid.)

To fully appraise the operations of venture capitalists it is important to understand that venture capitalists are actually a very heterogeneous group consisting of individuals and entities each having their own missions and objectives. Some of them are searching for financial profits, while others long for creation of new jobs or even new technologies, to name only few. This part illustrates the main categories of venture capitalists and contributes to the understanding of the motives each of them have in the business. However, before dividing the venture capitalists into categories, it is important to clarify how venture capitalists are defined in this study, who actually is a venture capitalist, and how he differs from a managers of venture capital fund, for example.

2.2.1 Who is Venture Capitalist?

According to the glossary of European Private Equity and Venture Capital Association a venture capitalist is “the manager of private equity fund who has responsibility for the management of the fund’s investment in a particular portfolio company” (EVCA 2006). However,

strictly speaking, not all managers of venture capital companies are actual capitalists, but rather, hired managers of venture capital funds. Therefore, a key to identify venture capitalists in today's world, as venture capital companies are usually owned by widely-held organizations, is to separate ownership from control. Defined strictly, venture capitalists are "legal persons, owned either by natural persons or legal persons whose decision making authority is vested in natural persons acting as board members" (Seppä 2000, p. 73), i.e. the ones who own the control over the venture capital companies. Thus, according to this definition, the venture capitalist, for example, in a Finnish governmental venture capital company Sitra is actually the Finnish Parliament which supervises the operations of Sitra. What makes a fund manager a venture capitalist lies, therefore, in their share of ownership of the VC company: if a manager or team of managers own a majority share of the venture capital company, they can be identified as venture capitalists; otherwise they are, strictly speaking, just venture capital managers. Despite the institutionalization of the venture capital, it is to be noted, however, that classic individual venture capitalists are still active in the VC market, though commonly labelled as informal venture capitalists, and, in addition to formal venture capitalists, are of interest to this study.

Venture capital companies, in turn, are strictly speaking only vehicles of venture capitalists, established to serve their mission. In the dominant legal structure, venture capital companies utilize limited-life (typically ten years) limited partnership (LP) fund-vehicles. In this structure, outside funders participate as limited partners of the LP funds. In the other structural category, venture capital companies consist of and utilize one legal structure, typically a limited liability company (LTD). In this case, outside funders participate, alongside with the venture capitalists, as shareholders for undefined period of time. (Seppä 2000, p. 40).

In this study, the term venture capitalist is, however, used broadly to denote both the venture capital companies investing in particular portfolio companies as well as the informal investors and teams of managers of venture capital companies holding a majority stake in the venture capital company and, furthermore, are responsible for the investment decision of the funds. The reason for the broad use of the term venture capitalist, in this study, lays in the fact that only the portfolio companies are interviewed leaving the definite control and ownership structures of the venture capitalists open. In other words, in this study, venture capitalists can be individuals, teams of individuals or legal entities.

Based on the controlling owner of company, venture capital companies are in this study divided in three major categories; corporate, other private sector, and public sector venture capital companies. In a private sector venture capital company individual entrepreneurs or private financial sector entities own the majority of the company, whereas in corporate and governmental venture capital company (e.g. institutional venture capital), the major owner is a private non-financial corporation (Maula 2001, p. 9) and a public sector entity, respectively (Seppä 2000. p. 85). However, despite the form of the venture

capital company, the actual source of venture capital to be invested can be individuals, private organizations or governmental sometimes even a mixture of all of them.

As comprehensive data about the incentives of the venture capitalists are not collected from the venture capitalists, the following discussion is limited to secondary, general information about the investor types available in the public sources and literature. The simplest way to analyze the missions of a venture capitalist is to make an allocation to two basic categories, direct/financial and indirect/strategic (Seppä 2000, p. 88). In the following chapters, the four main categories of venture capital investors and the reasons for them to be in the business are discussed more deeply.

2.2.2 Public Sector Venture Capitalists

Within policy making circles, venture capital has been considered to be an important means of funding early-stage ventures and hence facilitating entrepreneurship, innovation, employment and general economic growth (Harding 2000, p. 59, Seppä 2000, p. 69, Gompers & Lerner 2004, p. 274). One way of promoting such business activity in many countries has been the establishment of public sector venture capital companies to open the market for private investors (Rasila 2004, p. 27). Besides providing directly capital to firms (or funds), governments may give financial incentives to VC investments and revise investor regulations (OECD 1997, p. 7). Public sector venture capital refers to venture capital funds organized by governmental bodies, or other programs to make venture-like financings with public funds (Lerner 2000, p. 521).

According to Seppä (2000, p. 154) the governments typically establish either wholly-owned LTD structured venture capital companies or similar structures in which they would hold majority control, but also invite private sector entities to participate. However, in recent years, also governments have established LTD structured venture capital companies utilizing the LP fund structure, for example, when establishing a joint venture with private sector entity. (ibid.)

In recent years, Finnish government has been rather active in intervening in the market for SME finance (Hyytinen & Väänänen 2003, p. 364). Public sector venture capital in Finland consists mainly of funding provided by the Finnish National Fund for Research and Development (Sitra)¹, the government venture capital firm Finnish Industry Investment (FII), and Veraventure Oy/Ltd established in 2003. Of these, only Veraventure Ltd operates as a fund of funds, while the other two make also direct investments in portfolio companies (Luukkonen 2006, p. 4). Moreover, there are few, so to say, semi-governmental venture capital firms operating regionally that receive a large proportion

¹ Sitra is an independent public foundation under the supervision of the Finnish parliament. [www.sitra.fi]

of their investment funds from public VC companies and municipals. Few years ago they were facing difficulties due to a shortage of public funding for several years. (Paasivirta & Valtonen 2004, p. 64.)

Genuinely, the mission of governmental venture capitalist is to rectify capital market failures (Hyytinen & Väänänen, 2003, p. 351), in other words, to perform activities that have not been carried out by the private sector (Seppä 200, p. 150), to seek and build new businesses, and to increase innovation and job creation (OECD 1997, p.2). More specifically, as stated in the Finnish legislation, common themes among the missions of government institutions include the promotion of development, growth and internationalization of Finnish firms' and particularly Finnish SMEs' (Hyytinen & Väänänen 2003, pp. 350–352). However, the objectives of different institutions vary somewhat, with each of them tackling different questions and, therefore, having different investment strategies.

It is argued that sometimes, to survive, a governmental venture capitalist only needs to get the funds invested and not to earn a competitive financial return from its investments (Seppä 2000, p. 154) Yet, according to Hyytinen & Väänänen (2003, p. 351), the Finnish governmental venture capital companies are required to be self-sufficient and, at least, they are implicitly being pressured by tax-payers to invest their money to make at least some profitable investments.

Among the major publicly-held venture capital companies in Finland, two are active in the Finnish biotechnology sector, namely, Sitra and FII. Sitra has had an important role in the Finnish life sciences cluster for almost a decade, but lately it has invested in the sector more passively. In 2004, it had 36 life science companies in its portfolio, made only one new initial investment and five exits in the cluster. (Luukkonen 2006, p. 5). According to the Annual Report 2004 of Sitra, the market value of its endowment capital was 573 million EUR at year end 2004, and it had approximately 100 portfolio companies and some 40 equity funds in its capital investment portfolio altogether. In its Annual Report, Sitra also announced that it is changing its role in seed financing, as it will only invest in companies that support the need of one of its programme areas, i.e. companies operating on health care, environmental technology, and nutrition industries. (Sitra 2004, p. 4). In 2004, Sitra initiated a capitalisation process concerning some 20 of its portfolio enterprises in life sciences sector, and since then, it has been seeking to find leading international investors to make additional investments in portfolio enterprises (Luukkonen 2006, p. 5). This strategy change of Sitra has recently been one of the most common topics of public discussion in biotechnology industry.

FII is concentrated on financing particularly regional, growth-oriented funds that are largely limited-life, limited partnership type and have high returns (Luukkonen 2006, p. 7). In 2004 FII launched a new seed financing program according to which FII commits to invest 50 % in projects that are able to acquire 50 % of the seed funding from a private venture fund (Paasivirta & Valtonen 2004, p. 62). According to Luukkonen (2006,

p. 7), in its direct investments, FII does not aim to provide hands-on value-adding to its portfolio companies and does not participate in their boards of directors.

2.2.3 Corporate Venture Capital Companies

Corporate venture capital (CVC)¹ is a form of venture capital where the investor is a financial intermediary of a non-financial corporation (Maula 2001, p. 9). The investee companies are either young firms outside the corporation or business concepts originating within the corporation (Lerner 2000, p. 516). In the strictest definition, CVC investment is done directly by a self-managed fund, while defined broadly, CVC includes also investing indirectly by having a third party to manage a fund or even making an investment in an external fund (Rasila 2004, p. 28). For clarification, if a corporate venture capital company is majority-owned by only one private sector entity, it is called captive, if two or more, it is called semi-captive (Seppä 2000, pp. 146–149).

The investments are usually organized as corporate subsidiaries, not as limited partnerships (Lerner 2000, p. 516), established, typically, to pursue the parent's strategic interest rather than direct financial gains (Seppä 2000, pp. 149). An important incentive for CVC could be to offset the reduced capacity to identify and build on new opportunities (Rasila 2004, p. 28).

The objectives of companies active in the corporate venture capital are wide. Some corporate venture capitalists are after financial gains, wherein a company is investing in projects with highest return on investment (Maula 2001, pp. 25–27). However, usually, the objectives of corporate venture capitalists are strategic and the investments are made to spur the investor's own business. Hence, a company making strategic investments may be aiming at, for example, learning about markets, technologies or processes. Alternatively, an investor may be seeking potential acquisition targets or areas to expand, or even leveraging its resources or complementary assets in order to increase demand for and availability of its own products. (Maula 2001, pp. 25–31).

¹ It is important to distinguish CVC from Corporate Venturing, CVC being only one part of the latter. (Rasila 2004, p. 28):

- External: Corporate venture capital, venturing alliances (e.g. joint-ventures, direct minority investments) and transformational arrangements (e.g. acquisitions and spin-offs).
- Internal: Funding of internal ventures that, while distinct from company's core business and granted some organizational autonomy, remain legally part of the company.

Nokia Corporation is currently the major Finnish company active in the internal venture capital business. It has a global geographical focus and does not invest actively in Finland (Luukkonen 2006, p. 9), leaving this form of venture capital investors therefore outside the scope of this study hereafter.

2.2.4 Private Sector Venture Capital Companies

In private sector venture capital companies, a team of individuals own the majority of the venture capital company. The dominant structure of Finnish venture capital companies is a management company, organized as a limited company, managing several funds which are organized according to the limited-life, limited partnership (LP) structure. Unlike the classic US-based LP-structures, in Finnish LP-funds limited partners require a strong position in the decision making. Limited partners are present in the investment committees and therefore involved in major investment decision-making concerning the major investments and investment strategy formulation. The Finnish venture capital sector consists of 44 venture capital managing companies with about 120 equity funds, and 253 managers. (Luukkonen 2006, p. 3).

In recent years, cross-border venture capital, i.e. venture capital funds investing in portfolio companies located in foreign countries, has become a particularly important form of financing in smaller, technology-oriented countries such as Finland, especially for high-tech ventures with high international growth expectations and potential (Maula & Makelä 2003, pp. 270–287). In addition to the financial contribution, foreign venture capitalists have appeared to support the internationalization of portfolio companies and to open access to international public capital markets as an exit route, which in turn could be highly valuable also for domestic venture capitalists syndicating with foreign venture capitalist (ibid., p. 285). Strictly speaking, when studying the origin of venture capital, one should distinguish funds *managed by* a venture capital company located in a country from funds *originating from* investors in that country (Baygan & Freudenberg 2000, pp. 13–16). However, in this study, the group of private sector venture capital companies are treated homogeneously without paying attention on the country of management or the origin of funds.

2.2.5 Informal Venture Capitalists

The birth of venture capital can be tracked to wealthy individuals investing on their personal account. Today, as venture capital industry has become strongly institutionalized, classic individual venture capitalists are commonly referred to as informal venture capitalists or business angels. (Seppä 2000, pp. 72–73). According to the definition of Lumme et al. (1998, p.11), the informal venture capital market comprises wealthy, self made, private individuals who

usually have an entrepreneurial or business background and provide small amounts of equity capital to businesses in which they have no family connection.

However, business angels constitute a heterogeneous group of investors in terms of personal characteristics and investment activity, some researchers (Coveney & Moore 1997) are even suggesting that there are as many as six different types of investors encompassed within the umbrella term business angel. Therefore, and because of the lack of comprehensive public records of their investment transactions, business angels are extremely difficult to identify and therefore to study their operations. Lumme et al. (1998, pp. 27–28) identify three types of boundary problem when defining informal venture capital investments: distinction between informal venture capital investments and 1) investments in family businesses, 2) an acquisition or 3) formal/institutional venture capital investments.

The differences between informal seed money put in as friendly money or formal/institutional venture capital and informal venture capital provided by business angels are not always clear (Rasila 2004, p. 15). In this study, investments in businesses in which the investor or his/her family has a majority shareholding are not considered to be informal venture capital investments. Lumme et al. (1998, p. 28) distinguishes informal investments, even when leading to majority shareholding of a company, from corporate acquisitions and management buy-ins referring to the objectives of the investor.

Companies making angel-like investments are the most difficult group to identify and distinguish from venture capital companies. For example, wealthy private individuals investing through family owned investment companies or groups of business angels creating pooled investment funds may operate much like venture capital funds, as they might even employ an investment manager to identify investment opportunities (Lumme et al. 1998, pp. 27–28). Lumme et al. (1998, pp. 27–28) suggest that these types of investment can legitimately be regarded as informal venture capital if the investors are investing their own money and make themselves their investment decisions. Rasila (2004, p. 16) in turn distinguishes business angels from well organized venture capitalists by suggesting that, contrast to VC company fund managers, for the *majority* of business angels, investing is neither a profession nor a full-time job.

Following these examples, the identification of informal investors without discussing with these investors themselves is rather challenging, especially due to the lack of public records on them. It is to be noted that, in this study, categorisation of the investors is only based on the information received from the portfolio companies and public information about the companies available in the National Board of Patents and Registration of Finland. Within these limitations, small companies making venture capital investments in Finnish biotechnology companies are defined as venture capitalists if a company has registered its the main line of business being unit trust activities, investment and development company activities, or other related financial activities. If a non-financial small company, in turn, is making angel-like in-

vestments, it is defined as informal investor or corporate angel, following the example of Covenay & Moore (1997, pp. 74–75).

According to Lumme et al. (1998, p. 49) Finnish business angels are relatively patient investors, as almost all investors are willing to hold their investments for more than three years. In addition, in practice, investors are likely to be willing to keep their investment in the enterprise for a longer period than the five year investment period they prefer. Against the principles of venture capital investments, some business angels are found not to intend to exit from all of the investee companies. (ibid.). These include, for example, angels that take formal management positions in the ventures (Covenay & Moore 1997, pp. 72–73). Business angels represent their private missions, most of them being profit-driven - some seeking their everyday income, some maximising their wealth (Covenay & Moore 1997, pp. 71– 77). Most of the business angles have a great store of knowledge, skills, experience and hands-on involvement strategy and therefore are vested with an extensive value-adding potential (Rasila 2004, p. 16, Lumme et al. 1998, p. 11).

In summary, when analyzing the relationship between venture capitalists and investee companies, it is important to recognize that venture capitalists are extremely diverse. Different types of venture capitalists have different mission, objectives and business models and, therefore, one can assume that the actions taken in the development of the investee company may differ. This study aims at finding empirical evidence on whether or not there are differences in the involvement between different venture capitalists.

3 BUILDING THE FRAMEWORK OF THE VALUE-ADDING

3.1 Review on Previous Value Added Research

Because no extensive and well-developed theory of how and when VCs add value to their portfolio companies exists (Sapienza et al. 1996, p. 447), in this study, a framework is build based on earlier empirical generalizations and studies in general. Before discussing the results of earlier studies, first attention is paid to term value-added itself and the ways it has been measured.

3.1.1 What is Value Added and How to Measure It?

One special feature, besides active and temporary involvement, that distinguishes venture capital from other forms of finance, is its cyclic nature. Gompers and Lerner (2004, p. 3) viewed venture capital as a six-part cycle that starts with 1) raising of a venture fund; proceeds through 2) the investing in, 3) monitoring of, and 4) adding value to firms; and continues as the venture capitalist 5) exits successful deals and 6) returns capital to their investors. The cycle renews itself as the venture capitalist raises additional funds. Seppä (2000), in turn, condensed the venture capital process into four stages, namely fund-raising, entering, value-adding and exiting, which are depicted in Figure 1.

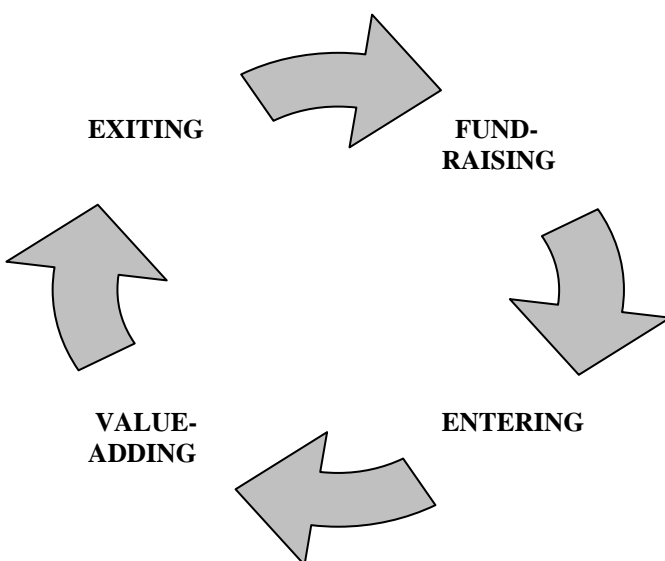


Figure 1 : The four stages of venture capital process (elaborated by the author by Seppä 2000, p. 43 and Gompers and Lerner 2004, p. 3)

Independent of whether the process is defined widely or more narrowly, value-adding emerges as an important stage of venture capital activity indicating that there is more to venture capital than investing and exiting from investments. After investing financial capital in firms, the venture capital firm provides advisory services and monitoring, and therefore, helps the investee firms to mature, with a successful exit being the final target. As value-adding is generally recognized as a potentially extremely valuable function of the venture capitalists for the investee companies, researchers have been interested in studying this phenomenon. The first task for a researcher is to find out what is actually the added-value that the VCs provide?

Value-added is an abstract term, and there does not exist any formula or unit to measure it. According to Maula (2001, p. 15), value-added refers to all non-financial benefits the portfolio companies receive from the venture capital investors, as a result of the investment relationship. Fried & Hisrich (1995, p. 102) argue that the value of the input the venture capitalist adds, depends on how well it fills the gaps between the resources needed and those already available to the investee company.

In addition, the meaning of the term ‘value-added of venture capital’ varies a lot depending on the perspective. What is valuable for a venture capitalist or an economy may be unimportant for an investee company. For example, from the perspective of the venture capitalist, the value-added is simply the difference between returned and invested capital, while for governments it is the number of new jobs created by venture backed vs. non-venture-backed companies (Seppä 2000, p.88). In this study, the value-added is examined from the viewpoint of the investee company, and definitions refer to the ones described in the first paragraph of this chapter.

Due to the broad definition of value-added, measuring it is difficult. Since there do not exist any unambiguous and objective indicators, researchers are forced to come up with subjective indicators. Sapienza (1992) and Sapienza et al. (1996), for example, measure value-added with a parameter that was calculated by, first, multiplying the perceived importance by perceived effectiveness of the lead investor’s involvement in eight key roles, and the total value-added was obtained by calculating the weighted average across these roles. Fredriksen et al. (1992, p.3) measured the perceived value added, or subjective outcome of the co-operation as they labelled it, by asking VCs and managers of the portfolio companies to estimate the degree of fulfilment of their expectations. The value-added was given a numeric value on a five point Likert-type scale. Maula (2001, p. 118–119) also used perceptual measures for value added in his study on the value added of corporate venture capital. Multi-item scale was used to measure the overall perceived value-added of the corporate venture capitalists. The start-up CEOs were asked whether their VC had provided them valuable value-adding support in addition to financing, whether the value-adding support provided by their VC had been critical for their success, and whether they were happy about having this investor. Finally, the overall perceived value-added for each corporate venture capitalist was given a value ranging from one to seven. (ibid.)

Usually value added is measured implicitly without even trying to find a numeric value for it, for example, measuring the overall performance of the VC-backed companies or simply studying the involvement of the venture capitalists in their portfolio companies and, therefore, contributing to the understanding of value adding phenomenon. These methods are discussed in the following section as the relevant literature on topic is reviewed.

3.1.2 Main Streams of Value-added Research

The value added research can be traced back to the mid-1980s when a number of researchers argued that venture capitalists contributed not only capital but also managerial/technical assistance and monitoring (for example Gorman & Sahlman 1989, MacMillan et al. 1988, Barney, 1989).

In the value-adding research, four main streams can be identified: 1) impact of the venture capital on firm performance, 2) governance and monitoring of venture capitalists, 3) the value-added mechanisms used by venture capitalists, and 4) factors influencing the value-added. Table 1 shows some of the most relevant studies on value-adding of the VC.

Table 1: The main streams of research on value-added.

Impact of VC on Investee Company's Performance
Fredriksen et al. 1992, MacMillan et al. 1989, Megginson & Weiss 1991, Jain & Kini 1995, Jain & Kini 2000, Lin & Smith 1998, Franzke 2001
Governance and Monitoring of VCs
Barney et al. 1989, Sahlman 1990, Megginson & Weiss 1991, Sapienza & Gupta 1994, Gompers 1995, Sapienza et al. 1996, Fredriksen & Klofsten 2001, Gompers & Lerner 2004
Value-adding Mechanisms Used by VCs
MacMillan et al. 1988, Gorman & Sahlman 1989, Sapienza 1992, Sapienza et al. 1996, Timmons & Sapienza 1992, Erlich et al. 1994, Harrison & Mason 1996
Factors Influencing the Value-Added
Sapienza 1992, Sapienza et al. 1994 & 1996, Fried and Hisrich 1995, Gorman & Sahlman 1989

In most traditional studies on the value-added only venture capitalists are interviewed (e.g. Gorman & Sahlman 1989, MacMillan et al. 1988). Although, in the 1990s a few studies were made, interviewing also representatives of the investee companies (e.g. Harrison & Mason 1992, Sapienza 1992, Timmons & Sapienza 1992, Erlich et al. 1994, Fried & Hisrich 1995), thus shedding light to the other side of the two-sided relationship. Later studies are commonly based on the findings made in the earlier ones, and they test the same questions in either a new environment or in relation to other factors.

A lot of the research on the impact of venture capitalists focus on the economic performance of the VC-backed companies either comparing them with to non-VC-backed companies (e.g.

Jain & Kini 1995, Jain & Kini 2000, Franzke 2003), or looking at the extent of the VC's involvement (MacMillan et al. 1988, Fredriksen et al. 1992, Barney et al. 1996 and Sapienza et al. 1996). Economic performance is measured by, for example, development of certain economic figures after the venture capital investment either explicitly or implicitly by subjective estimations of venture capitalists and managers about the fulfilment of their expectations (e.g. MacMillan et al. 1989, Fredriksen et al. 1992, p. 3). Another ways to measure the economic performance has been to look at early stock returns for VC-backed versus non-VC-backed initial public offerings (e.g. Megginson & Weiss 1991), or the effects of venture capital on start-ups in terms of product development and commercialization (e.g. Hsu 2000). However, most of these studies have treated value-adding of the VC more or less like a black box without paying attention to the ways on which the VCs actually are involved in their portfolio companies.

As this cross-sectional study focuses on the value-added of the venture capitalists for the Finnish biotechnology growth companies, it is not worthwhile to take the "economic performance" approach. Fredriksen et al. (1992, p.7), for example, argue that the contribution of active VCs reflects most on the turnover and the growth in the number of employees. As discussed earlier in the section 2.1.3, most Finnish biotechnology companies are yet unprofitable, a large number of them does not even generate turnover and the initial public offerings are few. Besides, as VC investments in Finnish biotechnology companies are a fairly new phenomenon, due to the short history of the industry (Luukkonen 2006), their impact on economic figures may not yet be observed. Most researchers argue that in a few years' horizon after the investment, the influence of active VCs is reflected in non-economic development and to a much lesser degree in economic development (e.g. Fredriksen et al. 1992, p. 8, Barney et al. 1996, p. 267, MacMillan et al. 1988). In addition, as the total number of Finnish biotechnology companies is small, deeper interview surveys covering a full population are feasible, but at the same time, make the use of statistical analyses for financial data less feasible. Therefore, this study focuses more on the involvement of venture capitalist in the portfolio companies when creating value and the factors influencing how the CEOs perceive this value-adding.

Other main streams of the research on venture capital value-added have focused more on shedding light on the relationship between the venture capitalist and their portfolio companies and the forms of VC involvement in their portfolio companies. The main findings of these studies are discussed in the following chapters when the model of value adding is built block by block, based on these earlier studies. The rest of this section is structured as follows: chapter 3.2 focuses on the different value-adding mechanisms that venture capitalists use and in chapter 3.3 the factors influencing the value-added are studied more deeply. Finally, chapter 3.4 concludes the value-adding model.

3.2 The Value-Adding Mechanisms of the Venture Capitalists

Literature on value-adding identifies vast number of mechanisms by which venture capitalist add value to investee firms. In this study, these are divided into four categories similarly as Bertoni & Colombo (2005), namely screening, governance, signalling and non-financial support. Each of them is described more in the following chapters.

3.2.1 Screening the Most Promising Investment Opportunities

Since venture capitalists select the most promising ventures in their investment portfolio, they are commonly known to benefit the economy. However, this study argues that this screening function is also valuable for the investee companies in two ways: explicitly, through a thorough evaluation and implicitly through signalling to companies what they are expected to improve in order to be ‘investable’ in the eyes of the venture capital financiers.

To fully understand the value-adding potential of the screening function, it is important first to shed some light on the process itself. The screening function of venture capitalists derives from their ability to reduce ex-ante asymmetries in information as the venture capitalists are putting substantial effort in selecting the most promising ventures among a vast number of investment proposals (Bertoni & Colombo 2005, p.3–5). This pre-investment screening process includes the following steps: searching for attractive deals, a deep analysis of the deals including the due diligence process, selecting deals as potential investments and structuring and negotiating of deals (Nathusius 2002, p. 8).

Even though the extensive screening by venture capitalists is without a doubt useful for the economy as a whole, this extensive evaluation is valuable for all the companies going through the process. The ones getting positive investment decision receive a signal that they are developing their business in the right direction. Whereas the ones that get a negative investment decision, will learn why their investment proposal was not good enough and, therefore, they receive valuable information about the areas needing improvements in order to become more attractive in the eyes of the investors.

In addition, in this study, the venture capitalists are suggested to, in a sense, add value implicitly during the pre-investment screening process. In order to get financing from venture capitalist, a company must fulfil certain investment criteria, which naturally vary somewhat according to the investment strategy of the venture capitalist. These investment criteria are commonly built on a desirable combination of the following blocks: background and experience of founders, competence of management team, characteristics of markets, level of technology and business plan (Lauriala 2004, pp. 29–32). Therefore, if a company develops its operations, business plan or resources merely in order to make the company more attractive to a venture capitalist, this development can be seen as a merit of the venture capitalist. Hence,

in a way, the venture capitalist adds implicitly value to an investee company before making a capital investment.

As this study tackles the research problem from the investee company point of view, this part of value-adding by venture capitalist is unavoidably studied incompletely, since it examines only one side of the coin. To get more accurate data and understanding of the screening and due diligence process, the venture capitalists should be interviewed. However, this could not be done for this study. In addition, this study does not focus on the companies that have not received venture capital finance meaning that the implicit form of value-adding through screening function is left unexplored.

3.2.2 Monitoring the Portfolio Company

The second main stream of value-adding studies focuses on the governance and monitoring performed by the venture capitalists in their target companies. Pioneering studies on the VC governance were introduced late 1980s and early 1990s by Barney et al. (1989) and Sahlman (1990). Since then, this area has attracted researchers rather widely (e.g. Megginson & Weiss 1991, Sapienza & Gupta 1994, Gompers 1995, Sapienza et al. 1996, Fredriksen & Klofsten 2001, Gompers & Lerner 2004). The main interest has been to study the conditions, for example characteristics of both investee company and VC fund, under which VCs monitor their portfolio companies more intensively and the mechanisms used in the monitoring. This chapter concludes the main findings of these studies in terms of the value-added that the monitoring of the VCs brings to the investee companies.

After making the investment decision, venture capitalists face a problem of how best to structure the financing to protect their own interests, while simultaneously enhancing the likelihood that the investee firm will succeed (Barney et al. 1989, p. 64). However, the success or failure of a company depends on the effort and skill of the people involved as well as on certain factors outside their control, which are all difficult to predict beforehand (Sahlman 1990, p. 506). In the venture capital industry, environment is characterized by a high degree of information asymmetry between venture capitalists and managers (Sahlman 1990, p. 517–518) as the venture capitalists and the management teams are likely to have different information about and objectives for the future of the firm. For example, entrepreneurs might make decisions that are not fully known by VCs because of the information disadvantage of the latter (Fredriksen & Klofsten 2001, p. 204) and are inconsistent with the wealth maximising interest of the venture capitalist (Barney et al. 1989, p. 64). These, so called, agency risks and the business risks associated with new investee companies (especially in high technology industries) force the venture capitalists to monitor the investee company's development in several ways after the investment (Nathusius 2002, p. 11).

Venture capitalists tackle these risks through corporate governance. According to Brealey & Myers (2000, p. 976), the term 'corporate governance' generally covers all the mechanisms

by which managers are led to act in the interest of the corporation's owners. The corporate governance mechanisms used by VCs is, besides screening, a function that is usually more highly valued by stakeholders other than the investee firm, especially owners. However, at best, this function may be of great importance for the ventures as well. For a small, privately-held growth-oriented company, adopting proper systems for corporate governance reduces information asymmetries (Bertoni & Colombo 2005, p.6) and, thus, makes the company more transparent not only to its current stakeholders, but also to the wider financial community. If the company aims at becoming publicly-held, the management team has to learn and practise the normal corporate governance procedures which are in that case a statutory requirement (Nathusius 2002, p. 11). In addition, VCs are even found to be able to lower the costs of going public by reducing the information asymmetries between the firm and the investors (Megginson & Weiss 1991, p. 901). Introducing sound corporate governance procedures is useful, if not even essential; no matter whether the next step of development of the investee company is an initial public offering, a trade sale or even further round of venture capital financing. Barney et al. (1989, p. 68) suggests that the managers are able to work on less costly venture capital, i.e. retaining higher percentages of their equity and maintaining control over more seats on their boards, if they aim at reducing the business risks and agency risks associated with investing in their firm. Therefore, companies that are unable to obtain venture capital, or find it too costly, should try to reduce the risks associated with the investment.

Venture capitalists use one or all of the following mechanisms to mitigate risks associated with the investment: employ screening mechanisms, syndicate their investments with other investors, take care of contractual arrangements agreed upon during the closing and signing of the investment deal, sit in the board of directors, measuring accurately and timely the performance of the firm, implement incentives to exit, stage their investment and provide active monitoring (e.g. Nathusius 2002, p. 11, Sahlman 1990, p. 506). When implementing these mechanisms VCs have a critical role in generating information about the firm's prospects (Gompers & Lerner 2004, p. 160).

Contractual Arrangements

In a business environment that is characterised by high levels of uncertainty it is impossible to structure state-contingent contracts that would be able to solve any potential agency cost. However, certain ways to form contracts between venture capitalists and entrepreneurs have evolved to minimize the potential agency costs associated with high-risk and high-return projects (Gompers 1995, p. 1485). The aim of contracting is to shift risk from venture capitalist to the entrepreneur (Sahlman 1990, p. 510) and keeping management "under pressure" giving it correct incentives to exert effort. (Bertoni & Colombo 2005, p.6). This is done by forming such contract terms that entrepreneurs will accept them only if they are truly confident of their own abilities and deeply committed to the venture (Sahlman 1990, p. 510). Management is motivated by including appropriate incentives in the contracts, e.g., performance-sensitive remuneration, covenants and convertible securities (Bertoni & Colombo 2005, p.6).

The contractual arrangements usually consist of covenants, shareholder rights, ‘milestone’ agreements (Nathusius 2002, p. 13), and clauses of exit (Bertoni & Colombo 2005, p. 9). Covenants protect VCs’ interest and they cover, for example, protection of IPR or other assets, balance sheet oriented ratios, dividend payments and uses of available cash (ibid.). By contracting VCs usually acquire a decision power on specific issues that is more than proportional to their stake in the company (Bertoni & Colombo 2005, p. 9). VCs usually claim special rights of a preferred shareholder, such as option to claim a seat on the board, approval of the financial reports or business plan, changes in financial structure, issue of new shares and changes in the company’s portfolio of activities (Nathusius 2002, p.4).

In addition, the contract usually includes mechanisms to make the investments liquid. (Sahlman 1990, p. 506), and some special clauses about exit, for example, ‘tag along’ and ‘right of first refusal’ (Bertoni & Colombo 2005, p. 9). The former giving the VC the right to sell its stake, in case the entrepreneur does, at the same price and to the same investors, and the latter giving the VC the pre-emption on any transaction between current shareholders and new shareholders (ibid.). Finally, the contracts may include milestones, which are used as indicators for initiating new rounds of financing. Possible milestones are, for example, the attainment of certain level of sales or a key stage in the product development schedule (Nathusius 2002, p. 14).

Monitoring Financial and Operational Performance

One of the most important monitoring tasks of the VC is to ensure that the investee company implements effective reporting systems, as high-quality and up-to-date financial information is the main tool for establishing and maintaining the transparency required by investors (Nathusius 2002, p. 12). Financial information is further emphasized in the case of high-tech companies that are complex and dynamic by nature.

Although, the major review of progress and due-diligence is generally done at the time of refinancing when the decision whether or not to continue funding is made (Gompers 1995, pp. 1464–1465), the VCs monitor the performance regularly between the financing rounds. The management of the investee company is required to provide regular status information, forecasts and analyses of certain phenomena on timely basis. The VCs analyze the reported information and may check performance against competing companies in the same market segment. (Nathusius 2002, p. 11).

Seat in the Board of Directors

The roles of the venture capitalist on the board of directors includes besides providing advices also monitoring (Gompers & Lerner 2004, p. 166). Sitting in the board of directors enables the VCs to analyze and discuss the financial and management information

with the managers and to ensure that the managers are fulfilling their covenanted obligations (Nathusius 2002, p. 13).

Sometimes venture capitalists appoint a nominee to represent them in the firm's board. The role of these outside directors is to oversee that the funds are used in compliance with the business plan and to inform the venture capital company about the progress of their portfolio company (Rasila 2004, p. 79). One reason for this may be the fact that the venture capitalist prefers to separate the responsibilities of being a member of the board of directors and adding-value through active involvement in other ways. By law, as a member of the board of directors, the venture capitalist is obliged to safeguard the interests of all the stakeholders, and not just those of the venture capital fund (Nathusius 2002, p. 14).

In their study on 271 biotechnology firms, Gompers & Lerner (2004, pp. 241–243) found that the venture capitalists with offices within five miles of the firm were twice as likely to be board members as those with offices more than 500 miles distant. In addition, Sapienza et al. (1996, p. 460) indicated that a geographical distance between a venture capitalist and its portfolio company reduces the frequency of personal contacts. To generalize these research findings, one might suggest that proximity to the investee company promotes monitoring and value-adding of the VC. Nevertheless, there are plenty of other ways to be in contact with the management of the portfolio companies without direct personal contact, e.g. telephone or video meetings and e-mail to name only few.

The extent of involvement itself has been measured usually by the amount of interactions between the VC and management team (e.g. Sapienza et al. 1993). In their in-depth research on the relationship between venture capitalists and their portfolio companies Gorman & Sahlman (1989, p. 235) measured the time spent in direct and indirect contacts as well as the annual number of contacts. Their results indicate that between financing rounds the lead venture capitalist visit the entrepreneur once or twice a month and during each visit spends about five hours in the facility (ibid.). MacMillan et al. (1988, p.31) in turn asked the respondents to estimate the level of involvement of the venture capitalist in terms of their contribution to the activity compared to the contribution of the management team on twenty activities.

In summary, the studies discussed in previous paragraphs suggest that venture capitalists provide value-added to their portfolio companies through monitoring and corporate governance. Reducing the risks associated with investing in new high-technology companies, these actions of the VCs are useful for the portfolio companies especially when acquiring additional finance or selling the company. The monitoring of the VCs takes variety of forms, for example contracting and staging, and the implementation is usually vested in the role of the VC in the board of directors and other direct contacts with the portfolio companies.

3.2.3 Signalling about the Firm's Quality

Venture capitalists with a record of backing successful companies have a highly positive image that could be advantageous for their portfolio companies as well (Nathusius 2002, p. 104). Receiving financing from such venture capitalists gives a signal of firm's high quality to its stakeholders, for example other financiers, human resources (e.g. potential employees), customers, suppliers, and other business contacts (Bertoni & Colombo 2005, p.5). According to Maula (2001, p. 123) the endorsement benefits that VCs may implicitly provide consist of all the help the association with a VC brings in the form of increased legitimacy when attracting new investors, employees, partners, and customers.

Signaling is closely related to venture capitalists' function as a provider of contact networks. Besides providing the contact, venture capitalists may convince the stakeholders about the capabilities of the company and the management. For example, since start-up companies often have low credibility with potential customers, a meeting with VC can help to convince potential customers about the capabilities of the start-up (Nathusius 2002, p. 104). The reasons given by an objective professional, a venture capitalist, for investing in the company and believing its success, may shift doubt to confidence and courage a potential partner to co-operate (Timmons & Sapienza 1992, p. 37). Steier & Greenwood (1995, p. 352) argue that sometimes having a successful venture capital investor may even supersede business plans in attracting investors. Similarly, the positive image of the VC may also encourage potential managers to join the company (Nathusius 2002, p. 104).

The signaling role of venture capitalists has been widely studied in the context of initial public offerings (e.g., Megginson & Weiss 1991, Cumming & MacIntosh). Megginson & Weiss (1991, pp. 900–901) among others indicate that having successful venture capitalists investing their financial and reputational capital in the offering firm certifies the quality of the issue. Especially, if the VCs are major shareholders prior to the IPO and retain significant proportions of their holdings after the offer, is the power of the certification enhanced (Megginson & Weiss 1991, p. 880) because ownership retention after the IPO constitutes a credible signal that the quality of the investee firm is high (Cumming & MacIntosh 2003, p. 544). Therefore, Cumming & MacIntosh (2003, p. 544) suggest that VCs can maximize the overall proceeds of the IPO by initially exiting only partially, especially if the information asymmetry between the selling VC and the buyer is high.

Denis (2004, pp.306–307), mainly focusing on the signaling effects of VC on raising additional finance, distinguishes three prerequisites for effective certification. First of all, the VC must have reputational capital at stake that will be damaged if the certification turns out to be false. Second, the value of the VC's reputational capital must exceed the largest one-time gain from a false certification and, finally, the investee company

must face a cost from losing the VC's reputation that is increasing in the uncertainty regarding the value of the investee. (ibid.) An interesting finding of Maula (2001, p. 170) was that young ventures seemed to benefit the endorsement of their corporate VC the most.

3.2.4 Non-Financial Support

One of the most common ways to study the value-added has been to examine the involvement of the lead investor in different roles or dimensions of the business in developing their portfolio companies. The added-value is then analyzed on the grounds of either the versatility/range of the roles (Harrison & Mason 1996) or the subjective perception of degree (MacMillan et al. 1988, Erlich et al. 1994), effectiveness (Sapienza 1992, Sapienza et al. 1996, Timmons & Sapienza 1992), importance (Gorman & Sahlman 1989, Sapienza 1992, Timmons & Sapienza 1992, Sapienza et al. 1996) or helpfulness (Harrison & Mason 1996) of the lead investor's involvement in these roles. Both the entrepreneurs and the venture capitalists have been interviewed and some studies have also analysed the differences between the answers of these two groups.

In their commonly referred studies, Harry Sapienza and his colleagues examined (e.g. Sapienza 1992, Timmons & Sapienza 1992, Sapienza et al. 1994 & 1996) eight key roles performed by venture capitalist in value creation. They divided the roles into three categories: strategic (sounding board, business consultant, and financier), social and supportive (coach/mentor and friend/confidant) and networking roles (management recruiter, professional contact and industry contact).

Timmons & Sapienza (1992, p. 38) interviewed 120 entrepreneurs and venture capitalists from the U.S. on their view of the effectiveness and importance of these eight roles of the VCs in developing the company. Timmons & Sapienza (1992, p.39) found out that the most important roles were the strategic roles, especially 'sounding board' and 'business consultant'. The perceptions of importance and effectiveness by both the entrepreneurs and the venture capitalists were surprisingly similar, even though the venture capitalists regarded almost every role as somewhat more important than the entrepreneurs. Timmons & Sapienza (1992, 39) further analyzed the results concerning early stage and later stage companies separately. The main finding was that the importance of the venture capitalist's involvement in most of the roles was reduced as the company matured. Especially the roles of financier, management recruiter and provider of contacts were more important for early-stage companies than for later-stage companies. The early-stage companies also evaluated the effectiveness of the venture capitalist in implementing the roles of professional contact, industrial contact, business consultant, and coach/mentor more highly than the later-stage companies did. (ibid., p39). These results prove that venture capitalists are very important financiers and providers of managerial assistance for early-stage companies, which usually have less resources and busi-

ness experience compared to the later stage companies. For example, the contacts that the venture capitalists provide are likely to be of great importance to early-stage companies for which all the customers are vital. Typically the contacts provided by the venture capitalist are used to acquire customers, suppliers and partners, when the company is yet unknown in the market (Nathusius 2002).

Sapienza et al. (1996)¹ studied 221 venture capitalists from France, the Netherlands, UK and the USA using the same method as in their earlier research (Timmons & Sapienza 1992, Sapienza 1992, Sapienza et al. 1994). Sapienza et al (1996, p. 458) found no remarkable inconsistencies across all four countries in regards to the value added through these eight roles. The strategic roles were found out to add most and the networking roles least value, when measured by weighing the perceived effectiveness of the investor's involvement by its perceived importance. This supports the earlier results by Sapienza and his colleagues. A conclusion from three studies on the eight roles of the venture capitalist is that the roles perceived as the most value-adding are in strategic management, and the least value-adding at a more operational level, e.g. providing contacts or recruiting managers. However, the results indicate that social and interpersonal roles are a significant element in these partnerships (Sapienza et al. 1996). In other words, motivating and sparring the management team and being a friend to the VC were valued more highly than providing a contact network, which has commonly been emphasized by venture capitalist (Sapienza et al. 1994, p. 15).

The involvement of venture capitalists in different activities of the business has been of interest to other researchers as well (e.g. MacMillan et al. 1988, Gorman & Sahlman 1989, Harrison & Mason 1992, Erlich et al. (1994), Fried & Hisrich 1995). In most studies, the range of the VC involvement is simply examined without drawing attention, whether the portfolio companies find these roles useful. The findings of the studies are summarized in the Table 2 and Table 3.

¹ Sapienza et al. (1996) combines the data from the U.S reported also in .Sapienza (1992) and Timmons & Sapienza (1992), and data from three European countries reported also in Sapienza et al. (1994).

Table 2: Activities with most venture capital involvement

Researcher(s) (year)	Respondents	Activities/Dimensions with most VC involvement
MacMillan et al. (1988)	62 venture capitalists in the USA	Serving as sounding board to entrepreneur team Obtaining alternative sources of equity financing Interfacing with the investor group Monitoring financial performance Monitoring operational performance
Gorman & Sahlman (1989)	49 venture capitalists	Help obtaining additional financing Strategic planning Management recruitment Operational planning Resolve compensation issues Introductions to potential customers and suppliers
Timmons & Sapienza (1992)	120 entrepreneur-lead investor pairs	Sounding Board Business Consultant Financier Coach/Mentor Friend/Confidant Management Recruiter Professional Contact Industry Contact
Harrison & Mason (1992)	36 informal investor backed companies in the UK	Development of new business strategy Serving as sounding board to the management team Monitoring financial performance Monitoring operating performance Development of marketing plan Interface with other members of the investor group Evaluation of marketing plan Evaluation of product/market opportunities Assistance on short term crisis/problems Development of actual products/services Help in obtaining other sources of equity financing Motivating personnel Providing contacts with customers Development of original business strategy Replacement of members of management team Development of product/service techniques

Table 3: Activities with most venture capital involvement (continued)

Researcher(s) (year)	Respondents	Activities/Dimensions with most VC involvement
Harrison & Mason (1992)	156 venture capital fund backed companies in the UK	Monitoring financial performance Serving as sounding board to the management team Monitoring operating performance Assistance on short term crisis/problem Development of new business strategy Interface with other members of the investor group Evaluation of marketing plan
Fredriksen et al. (1992)	59 managers of VC-backed companies and 34 venture capitalists	Investments Goals Business development Partners Job situation of manager Staffing Economic control Markets and products Production Technology
Erlich et al. (1994)	VC-backed companies (N=47 together with private investor backed companies)	Interfacing with the investor group Obtaining alternative sources of equity financing Monitoring financial performance Serving as sounding board to entrepreneur team Monitoring operating performance Formulating business strategy
Erlich et al. (1994)	Informal investor backed companies (N=47 together with VC-backed companies)	Interfacing with the investor group Monitoring financial performance Serving as sounding board to entrepreneur team Formulating business strategy Monitoring operating performance Obtaining alternative sources of equity financing
Fried & Hisrich (1995)	14 manager-VC pairs in the USA	Evaluating and replacement of management Monitoring the firm performance Promoting reporting Providing networks Improving the company image Proving moral support Proving general business knowledge Arranging financing Arranging corporate partnerships or acquisitions Selecting of top management

According to the studies depicted in the Tables 2 and 3, the venture capitalists have been involved in the portfolio companies in numerous different dimensions of business besides the eight roles discussed earlier. The studies do not usually define these roles or dimensions of involvement clearly which makes the comparison difficult. Some of the roles in one study may include variety of functions studied separately in another. In ad-

dition, each of the areas may include a variety of forms of assistance. For example, a venture capitalist that is involved in management recruiting, may contribute explicitly to the finding of potential managers or implicitly to the finding of proper recruitment consultants (Nathusius 2002) or even contribute to the contract negotiations with new managers (Timmons & Sapienza 1992, p. 36). However, the findings of these surveys are rather analogous emphasizing few dimensions that were supported by most of the studies: arranging financing, strategic planning, serving as sounding board, providing contacts, and monitoring performance. From the viewpoint of this study, there are interesting differences between the results, for example, when comparing the range of the involvement between informal investors and venture capitalists represented in the studies of Harrison and Mason (1992) and Erlich et al. (1994). The results of the former study indicate that informal investors are involved in substantially more activities than the venture capitalists. Therefore, Harrison & Mason (1992, p. 7) suggest that the informal investors may have a potentially higher value-added than venture capitalists in terms of the breadth of their contribution. However, this was not supported by Erlich et al. (1994, pp. 74–79) as they suggest that that VCs and informal investors seem to be most actively involved in similar sets of activities.

In the light of the studies discussed in the previous paragraphs, the job description of venture capitalists implementing the hands-on strategy seems rather diverse. One can not help wondering whether all these roles are perceived useful by the portfolio companies and whether they add value to the investee firm. In addition to Timmons & Sapienza (1992), Harrison & Mason (1992) studied the entrepreneur evaluation of the VC involvement. In their study, entrepreneurs estimated the helpfulness of the venture capitalist and informal investors according to 19 dimensions of the business on a scale from one to three (where 1 = very helpful and 3 = not helpful). For each dimension of involvement, the mean score was calculated from the answers of all respondents. Of these fourteen areas of involvement, informal venture capital-backed companies found only three helpful, that is, serving as sounding board, monitoring financial performance and assistance on short term crises/problems. In addition to these three roles, venture capital company-backed ventures found two roles helpful, namely, interfacing with other members of the investor group and monitoring operational performance. (ibid. pp. 8–10). Confirming the results of Timmons & Sapienza (1992), the study of Harrison & Mason (1992) proves that even though venture capitalists are involved in a variety of dimensions of business, their portfolio companies perceive only a small part of this involvement as useful and value-adding. In the studies of Timmons & Sapienza (1992) and Harrison & Mason (1992), serving as sounding board was actually the only form of involvement that was found useful by all the respondent groups.

One could argue that the entrepreneurs might not value the contribution of their VC in, for example, monitoring performance even though venture capitalists find it extremely important. Therefore, studies made from the perspective of the venture capitalists could provide some explanations for the active VC involvement in areas that are undervalued

by entrepreneurs. For example, MacMillan et al. (1988, p. 31) studied 62 VCs and asked the venture capitalist the degree to which they would change their involvement in 20 selected activities if they could. According to their findings, the venture capitalists are eager to increase their involvement in formulating business strategy and marketing plan, serving as a sounding board to the entrepreneurial team, replacing management personnel, monitoring operating performance, and interviewing and selecting the management team. (ibid., pp. 33–34). Except for formulation of the marketing plan, these activities were perceived as useful by CEOs of investee firms at least in one of the studies discussed in previous chapter. However, MacMillan et al. (1988, p. 34) argued that the activities in which venture capitalists would have preferred to increase their involvement were not valued very much, but rather, they proved not to require significant time commitment. By contrast, the VCs would have preferred to decrease their involvement in operational level activities, which are rather time-consuming. As the venture capitalists devote about two hours a week to the management of each of their portfolio companies (Gorman & Sahlman 1989, p. 242), it is understandable that VCs are reluctant to participate in tasks requiring continuous attention. However, according to Fried & Hisrich (1995, p. 102), both VCs and managers commonly state that VCs should not be involved in operations.

In summary, the studies discussed in this section suggest that venture capitalists add value to their portfolio companies by using a variety of mechanisms, with most common of them being arranging financing, strategic planning, serving as a sounding board, providing contacts and monitoring performance. However, not all these value adding functions are perceived as useful by the portfolio companies for one reason or another.

3.3 Factors Influencing the Perceived Value-Added

The fourth main stream of value-adding research covers the factors influencing the eventual utilization of the VC value-adding by the portfolio companies. An observation that not all the investor's involvement is perceived as useful by the management of the investee companies motivates a study into the relationship between the venture capitalist and the portfolio company. The studies focusing merely on the areas of involvement have presumed that the management teams of the portfolio companies are receptive for all the support provided by venture capitalists, and therefore have suggested that the versatility and level of the investor's involvement is the main determinant of the total value-added. However, as value-adding takes place in a dynamic environment between the VCs and the managers of the investee company, it is reasonable to presume that also other factors influence the definite value-added that the CEOs perceive their VCs to provide.

In the mid 1990's, an increasing number of value-added studies argued that not all the support provided by venture capitalists is welcomed and exploited by the investee companies for one

reason or another. Special interest was paid to the characteristics of the relationship between the venture capitalists and the managers of the portfolio companies (Fried & Hisrich 1995, Sapienza 1992), and the characteristics of the management team and of the portfolio companies (Barney et al. 1996, Sapienza 1992, Sapienza et al. 1996) influencing the definite utilization of the investor's contribution.

Barney et al. (1996) studied the reasons why some managers were more receptive than others for the non-financial assistance provided by VCs. They studied the characteristics of the early-stage companies and their management teams which influence the high valuation of the support of the VCs. The main finding by Barney et al. (1996, p. 267) was that there are systematic differences between management teams in their evaluation of the business management and operational learning assistance provided by their VCs. The success of the portfolio company was found not only to depend upon the level of the venture capitalist's involvement but also upon the extent to which the management team values the VC contribution. More precisely, Barney et al. (1996, pp. 265–267) indicate that management teams that lack experience in the venture's industry are more receptive to business management advice and operational assistance than highly experienced management teams. Operative assistance is valued more highly than business management advice specially when the tasks are complicated and uncertainty is remarkable, i.e., in companies established on the basis of a technological innovation (*ibid*). These findings confirm the common suggestion that the venture capital is especially valuable for technology oriented companies.

Fried & Hisrich (1995, p.105) in turn, argue that the impact of the venture capitalist's contribution varies with the venture capitalist's power with management of the portfolio company. They find that venture capitalists have three important sources of power in the relationship; money, personal relationship and formal power (*ibid*, pp.105–108). Share of ownership is naturally the main determinant concerning the decision-making within firms. The power of money is highly emphasized in venture capital, as the staging of the investment is a typical way to control risks (Sahlman 1990, p. 518). Fried and Hisrich (1995, pp. 105–106) indicate that power based on money is especially high, when the investee company is performing poorly, as the entrepreneur is highly dependent on the current financiers and is therefore likely to defer to the will of the investor. The power of personal relationship is based on the manager's trust and respect of the opinions of the investor. This form of power is most desirable for the co-operation between venture capitalists and managers, as it infringes less on the manager and can still be strong (*ibid*). This finding is supported by Timmons & Sapienza (1992), who suggest that openness in the communication and the compatibility of the personal chemistries are prerequisites for successful co-operation. However, in practise, the creation of respect and trust may be difficult. The third source of power defined in the study of Fried and Hisrich (1995), formal power, is based on the control of the board of directors and investment contracts. This source of power is usually avoided by VCs, as using formal power is the most problematic in terms of the co-operation and cause easily tension in the relationship. (Fried & Hisrich 1995, p. 107).

Sapienza (1992) and Sapienza et al (1996) studied the conditions under which the VCs believe that their involvement is of greatest value to their portfolio companies. In the earlier study, ten variables that were expected to impact the value of VC involvement were divided into two categories: contexts specific (stage of the venture, innovation pursued, competitive strategy, environmental uncertainty, entrepreneur's task and star-up experience and geographic distance) and VC-CEO interaction specific (frequency and openness of interaction and divergence of perspectives). The perceived value-added was found to correlate with the frequency of interactions and openness of the relationship between venture capitalist and portfolio companies, and with level of innovation (Sapienza 1992, pp. 20–21). In addition, the task experience of the CEO was found to moderately influence the value added supporting the arguments of Barney et al. (1996) discussed earlier.

In their study on four countries, Sapienza et al (1996) used quite similar independent variables as Sapienza (1992), but included also venture capitalist-specific measures (venture capitalist's VC experience and experience in the ventures industry). The results by country were somewhat inconsistent. However, they found out that venture capitalists create most value to companies which had performed well in the pre-investment stage and under circumstances when uncertainty was high (Sapienza et al. 1996, p. 461). In addition, the value-adding of venture capitalist was significant when venture capitalist had experience in the industry of the investee company. Surprisingly, the VC's experience in the venture capital industry was not found to correlate to the success of the value creation. (Sapienza et al. 1996, p. 461). Although geographical distance was found to reduce face-to-face contacts, it was not found to be related to value added (*ibid.*, pp. 460–462).

Most of the quantitative research on the level of involvement of VCs analyses the impact of involvement on the economic performance of the investee firm (e.g., Barney et al. 1996, MacMillan et al. 1988) and not on the perceived value added. Sapienza et al. (1992, p. 20) is an example of the latter, and they found a positive link between the intensity of involvement and the added-value. The study of Fredriksen et al. (1992, p. 2) can be placed in both of the categories as it examined the level of influence of venture capitalists' contribution on the economic versus non-economic development of their portfolio companies. Fifty-nine venture capital-backed companies and 34 venture capitalists were asked to rate the development of the portfolio company after the investments in ten dimensions, five of them being economic and five non-economic, and the influence of the VC on ten dimensions (see Table 2) on a seven point scale. In addition, the respondents were asked to rate the subjective outcome of the cooperation in terms of fulfilment of expectations of each party on a five point scale. Fredriksen et al. (1992, p. 8) discovered that the contribution of venture capitalists influenced the non-economic development but not so much the economic development of the investee companies. Both VCs and managers agreed upon four of the five aspects of on-economic development, namely, the motivation and work situation of the manager, managerial control and acquisition of capital (*ibid.*) According to Fredriksen et al. (1992, p.6) active venture capitalists were contributing clearly more to the acquisition of capital and economic control than passive

venture capitalists. Interestingly, the high perceived influence of the VC was not found to be related to the subjective outcome of the co-operation (ibid. p. 8).

Table 4: Summary of the research on the factors influencing the value-added

Researcher(s) (year)	Respondents	Factors influencing the value-added
Sapienza (1992)	51 lead investor-CEO pairs in the USA	The circumstances under which venture capitalist involvement value-added is high: The level of innovation pursued by the investee is high The relationship between CEO and VC is open and informal The intensity of interaction in the VC-CEO pair is high. CEO does not have long task experience
Fredriksen et al. (1992)	59 managers of VC-backed companies and 34 venture capitalists	High perceived influence of the VC is not related to the subjective outcome of the co-operation. High perceived influence of the VC is related to the following non-economic aspects of the development: the motivation and work situation of the manager of the portfolio company managerial control acquisition of capital
Fried & Hisrich (1995)	14 venture capital financed companies and their lead investors in the USA	The impact of the VC's inputs on the company varies with the VC's power with management. Sources of power Money Personal relationship Formal power
Barney et al. (1996)	205 venture capital-backed companies	The influence of the VC's non-financial assistance on the venture performance depends upon the management team's openness to learning from their VCs. Attributes of investee firms and their management team supporting the receptiveness to learning Management team lacks industry experience Management team has long experience in working together The degree of innovation is high
Sapienza et al. (1996)	221 venture capitalists from UK, France, the Netherlands and the USA.	The circumstances under which venture capitalist involvement value-added is high: The venture performance is high Uncertainty is high VC has long experience in the venture's industry

Table 4 summarizes findings of the studies discussed above. Although there is variation among the results, few attributes impacting the value added are emphasized. First of all, the previous research suggests that ventures benefit from the venture capitalist's involvement most when the relationship between the VC and the CEO of the venture is close and open. In addition, some venture characteristics are found to be related to the successful value-adding, for example, high level of innovation pursued by the venture and the lack of industry experience of the CEO.

3.4 Summary of the Framework of the Value-Adding

Concluding the findings of the previous research and relevant literature, in this section, a theoretical process model of the value-adding of the venture capitalists is built. The graphic of the model is depicted in Figure 2.

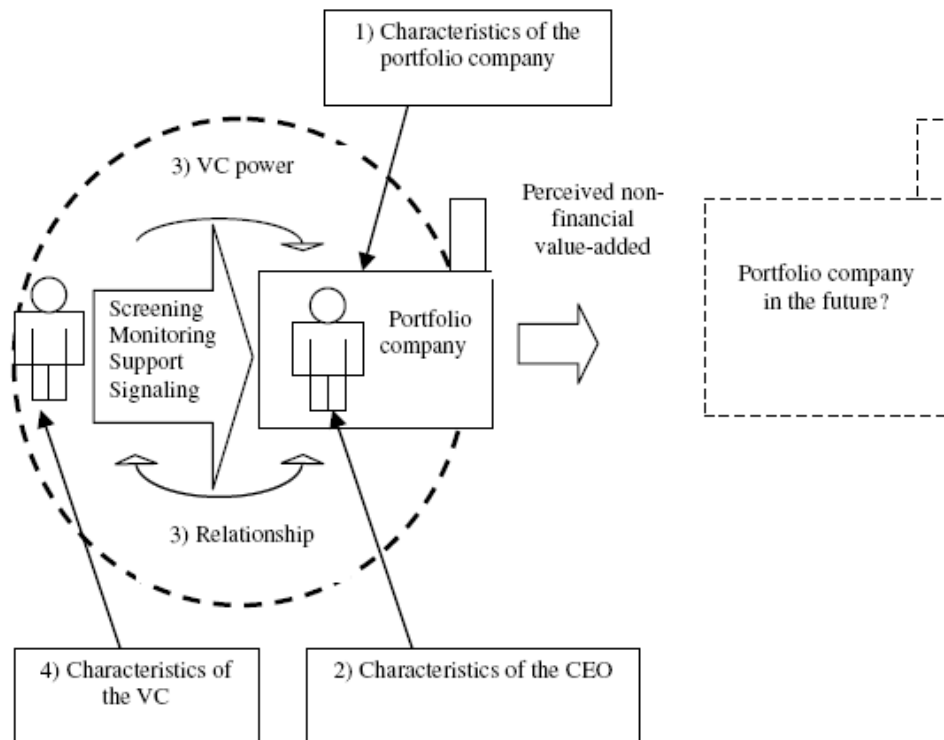


Figure 2: The model of VC value-adding

First of all, VCs are in this study suggested to provide value-adding through variety of mechanisms, namely screening, monitoring, signalling and providing non-financial support, which all include variety of aspects. Second, it is argued that the CEOs appreciate and take advantage of only portion of the contribution of their VCs. For example, the VC may be active in a variety of areas of business although the CEOs find their participation useful only in some of them. The framework built concentrates on this perceived value-added and it leaves open whether or not the value-adding of the VC can be observed with economic measures of the development of the portfolio company.

Third, the model suggest that there are several factors that influence how the CEOs perceive the value added of their VCs, which can be put in four categories, namely 1) characteristics of the portfolio company, 2) characteristics of the CEO, 3) characteristics of the relationship between the CEO and the VC and 4) characteristics of the VC. Based on previous research a few assumptions can be made. First of all, the CEOs of the companies that have high innovation intensity are assumed to perceive the value-adding of VCs as greater than companies with lower innovation intensity. These companies are

operating in an environment in which the uncertainty is great and the CEOs are assumed to value the assistance of an experienced VC. Secondly, the CEOs that do not have long experience in the industry of their companies probably perceive the VC value-added as great, as they may need advice on how to operate in this industry more than experienced CEOs. Third, an assumption is made here that the more open the relationship between the VC and the CEO and the more frequently the VC is in contact with the portfolio company, the higher is the perceived value added. In other words, if the VC provides a lot of time and effort to the company, they are more likely to contribute to the company in a way that is valued by the CEO. In addition, if the relationship is open and close, the co-operation is assumed to work better and, furthermore, the power that the VC has in the company is more likely to be based on personal respect and not on money or formal power. Moreover, concerning the characteristics of the relationship, a suggestion can be made that in cases where the active involvement of the VC has caused tensions inside the company within the history of the co-operation, the overall perceived value-added is lower. Finally, the model suggests that the involvement of the VCs that are experienced in the venture's industry would be perceived as greater than the involvement of non-experienced VCs. However, as in this study the VCs are not interviewed and we do not have enough information about the VCs, this could not be tested empirically. However, in this study, differences between private and public sector venture capital companies and informal VCs are studied.

Due to the shortage of the research in the area it is difficult to conclude, whether there are differences between the different types of VCs in their involvement in the portfolio companies. However, a few studies suggest that informal venture capitalists are implementing hands-on strategies and are more actively involved in the ventures in which they invest than the representatives of venture capital companies (cf. Harrison & Mason 1992, p. 1). Previous research also suggests that informal VCs are most of all useful for later stage companies as they usually have experience in general management and marketing (Lumme et al. 1998, p. 46). In addition, some researchers have assumed that governmental VCs provide less value-added than private sector VCs although this has not been tested empirically. For example, Seppä (2000, p. 154) argues that entrepreneurs could be better off with a more demanding and more ambitious private sector venture capitalist than with governmental VCs who can be practically seen to give money away. In their study, Sapienza et al. (1996, p. 466) consider also that governmental venture capital companies may have difficulties to attract high quality fund managers due to the poor compensation schemes of public sector organizations compared to private sector venture capital companies. In summary, the above discussion leads to an assumption that the VCs that invest their own money or whose remuneration is linked on the profits that the investment will eventually generate are more actively involved and provide more value-added to their portfolio companies.

4 METHODOLOGY AND DATA

4.1 Study Population

The companies included in this study were derived from the ETLA database of Finnish biotechnology companies. The companies in this database have been a study focus of ETLA since 2002, when ETLA started their research of managerial economics of biotechnology in Finland. The study carried out at the end of 2005 was the third ETLA survey on biotechnology industry, the earlier ones being conducted at the beginning of 2002 and at the end of 2004 (see for example Hermans et al. 2005, Hermans 2004, Hermans & Kulvik 2006, Luukkonen 2004 & 2006). The ETLA database of biotechnology companies has been updated at the time of each study.

The study population for this research was derived from ETLA database using following criteria:

1. Company is dedicated biotechnology company. To distinguish cluster companies specializing solely on, for example, distribution, import, consulting, and other support functions from dedicated biotechnology companies the Index of the Finnish Bioindustries Association was used, besides publicly available information on the companies, e.g. from the companies' Internet pages.
2. Company is currently active in the biotechnology sector, and not, for example, only raising royalty payments.
3. Company was founded in 1986 or later.
4. Company is a genuine SME, i.e. had less than 250 employees and turnover was no more than € 50 million or balance sheet total did not exceed € 43 million. In addition, a company had to be an autonomous enterprise, i.e. not part of a larger grouping.
5. A company had received venture capital financing from either a venture capital fund or an informal investor (BA).

As some of the companies in the database had not participated in earlier ETLA surveys, their suitability for this study was not known. In these cases, their suitability was checked and a company was later removed from the study population, if all of the criteria discussed above were not fulfilled. Besides the ETLA database, also other sources of secondary information, such as the Register of the National Board of Patents and Registration of Finland and the home pages of the companies in the Internet, were used when identifying companies for this study population. All the companies fulfilling the first

four criteria were contacted for information collection, which ensures that all the venture capital backed companies were identified. However, to be included in the population and analysis of this study, the companies also needed to fulfill the final criteria.

Finally, using these methods, overall 47 companies that had had VC financiers within the last three years were identified, and 46 of them were willing to participate in the study. Of these 46 companies, four announced that their investor had already exited from their investments via trade sale within the last three years, and four were publicly listed companies. Therefore, the final study population consisted of 39 privately-held VC-backed dedicated biotechnology companies of which 38 participated in the study. The response rate was as high as 98 %, and therefore the data can be considered to cover the whole study population. Table 5 summarizes the response pattern of the study.

Table 5: Response pattern in the survey

	Number of companies	Percentage
Total number of dedicated biotechnology companies that had received VC funding within three years	47	
- Company that venture capitalist have exited within last three years	4	
- Publicly held company that have VCs as shareholders	4	
Study population: Privately-held VC-backed companies	39	100 %
Total number of companies interviewed	38	98 %

The study population has two characteristics which needed to be taken into consideration when planning the approach and methods for empirical research. The first is that the number of companies in the study population is small, which means that the whole population had to be contacted and the response rate needed to be high in order to get reliable results. However, the rather small amount of cases would allow the use of more time and resource consuming data collecting techniques. The second characteristic is that Finnish biotechnology industry has attracted high public interest during the last few years, and the companies had been frequently contacted by researchers both from private and public sector. This meant that, in order to get the response rate high, time and effort needed from the respondents had to be as small as possible.

Finally, telephone interview was evaluated as the most proper technique to gather data, because it provided personal contact with interviewees and allowed flexibility to re-schedule the appointed interview time even in the last minute, which was highly valued by busy CEOs. Besides, personal contacts enabled the interviewees to complement the responses with valuable comments on topic in order to gain broader comprehension of the phenomenon.

4.2 Interview process and questionnaire

ETLA database provided basic characteristics of the companies that took part in the survey in 2004. Therefore, the basic information needed to be collected only of the companies that had not responded in previous study. As the involvement of venture capitalists in Finnish biotechnology companies has not been studied before, data on this specific topic needed to be collected from all companies in study population.

Although the data was collected via telephone interviews, a semi-structured questionnaire was used as a survey instrument. Having open questions among the structured ones enabled interviewees to give responses using their own terms, which were valuable for a deeper understanding of the relationship. Therefore, the data collected were rather qualitative even though it included quantitative measures, too. The most important and complicated questions were sent to the interviewees beforehand to make the interview itself as effective as possible.

The questions were derived from the theoretical model created on the basis of earlier empirical studies and literature review (see Chapter 3). The questionnaire included themes and questions that were not relevant for this study because the aim of the survey was broader and it was a continuation of ETLA studies on biotechnology industry. When building the questionnaire, opinions were asked from several experts¹. Finally, the questionnaire was pre-tested in one personal interview with a CEO of a biotechnology company.

In most of the cases was the current CEO of the investee firm interviewed. In three companies the CEO had recently changed, and the ex-CEO was therefore interviewed, and in few cases, was the interviewee other manager or founder. However, in all companies, the person who was evaluated by the company to have the longest experience on the co-operation with their venture capitalists was interviewed.

4.3 Statistical Methods

In this study, the analyses of the empirical results aim at describing the current state of the value-adding of the venture capitalists in Finnish biotechnology companies. Therefore, this study mostly uses basic statistical methods, such as cross-tabulations. Because the data were collected of the whole study population, probability calculations and statistical tests used in sampling studies were not needed in the analysis (Heikkilä 2005,

¹ The author wishes to thank the Venture Fun participants Prof. Massimo Colombo and Dr. Fabio Bertoni, and Prof. Asko Miettinen, Dr. Marko Seppä, Prof. Markku Maula, Dr. Raine Hermans, Dr. Martti Kulvik and Antti-Jussi Tahvanainen for their valuable comments.

p. 34). Moreover, even if the responses of the same CEOs in another study would differ from the ones given for this survey it could not be predicted by any statistical methods.

In addition, the small amount of companies in the population ($N < 40$) restricts the use of some of the basic statistical tests for finding causalities between different factors. For, example, the use of χ^2 -test, which is used to test interdependencies between two nominal scale variables, such as different types of VCs in this study, requires five responses within each cell in a cross-tabulation and at least 40 cases in the study sample (Metsämuuroinen 2003, pp. 293–296, Heikkilä 2005, p. 213). This limitation would often require the banding of the VC types in fewer than three categories, which would, however, be unreasonable for the nature of this study. Within these limitations, the analysis of the empirical results does not enable predicting the future variation of the variables. However, the χ^2 -test is used in the analysis whenever the requirements are met.

4.3.1 Regression Analysis

In order to find out, which factors influence how the CEOs perceive the value-added of venture capitalists a multivariate statistical method was used. Altogether four OLS regressions were performed using five to seven independent variables and zero to one control variables against the perceived value added measure. The regressions were performed on the whole study population ($N=38$). Table 6 summarizes the dependent, independent and control variables used in the four models constructed. Detailed descriptions of the variable construction included in the regression models are contained in Appendix 1.

Table 6: Variables used in the OLS regression models

Dependent Variable		Values	Expected sign. of correlation
Y_{PVA}	Perceived Value Added	1=Absolutely insignificant, 2 = Rather insignificant, 3 = Neither insignificant nor important, 4 = Rather important, 5 = Very important	
Independent Variables			
X_1	R&D-intensity of Venture	The share of R&D expenses of total expenses	+
X_2	Stage of Venture (dummy)	0=Early stage, 1=Later Stage	-
X_3	Size of Venture	Number of employees	-
X_4	Industry Experience of the CEO	Number of years in the industry of the company	-
X_5	Perceived Closeness of the Relationship	1 = Very distant, 2 = Rather distant, 3 = Neither distant nor close, 4 = Rather close, 5 = Very close	+
X_6	Level of VC Involvement	4=Daily or almost daily, 3=Max. three times in a week, 2=Max. once a week, 1=Max. once a month	+
X_7	Tensions (dummy)	1=VC involvement has caused tensions inside the company, 0=No tensions	-
X_8	Informal VC (dummy)	1=Informal VC, 0=Other VCs	?
X_9	Public Sector VC (dummy)	1=Public Sector VC, 0=Other VCs	?
Control Variables			
C_1	Drug Discovery Company (dummy)	1=Drug Discovery, 0=Other	+

The models tested the assumptions derived from the theoretical framework. The first model tested the results of previous research on factors influencing the value-added in the context of this study. In previous research, the value-added was found high, when the uncertainty is high, the CEO has short experience in the industry of the venture, the relationship between the VC and the CEO is open and informal and the intensity of interaction between the VC and the investee company is high (Sapienza 1992, Sapienza et al. 1996, Barney et al. 1996, Friend & Hisrich 1995, see Table 4).

The three other models included other variables and compared their suitability in predicting the perceived value-added. First of all, the second and the third models tested, whether the VC type influenced the perceived value-added with two dummy variables. Secondly, the models tested whether the number of employees would explain the overall perceived value-added. The assumption was that companies that have more human resources in-house would not need the help of the VCs as much as the companies with fewer employees. In addition, these models include a control variable to test whether the companies that were active in the drug discovery would perceive the value-adding more

high than the companies that were operating in more less difficult industries. In fourth model, the aim was to test whether the tensions caused by the active involvement of the VCs, would explain the overall value-added that the CEOs perceive. The results of the regression analysis are discussed in Chapter 5.2.

However, before making conclusion based on the results of the OLS regressions, it is important to shed light on the assumptions that the multivariate regression method is based on. The limitations of the use of regression analysis in this study are discussed in Appendix 2, where the reliability and validity of the results used are analyzed.

5 RESULTS

This chapter presents the empirical results from the statistical analyses. The first section aims at providing information of the companies included in this study population as well as of the involvement of the venture capitalists in these firms. The purpose of the second section is to give an overview of the factors that influence how the CEOs perceive the value-added of the venture capitalists.

5.1 Descriptive Analysis of the Involvement of the Venture Capitalists

This chapter illuminates the first and fourth specific research question of this study (see chapter 1.2), namely

1. What value-adding mechanisms do the venture capital investors use in developing the portfolio companies?
2. Does the involvement differ by type of venture capital investor?

5.1.1 Firms in the Study Population

Table 7 shows descriptive statistics of the characteristics of the investee companies. The population included only three medium-sized companies, while the others were micro or small-sized. Most of the companies were found to be active in more than one industry application segments, usually providing different types of services besides developing own products.

Table 7: Description of the firms in the study population.

	N	%	Minimum	Maximum	Mean	Median	Std. Deviation
Company Age			0	18	7,5	7,5	4,38
1-5	17	45 %					
6-10	13	34 %					
11-15	5	13 %					
15-20	3	8 %					
Number of Employees			1	80	15,9	11	17,26
Less than 10	17	45 %					
10-49	18	47 %					
50-250	3	8 %					
Industry application segments (not exclusive categories)							
Drug Discovery	18	47 %					
Diagnostics	9	24 %					
Biomaterials	9	24 %					
Services	27	71 %					
Other	33	87 %					

A typical respondent in this study was a CEO that had not background as a researcher in biotechnology fields, but had been involved in biotechnology industry for 13.5 years and had eight years of experience in management (Table 8).

Table 8: Characteristics of the CEOs of firms in the study population (N=38).

CEO Characteristics	N	%	Minimum	Maximum	Mean	Median	Std. Deviation
Research background	18	47 %	0	1	0,47	0	0,51
Years of Industry Experience			0	42	14,34	13,5	10,08
1-5	11	29 %					
6-10	6	16 %					
More than 10	21	55 %					
Years of Management Experience			0,5	41	10,11	8	8,26
1-5	12	32 %					
6-10	12	32 %					
More than 10	14	37 %					

Table 9 shows statistics of the venture capital ownership in the companies in the study population. A typical company in the population had received the first VC investment four years ago and obtained, so far, two rounds of VC financing. Currently, it had one VC investor and 34 % of its shares were held by venture capitalists.

Table 9: Characteristics of venture capital ownership in the firms in the study population (N=38)

	N	%	Minimum	Maximum	Mean	Median	Std. Deviation
Type of Lead Investor							
Informal VC	11	29 %					
Public Sector VC	14	37 %					
Private Sector VC	13	34 %					
Number of Rounds of VC Finance			1	6	2,5	2	1,22
1	7	18 %					
2	15	39 %					
3	9	24 %					
More than 4	7	18 %					
Years Since First VC investment			0	18	7,8	4	3,75
Less than 3	11	29 %					
3-5	14	37 %					
More than 5	12	32 %					
Missing	1	3 %					
Current Number of VC Investors			1	6	2,0	1	1,39
1	20	53 %					
2	9	24 %					
3	2	5 %					
4 or more	7	19 %					
Current Share of total VC Ownership			10	100	44,8	34	25,45
1-25	10	26 %					
26-50	15	39 %					
51-100	12	32 %					
Missing	1	3 %					

In this study, the study focus is on the involvement of the lead investor of each biotechnology company. The question of lead investor was found rather difficult as in many cases the CEOs indicated that they did not have a specific lead investor, i.e. a firm or an individual that organizes a round of financing. Therefore, later in this study, the lead investor¹ could also be a venture capitalist that was holding the biggest ownership share of all venture capitalists even though he/she had not organized a financing round, i.e., in terms of this study, also an informal investor. In few cases, where no lead was identified and two VCs had equal ownership shares, the involvement of the more active of the VCs was discussed.

In addition, identifying informal venture capitalists from private sector venture companies was found rather challenging as some of the informal investors were investing via a company, and, nevertheless, were labeled business angels by the CEOs of their portfolio companies. Referring to the definitions discussed in chapter 2.2.5, five corporate business angels, i.e. business angels investing via a company were identified, and in four

¹ In this study lead investor was defined as the firm or individual that organizes a round of financing, and /or contributes the largest amount of capital to the deal. In this study a business angel can also be a lead investor.

companies, they were acting as lead investors (Table 12). Additionally, the group of Finnish private sector venture capital companies consisted of nine companies that were members of Finnish Venture Capital Association and eleven smaller dedicated venture capital companies. Figure 3 shows the total number of VC ownerships (i.e. one biotechnology company may have one or more VCs, and one VC may have one or more portfolio companies in biotechnology sector) in Finnish biotechnology companies.

Figure 3 indicates that private sector venture capitalists are the most important providers of venture capital to Finnish biotechnology companies in terms of number of investments. Table 10 shows the venture capital investors holding shares in Finnish biotechnology companies included in this study at the end of 2005. Sitra, a public sector venture capital organization, and Bio Fund Management Oy, a private sector venture capital company, were found to be the most active venture capitalists in the industry.

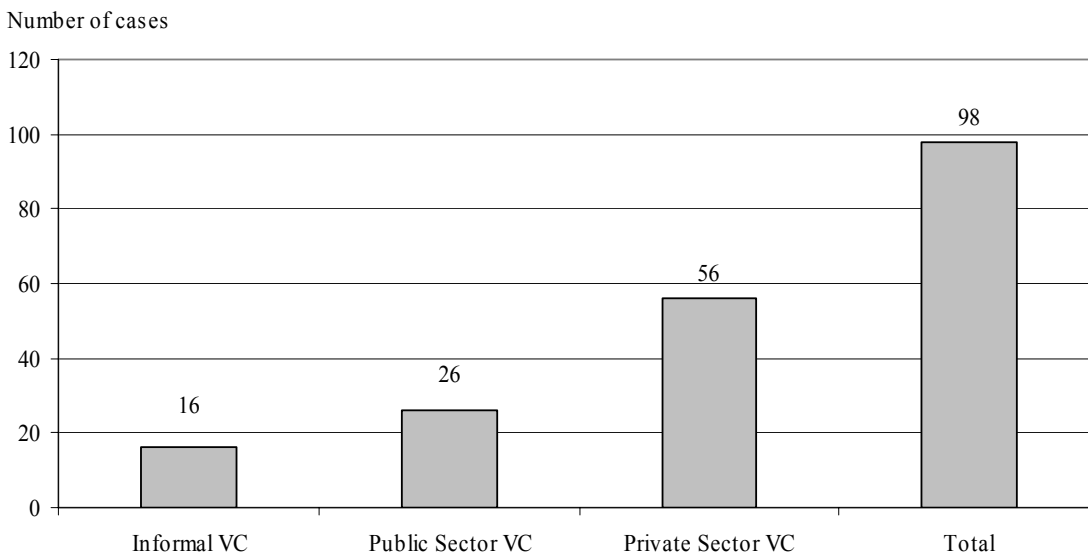


Figure 3: Total number of VC owners in privately and publicly held Finnish biotechnology companies (N=42) by VC type in December 2005.

Note: Here one biotechnology company may have one or more VCs as owners, and one VC may have one or more portfolio companies in biotechnology sector.

Table 10: Venture capital investors in Finnish biotechnology companies (N=42) in the end of 2005.

Informal VCs	
Business angels investing “from their own pockets”	
Business angels investing via a non-financial company	
Public Sector VCs	
Finnish National Fund for Research and Development (Si- tra)	The University of Helsinki Funds
Finnish Industry Investment Ltd Spikera Oy	Municipal owned VC company
Private Sector VCs	
Finnish	Foreign
Aboa Venture Management Oy	Apple Tree Partners
Aura Capital Oy	Bank Invest
Bio Fund Management Oy	Bank von Ernst
Concordia Capital Ab	CapMan Ab
Innofinance Oy	Health Cap
OKO Venture Capital Oy	Investor Growth Capital Ab
Optiomi Oy	Merlin Biosciences
Profita Management Oy	POD Holdigns, Inc.
Sentica Partners Oy	Technoventures Management
Teknoventure Management Oy	
Thominvest Oy	
Other small Finnish VC companies (non-FVCA ¹ members)	

Table 10 shows further that Finnish biotechnology companies have attracted a few foreign venture capitalists, with most of their management companies being located in Nordic Countries. However, foreign VCs do not usually act as lead investors.

5.1.2 Screening

Measuring the extent and impact of the screening activities by venture capitalists via interviewing the CEOs of the venture backed companies provides only limited information about the total phenomenon. Finding out how much time and effort venture capitalists devote to screening the investment proposals and the impact this activity has on the economy as a whole would have required different types of methods and a different study population. In addition, to find out the information the companies that have received negative investment decision have learned about their deficiencies, the non-VC-backed companies would have had to be interviewed.

However, by interviewing the CEOs of venture capital backed companies it is possible to find out how the investee companies prepared themselves for the evaluation of the VCs before the investment. As suggested in the theoretical framework (chapter 3.2.1), the development that the companies undergo merely in order to be more attractive for venture

¹ The Finnish Venture Capital Association [www.fvca.fi]

capitalists, can be regarded as implicit pre-investment value-adding of the venture capitalists. In this study, the respondents were asked whether they did put extra effort fulfilling the investment criteria of the VCs when they were searching for venture capital funding.

In 68 % of all cases one or more pre-investment development activities were implemented in the company in order to make the company more attractive for venture capitalists (see Table 11). Moreover, the responses informal and public sector VC-backed companies were similar, while the CEOs of the companies with private sector VCs implemented development activities somewhat more often than the former. This could mean, for example, that the CEOs think that there are differences between the investment criteria of private sector VCs and other types of VCs or that the private sector VC-backed companies have had more deficiencies when searching for VC funding than other response groups.

Table 11: Implementation of pre-investment development activities in biotechnology companies merely in order to make the company more attractive for VCs. Distribution of responses by VC type.

	Informal VC	Public Sector VC	Private Sector VC	Total
N	11	14	13	38
No	36 %	36 %	23 %	32 %
Yes	64 %	64 %	<u>77 %</u>	68 %

To illustrate the variety of development activities implemented in companies, at time of the interview the respondents were provided with a list of possible activities that were derived from different investment criteria of the VCs. Table 15 summarizes the frequency of each activity that was implemented in the companies to attract different types of VCs.

Table 12: Pre-investment development activities implemented by companies in order to make the company more attractive for different types of VCs (in percentage within each VC type).

	Informal VC	Public Sector VC	Private Sector VC	Total
N	7	9	10	26
Development of the business plan or business strategies	<u>86 %</u>	<u>78 %</u>	<u>70 %</u>	<u>77 %</u>
Development of the R&D function	<u>57 %</u>	<u>44 %</u>	<u>30 %</u>	<u>42 %</u>
Development of patenting	43 %	44 %	20 %	35 %
Development of the marketing function	29 %	33 %	30 %	31 %
Changes in the composition of the board of directors	14 %	22 %	20 %	27 %
Changes in the composition of the management team	14 %	<u>44 %</u>	20 %	27 %
Increase the share of ownership of the management team or employees	29 %	33 %	20 %	27 %
Other rearrangements in the ownership structure (for example having outside private person as a partner)	29 %	<u>44 %</u>	10 %	27 %
Development of the production function	<u>29 %</u>	11 %	0 %	12 %
Other	0 %	22 %	0 %	8 %

Other pre-investment development activities that were done in order to attract VCs included performing a customer research and investing heavily in promotion of the company by arranging meetings with a large number of venture capitalists. In addition, one respondent told that in order to receive finance from other investors, they had to buy back the shares of the current VC owner that wanted to write-off its investment and let the company go bankrupt.

The responses of the companies with different types of venture capital investors were surprisingly similar, as development of the business plan or business strategies and development of the R&D function were suggested as the most common activities implemented for the interest of all types of VCs. As the number of respondents in each category is rather small this table is only indicative, and does not allow for definite conclusions. However, the companies that had acquired venture capital investments from public sector organizations claimed that they had made changes in the composition of the management team and made other rearrangements in the ownership structure of the company before investment more often than the other companies. Similarly, the informal VC-backed companies were found to have developed their production function in order to obtain VC funding somewhat more often than the other companies.

In most cases where development activities were not made before investment (N=10), the venture capital investment was made very early during the life-time of the company, or even before the company was established, and, therefore, these companies had never extensively searched VC financing. However, some of these companies revealed that this kind of improvements had been done later on before further rounds of VC finance or before the exit of the VC. In a few cases, informal venture capital investments were made by business angels whom the entrepreneurs knew already before the investment, and the business angels themselves suggested their entry. A CEO of an informal venture capital backed company claimed that even the establishment of the company was a result of co-operation with the business angel:

“For a couple of years, the business concept of the company was developed together with the business angel, and all of the activities listed in the questionnaire were considered together.”

In summary, from the results discussed above, a conclusion can be drawn that the screening function of venture capitalists is commonly recognized by the CEOs of the Finnish biotechnology companies. When actively searching for outside finance, the managers tend to develop their companies in order to fulfill the investment criteria of venture capitalists, especially when they were trying to attract private sector venture capital companies. They implement a variety of development activities, however, the development of business plan or business strategies are by far the most common activities.

5.1.3 Monitoring

The value-adding of the venture capitalists is usually vested in the active role of the VC in the investee's board of directors (e.g. Gompers & Lerner 2004, p. 166). Therefore, the respondents were asked to explain the structure of their board, and especially the number of seats the lead investor and other venture capitalists and/or their representatives were holding. Table 13 summarizes the number of seats the lead investors and/or their representatives hold in the investee's board.

Table 13: Number of seats the lead investors or their representatives hold in the investee's board of directors.

	Total	Informal VC	Public Sector VC	Private Sector VC					
N	38	11	14	13					
0	8 %	18 %		8 %					
1	76 %	55 %	93 %	77 %					
2	11 %	9 %	7 %	15 %					
3	5 %	18 %							
Total	100 %	100 %	100 %	100 %					
Mean	1,13	Median	1	Std. Deviation	0,623	Min	0	Max	3

In most companies, a lead investor and/or his representatives were holding one or more seats in the investee's board of directors. Only two informal VCs and one private sector venture capitalist were not board members. However, as the value-adding of lead investors is not necessarily vested in the participation of the VC in the investee's board this does not mean that these VCs are not involved in their portfolio companies. All VCs and their representatives were found to hold, on average, 1.55 seats in the boards of directors. This number is rather small compared to the results of the study of Sapienza et al. (1996, p. 451), in which the outside investors had, on average, 2.73 seats in the boards of the investee companies.

Moreover, venture capitalists were mostly found to form boards in which all venture capitalists and their representatives were holding a minority of total number of seats (Figure 4). However, in one company the board was formed only from venture capitalists, whereas three boards did not have any VCs. Again, the results differ from the findings of Sapienza et al. (1996, p. 451), who suggested that in France, in the Netherlands and in the USA, the outside investors held usually a majority of all seats of the investee's board. However, in the study of Sapienza et al. (1996, p. 451), the UK-based VCs held usually the minority of the board seats supporting the findings of this study. One reason for the minority share of the board seats of the VCs in Finnish biotechnology companies could be that the VCs tend to avoid the use of formal power in their early stage investee companies in fear of confrontation between VCs and other owners as suggested by Fried & Hisrich (1995, p. 107). They argued further that in early stage companies the VCs have also other more preferable forms of power with the management that result from the needs of the investee companies of managerial advices and further financing (ibid.). This explanation seems rather rational.

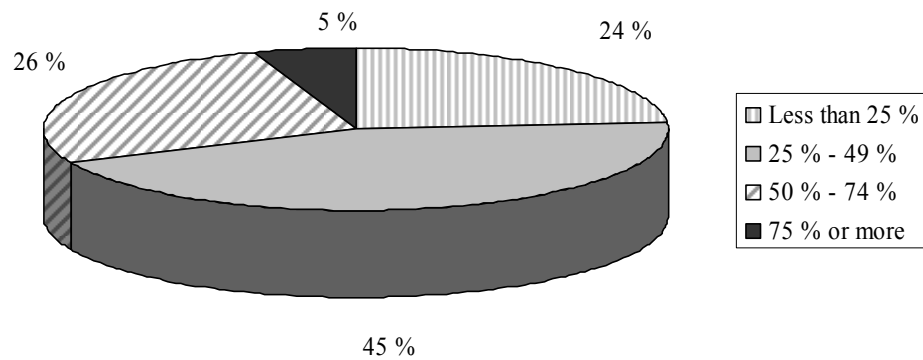


Figure 4: The share of all venture capitalists and their representatives in the board of directors of VC-backed Finnish biotechnology companies (N=38).

To measure VC involvement in the portfolio companies, the CEOs were asked to estimate the frequency of direct face-to-face contacts and indirect contacts, e.g. phone conversations and emails, with their lead venture capitalist. In addition, to learn about the activeness and importance of the board of directors in the value-adding, the respondents were asked to estimate separately the frequency of direct contacts in the form of the board meetings, and other face-to-face contacts.

Table 14 indicates that board meetings are arranged approximately once a month or usually even less frequently. The boards of VC-backed Finnish biotechnology companies that have an informal VC as the lead were meeting somewhat less frequently than boards with formal VCs as lead investors. However, as the number of cases in each of the subgroups is this finding only indicative and forbids making any further conclusions.

Table 14: The frequency of board meetings.

Frequency of Board Meetings	Total		Informal VC		Public Sector VC		Private Sector VC	
N	33	100 %	7	100 %	14	100 %	12	100 %
Approximately once a month	14	42 %	2	29 %	7	50 %	5	42 %
Less than once a month	19	58 %	5	71 %	7	50 %	7	58 %

Missing five responses: of three companies in which the lead was not a member of the board of directors, and of one company in which the lead VC was the only member of the board of directors. One company did not respond to this question.

As none of the companies indicated that their board of directors was meeting more often than once a month, one could draw a conclusion that the VCs investing in Finnish biotechnology companies are not very active investors. However, in most of the companies the VCs were in contact with their investees quite often outside the board meetings and

especially, in indirect contacts (e.g. via telephone or email). Calculating all direct and indirect contacts together the VCs were found to be very actively in touch with their portfolio companies, in half of the cases this took place even weekly (see Table 15). Especially informal VCs were found to be involved in the everyday business of their investee firms very actively, even though the differences between the respondent group were not statistically significant ($p > 0.05^1$). Compared to the results of Gorman & Sahlman (1989, p. 235) and Sapienza et al. (1996, pp. 453–454), who found that VCs visited their investee companies once or twice a month, the lead investors of the Finnish biotechnology firms seem rather active.

Table 15: The frequency of direct and indirect contacts with the investee company by VC type.

Direct and indirect contacts	Total		Informal VC		Public Sector VC		Private Sector VC	
N	38	100 %	11	100 %	14	100 %	13	100 %
1-5 times in a week	19	50 %	8	73 %	5	36 %	6	46 %
Less than once a week	19	50 %	3	27 %	9	64 %	7	54 %

To find out whether the venture capitalists use contracts as a way to monitor their investments, the respondents were asked whether their contracts with their venture capitalists included veto-rights for the VCs in some issues. Nearly all of the respondents admitted that they had made a contract, as only in two companies the private sector venture capitalists had preferred not to write a formal contract.

Most of the informal venture capitalists in Finnish biotechnology companies were found not to hold any veto-rights, whereas formal VCs, especially public sector VCs, preferred to have them (Figure 5). Two CEOs were not aware whether the contracts of their lead investors included veto-rights.

¹ Pearson Chi-Square Test:

$\chi^2 = 3,49$, Degrees of freedom = 2, Sig. = 0,17 < 0,05

(38 of Valid Cases; 0% > 20 % of the frequencies have expected count less than 5. The minimum expected count is 4.92.)

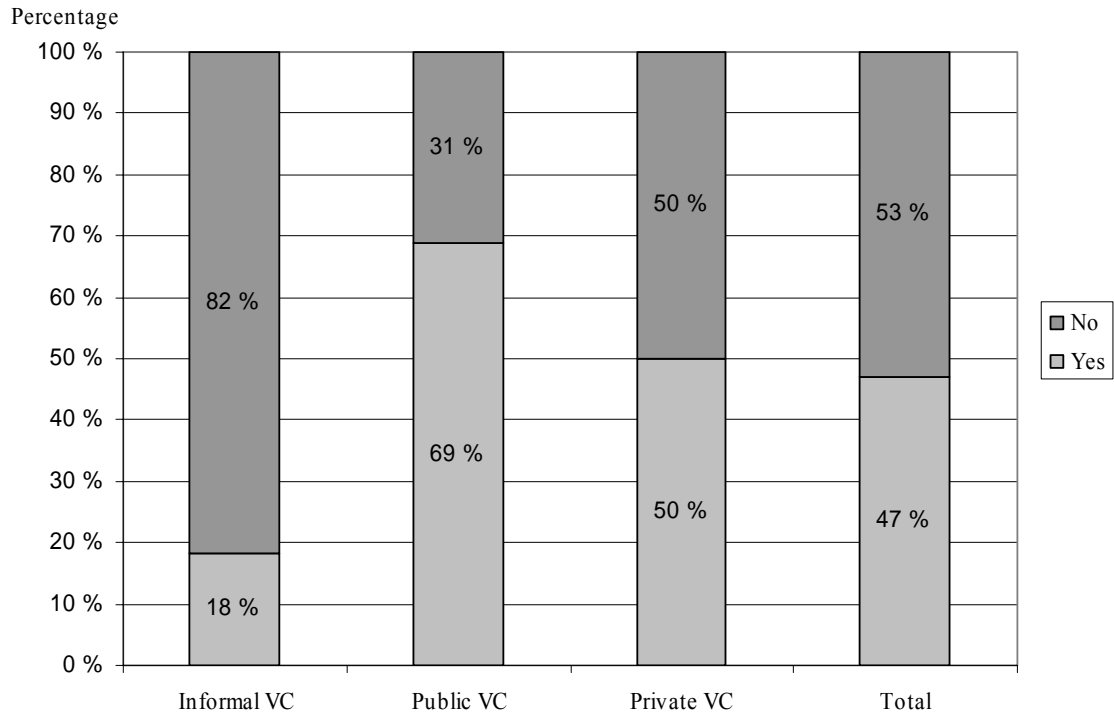


Figure 5: Investment contracts including veto rights for VC by VC type.

In case the veto rights were mentioned in the contact, they were found to cover a variety of areas. Some CEOs found the veto rights rather restrictive:

“The contract is extremely strict and includes many veto-rights for the VC. It covers, for example, recruitment of all key personnel like the CEO and the chairman of the board, all arrangements concerning the company’s shares and obtaining additional finance”. (a CEO of a private sector VC-backed company)

“The list (of veto-rights) is very long. It includes all important contracts and arrangements, for example, all changes in the financial structure of the company, trade sales, recruitments etc“. (a CEO of a private VC-backed company)

The contracts most commonly included veto-rights in all changes in the financial structure of the company (N=7), appointing and/or suspending key personnel (7), selling the company or other clauses of exit (6), important strategic decisions (6), important contracts (5) and obtaining additional finance (5). Other areas mentioned included the use of available cash, an option to claim a seat on the board and approval of certificate of incorporation.

The theoretical framework suggested that VC use investment staging as one of the mechanisms of monitoring and guiding their portfolio company. To study the prevalence of this form of monitoring, the respondents were asked whether they had agreed upon a follow-on investment with their venture capitalists. The results depicted in Figure 6 show that although most of the VCs usually had not made any agreement upon

further capital infusions, staging is, nevertheless, a quite widely adopted form of monitoring. Informal VCs were the most reluctant in this manner.

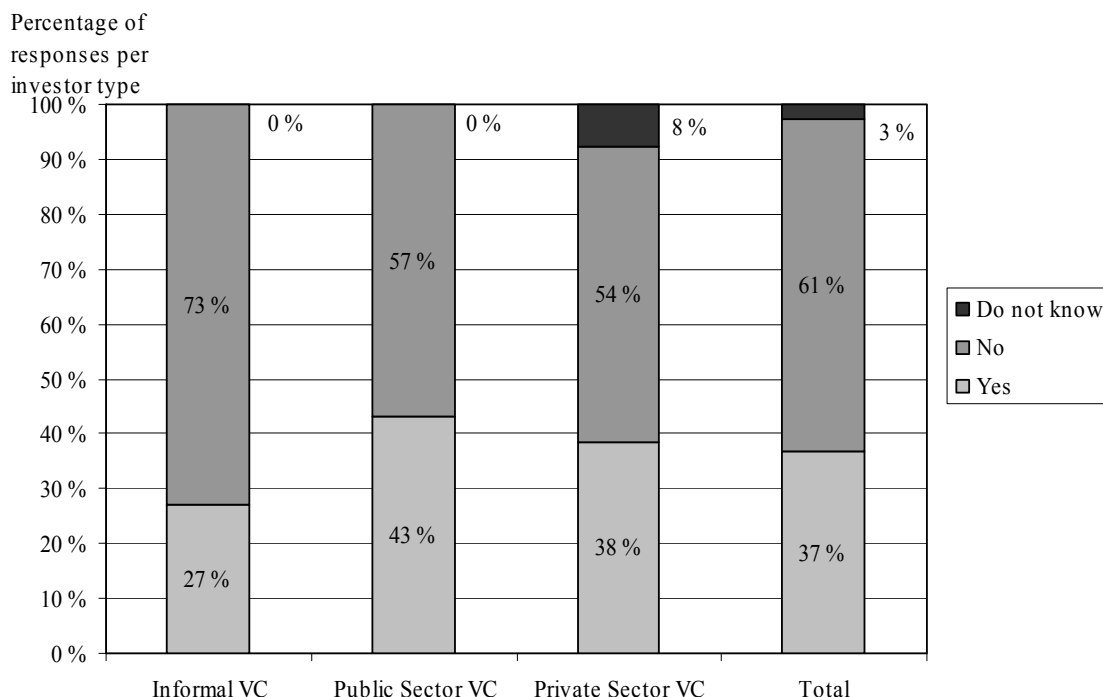


Figure 6: Agreements made upon a follow-on investment with the lead investor by VC type.

If companies indicated that they had agreed upon follow-on financing with their venture capitalists, they were asked whether this investment was agreed to take place upon the achievement of a specific milestone. Eleven of the fourteen companies admitted that one or more milestones existed, although the milestones varied across the respondents quite a lot (See Table 16). Most commonly the follow-up finance was agreed to take place if specific research and development objectives were reached.

Table 16: Milestones included in the contracts concerning the follow-on investments.

	Responses (N)	Percent of Responses	Percent of Companies
Total	17	100 %	155 %
Specific research and development objectives are reached	4	24 %	36 %
Product or service is brought to market	2	12 %	18 %
Enough cash flow is generated	2	12 %	18 %
License is sold	1	6 %	9 %
Sales objectives are reached	1	6 %	9 %
Other	7	41 %	64 %

Other milestones that were mentioned by the respondents included receiving funding from other financiers, contracting strategic co-operation for the financing of the R&D

with an international partner, having a patent approved and selling a license-like commercial application. In some cases, the follow-up financing was agreed to take place only as a part of complete sales process of the company. One respondent revealed that the follow-on financing was promised only if the firm is not able to get clients and its existence is threatened.

In summary, the venture capitalists in Finnish biotechnology sector seem active hands-on investors, especially in terms of frequent contacts. Informal VCs were clearly more actively in contact with their investee companies than other VCs and public sector VCs the least. However, the value-adding was not found to be merely vested in the VCs role in the investee's board, as commonly suggested in the literature (cf. Gompers & Lerner 2004, p. 166). The findings suggest that the lead venture capitalists in Finnish biotechnology companies are actually in contact with their investee firms more often outside the board meetings, especially indirectly (e.g. telephone or email). Moreover, the VCs were found to hold seldom a majority of the seats in the investee's board of directors.

Even though not used by the majority of the lead investors, including veto-rights in investor contracts and staging financing were yet found to be rather commonly used mechanism of monitoring. However, although informal VCs were found to sign contracts they did not prefer to include special veto-rights in them like most of their institutional colleagues did. Concerning the prevalence of staging, it is to be noted that, even though some investors had not agreed upon further capital infusions, they might, however, participate in further rounds of finance based on the progress and the financing need of the investee.

5.1.4 Signalling

To measure the signalling effect of the venture capitalists, the respondents were asked whether they had mentioned the name of their venture capital investors in order to improve the company image when acquiring different resources. Twenty-five of the companies announced that they had taken advantage of the signal that having a VC conveys. Figure 7 shows the distribution of the responses by investor type.

Percentage of responses by VC type

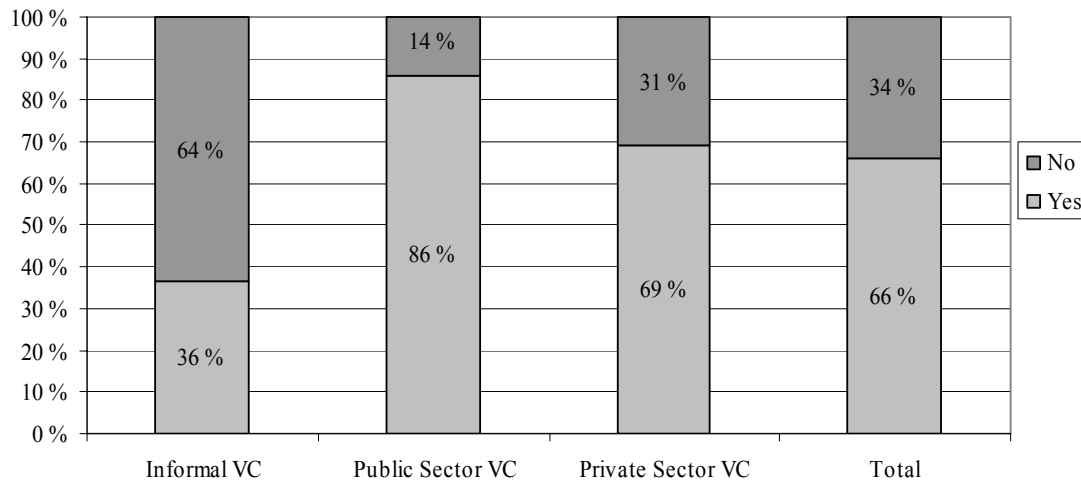


Figure 7: Mentioning the name of different types of VCs in order to improve company image when acquiring resources.

Companies that were backed by public or private sector venture capital companies were taking advantage of the signalling of their VC clearly more often than informal VC-backed companies. One explanation for this could be that the CEOs believe that taking advantage of the signal that having a VC conveys to other stakeholders is more feasible when the VC is well-known. Nearly all respondents that had a public sector VC investor told that they had mentioned their VC when they were acquiring finance, human resources or business contacts.

Findings in Table 17 suggest that the signalling of the VC is thought to convince, first of all, other investors, as the respondent had mentioned the name of their VC most often when they were acquiring finance. All respondent groups were united in the belief that having a VC investor would be clearly more useful when acquiring finance compared with other resources. However, supporting the propositions made in value-adding literature (see for example Bertoni & Colombo 2005, p. 5, Maula 2001, p. 123, Nathusius 2002, p. 104, Timmons & Sapienza 1992, p. 37 and Steier & Greenwood 1995, p. 352) these findings suggest that having a VC may help in attracting investors, customers, partners and employees.

Table 17: Resources that have been tried to acquire with the help of the signaling effect of VC.

	Total		Informal VC		Public Sector VC		Private Sector VC	
	Responses	%	Responses	%	Responses	%	Responses	%
Number of companies	25		4		12		9	
Acquiring financing from other investors	23	92 %	4	100 %	11	92 %	8	89 %
Acquiring new customers	6	24 %	2	50 %	3	25 %	1	11 %
Acquiring new suppliers or cooperation partners	5	20 %	2	50 %	2	17 %	1	11 %
Recruiting new employees	2	8 %	1	25 %	1	8 %	0	0 %

Percentages are based on the number of companies in a VC category at issue.

Some respondents argued that they are able to take advantage of the signaling of their VC only in Finland, where their VC is well-known:

“We have always mentioned our VC when we have sought for funds from national agencies. So far, we have not made any remarkable recruitment, when we would have mentioned the owners”. (a CEO of a private sector VC- backed company)

“The owners have been mentioned only when we have wanted to assure that the continuity of our business is guaranteed. However, on these occasions, we have not mentioned our VCs by name as no-one know our VCs’ by name abroad”. (a CEO of a private and public sector VC-backed company)

“We used to mention our VC in Finland five years ago, when its reputation was good, but never abroad”. (a CEO of a public sector VC-backed company)

The recent strategy change of the public sector VCs in Finland and the political discussion emerging from it appeared in the responses of other CEOs as well. However, the capability of the public sector organizations as a venture capitalist was also praised.

“The name of our public sector VC is not an asset, but more like a liability, because of which we do not bring it up. However, we do mention other VCs and business angels when we search for additional finance”. (a CEO of a public sector VC-backed company)

“The name of our public sector VC is not the most valuable in the market, although currently perhaps neutral. We have mentioned them, however, abroad when acquiring finance, and in Finland, when acquiring employees, as they are known for not letting their portfolio companies go bankrupt. It is a shame that the recent political discussion has spoiled their reputation after all what they have done for this economy. And they are, in addition, very capable venture capitalists”. (a CEO of a public sector VC-backed company)

In summary, the above results suggest that, especially the private and public sector venture capital companies are found to add value through signaling. However, the value-adding of the venture capitalists through signaling seems to depend on the reputation that the VC has on the resource markets. In other words, having outsider investors believing in the company's success is not itself believed to convince potential partners, financiers or employees of the company's capabilities, but in addition the VC needs to be well-known and in positive way. This conclusion is supported by the fact that informal venture capitalists are not mentioned that often when acquiring resources and by the fact that even though a VC is well-known in the market its name is not mentioned if there is possibility that it could bring out negative associations.

5.1.5 Areas of Involvement

To study the involvement of the different types of venture capitalists in Finnish biotechnology companies, the CEOs were asked to report the areas of business their venture capitals were involved. First, the CEOs revealed the areas in which the VC was serving as a sounding board, i.e. providing advice and opinions and, then, the areas in which the VCs were, on average, more responsible for the implementation than the management team of the investee firm.

As could be assumed based on earlier research (cf. MacMillan et al. 1988, Timmons & Sapienza 1992, Harrison & Mason 1992, Erlich et al. 1994), VCs were found to be much more commonly serving as a sounding board to the CEOs than being responsible for the implementation of activities in specific areas of business. Nearly all CEOs told that their lead investors provided advice in one or more areas of business. On average, the leads were acting as a sounding board in approximately five business areas, whereas they were responsible for implementation, on average, in less than one business areas (Table 18). Informal VCs were found to have somewhat wider job descriptions than the venture capital companies as an adviser supporting the findings of Harrison & Mason (1992, p. 7), whereas private sector VCs were the most active implementers.

Table 18: Average number of areas, in which different types of VCs are serving as a sounding board and are responsible for implementation more than the management team.

	Serving as a Sounding Board			Responsible for Implementation		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation
Informal VC	5,73	11	3,69	1,00	11	1,48
Public Sector VC	4,93	14	2,89	0,57	14	0,76
Private Sector VC	4,92	13	2,69	1,23	13	1,59
Total	5,16	38	3,02	0,92	38	1,30

To find out the areas in which the VCs were involved, the respondents were provided with a list. Table 19 and Table 20 summarize the responses of the CEOs concerning the involvement of their lead investors as a sounding board and as an implementer, respectively.

Table 19: Areas of activity, where the lead investor serves as a sounding board to management team.

Area of activity	Informal VC	Public Sector VC	Private Sector VC	Total
N	11	14	12	37
Strategic planning	<u>82 %</u>	<u>71 %</u>	<u>83 %</u>	<u>78 %</u>
Monitoring financial performance	<u>64 %</u>	<u>71 %</u>	<u>83 %</u>	<u>73 %</u>
Obtaining additional financing	<u>55 %</u>	<u>71 %</u>	<u>75 %</u>	<u>68 %</u>
Interfacing with investor group	36 %	<u>64 %</u>	50 %	51 %
Providing business contacts	<u>64 %</u>	43 %	33 %	46 %
Corporate governance	27 %	36 %	<u>67 %</u>	43 %
Internationalization of the company and/or markets	<u>64 %</u>	29 %	33 %	41 %
Formulating, testing, or evaluating marketing plans	45 %	36 %	25 %	35 %
Recruiting key personnel	45 %	21 %	42 %	35 %
Developing actual product or service	<u>55 %</u>	21 %	25 %	32 %
Improving patenting	36 %	21 %	0 %	19 %
Other	0 %	7 %	17 %	8 %

Percentages are based on the number of companies in each VC category that responded that their lead was serving as a sounding board in one or more area of business.

In addition to the business areas included in the questionnaire, some VCs were found to provide contacts to public sector authorities, to serve as a manager for the CEO and to provide moral support in decision making.

The results of the Table 19 indicate that the venture capitalists in Finnish biotechnology companies, most of all, provide advice in the areas of strategic planning, monitoring of financial performance and acquisition of additional finance. These business areas were mentioned by more than half of the respondents. The results are surprisingly similar with those in earlier studies (cf. Erlich et al. 1994, pp. 74–75, Harrison & Mason 1992, p. 15 and MacMillan et al. 1988, p. 32) as, for example, Erlich et al. (1994) found also that both VCs and informal investors were involved most actively in the above activities. However, in the study of Erlich et al. (1994), both VCs types were found to be the most actively involved in interfacing with investor group, which was in this study found common among public sector VCs and private sector VCs. Of all VC types, informal VCs were clearly more active in providing business contacts, operations aiming at internationalization of the investee and development of actual products or services than their formal counterparts. Moreover, private sector VCs were the most active lead investors in corporate governance in Finnish biotechnology companies.

As discussed earlier, the lead investors were, in general, rarely responsible for the implementation to a larger extent than the management team of the investee. Of the companies, in

which VCs were also responsible for the implementation, the leads were, most of all, active in obtaining additional finance, as could be assumed (Table 20). In addition, private sector VCs were commonly found to be responsible for interfacing with investor group. Interestingly, all the informal VCs that were active implementers were found to provide business contacts, on average, more than the management team.

Table 20: Areas of activity, where the lead investor is, on average, more responsible for the implementation than the management team (N=17).

Area of activity	Informal VC		Public Sector VC		Private Sector VC		Total	
	Responses	%	Responses	%	Responses	%	Responses	%
N	4		6		7		17	
Obtaining additional financing	2	50 %	3	50 %	5	71 %	10	59 %
Interfacing with investor group	1	25 %	2	33 %	5	71 %	8	47 %
Monitoring financial performance	1	25 %	2	33 %	3	43 %	6	35 %
Providing business contacts	4	100 %	1	17 %			5	29 %
Strategic planning	1	25 %			1	14 %	2	12 %
Recruiting key personnel	1	25 %					1	6 %
Corporate governance					1	14 %	1	6 %
Internationalization of the company and/or markets					1	14 %	1	6 %
Formulating, testing, or evaluating marketing plans	1	25 %					1	6 %

Percentages are based on the number of companies in each VC category that responded that their lead was responsible of the implementation in one or more areas of business.

In addition to finding out the areas where the VCs were involved in their portfolio companies, the aim was to reveal the activities that the CEOs perceived as useful and, moreover, the VC activities that the CEOs would find useful and wish their VCs to do. Therefore, the CEOs were asked to name three activity areas, in which their VC had proved most useful and three activity areas, in which the VC involvement would be most useful. Figure 8 shows the evaluation of the CEOs of their lead's previous and desirable involvement in different areas.

First of all, the lead investors were evaluated by the CEOs to be most commonly useful when obtaining additional finance, when taking part in strategic planning, when monitoring financial performance and when interfacing with the investors group. These were exactly the same areas in which they were found to be involved most often (Table 19) and support by and large the findings of Harrison & Mason (1992, p. 16) and Timmons & Sapienza (1992, p. 40). This result shows that the CEOs of the Finnish biotechnology companies appreciate the allocation of the human resources of their lead investors. However, this does not mean that the venture capitalists are equipped with resources and capabilities that the CEOs would actually want.

When comparing the areas of business in which the lead investors have been the most useful with the areas in which they would be the most useful from the viewpoint of the CEOs, obtaining additional finance and strategic planning were found at the top of the both lists (Figure 8). This result means, therefore, that a large number of venture capitalists are actually contributing to areas which the CEOs most appreciate. However, in some areas, for example, providing business contacts and internationalization of the company and/or markets, the lead investors were found useful less often than the CEOs would have wished them to be. On the contrary, monitoring financial performance was rarely evaluated among the three most useful areas in which VCs would be useful, while the venture capitalists were found rather active in this task (see also Table 19).

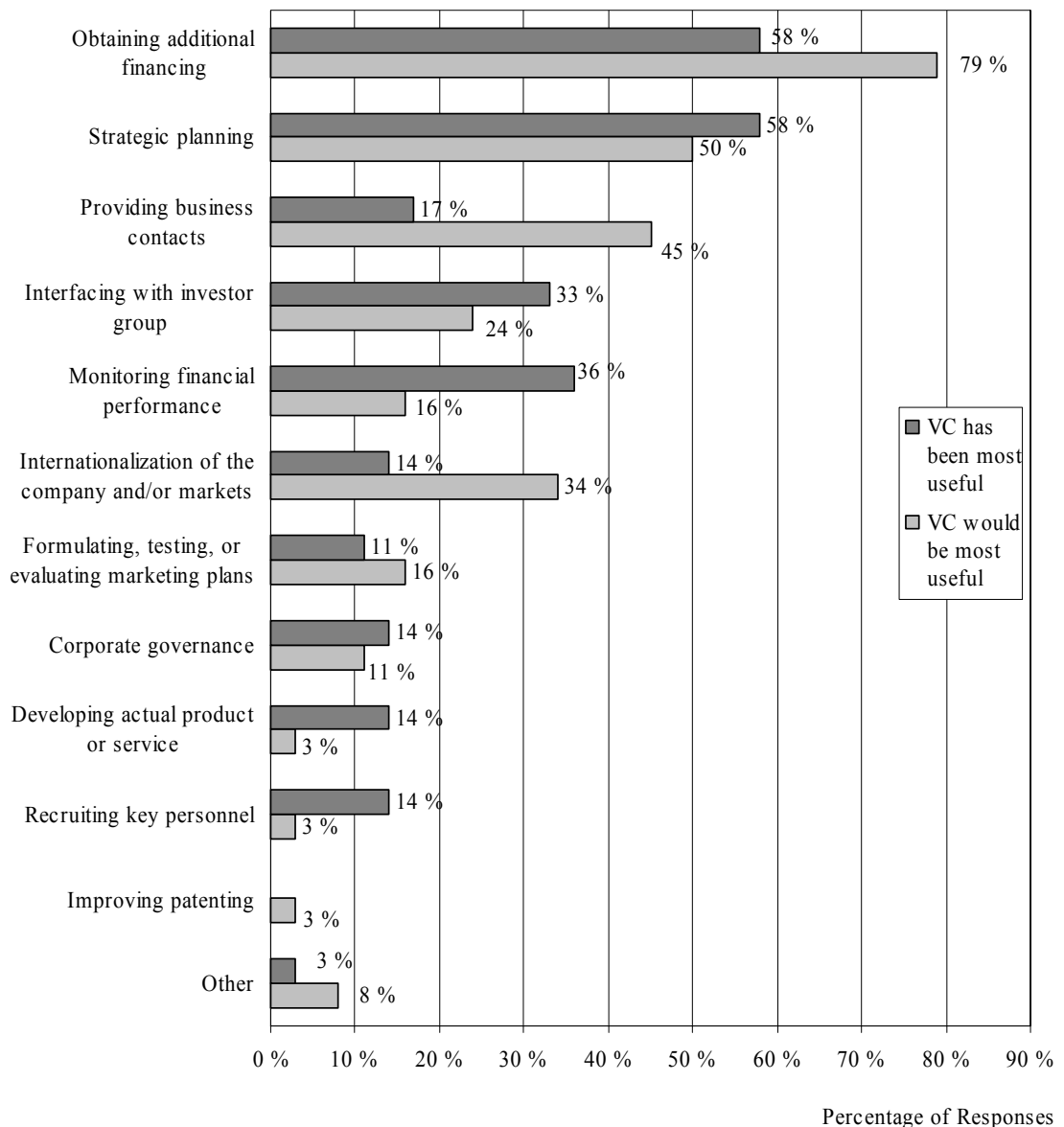


Figure 8: Activity areas, in which the lead investor has proved most helpful and would be most helpful.

Note: Percentage of the CEOs evaluating that VC involvement in each activity area has been / would be among the three most useful areas.

Even though the VCs were by and large found to be involved in areas that their portfolio companies appreciate, it is interesting to pay attention to the overall role of the VCs in Finnish biotechnology sector. From the above figure, one could conclude that the CEOs of Finnish biotechnology companies would wish their VCs to provide, most of all, capital and not so much knowledge on how to build their businesses. However, comparing these results with the findings by MacMillan et al. (1988, p. 34), who asked VCs the activities in which they would like to have increased their involvement, only one area in common can be found, namely, the VCs participation in strategic planning. MacMillan et al. (1988, p. 34) found formulating business strategy and formulating marketing plan the most common responses, whereas obtaining alternative sources of financing was not among the top six activities.

When measuring the perceived value-adding and usefulness of the VCs' contribution it is important to consider the pre-investment expectations that the CEOs had. For example, if the expectations were at a high level before the entry of the venture capitalist it is more challenging for the VC to exceed these expectations, and vice versa. Figure 9 shows that, in most cases, the CEOs of the biotechnology companies suggested that their expectations concerning the involvement of their lead investors were fulfilled. Especially, the informal VCs were found to fulfill the expectations of the CEOs of their portfolio companies, which could result either from low expectations or surprisingly good performance of the informal VCs.

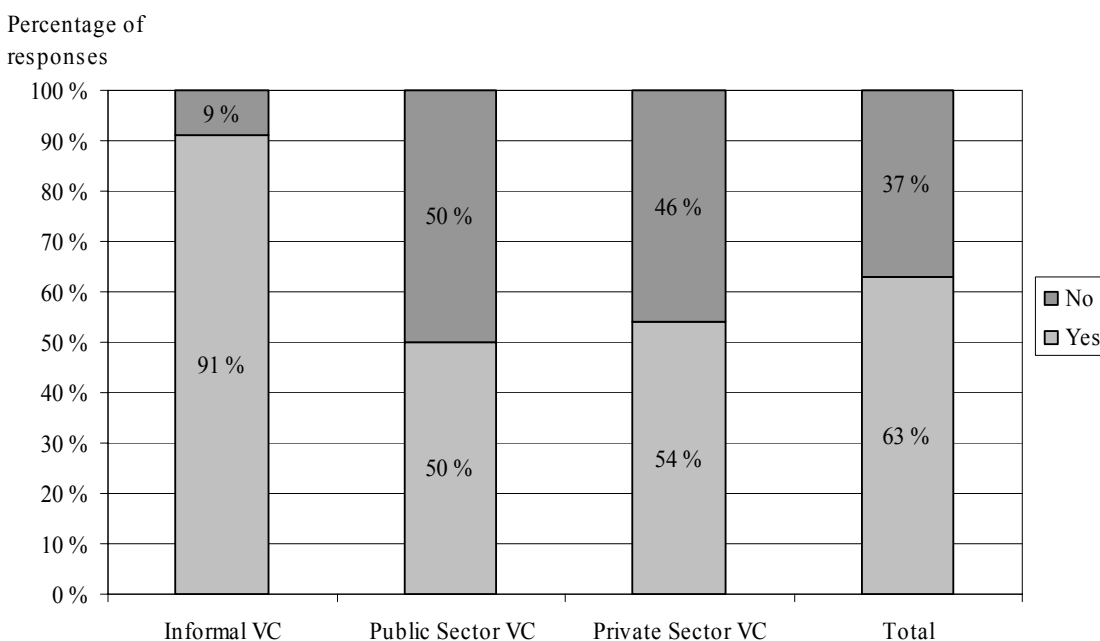


Figure 9: Fulfillment of CEOs' expectations.

The CEOs that claimed that their expectations were not met with were asked to tell the respects in which the involvement had failed to fulfill them. The quotations of the respondents are categorized by VC type in Table 21.

Table 21: The expectations of the CEOs on the VC involvement that had not been fulfilled.

Informal VC
<i>“Partly the expectations have been fulfilled, and partly not. We expected that the VC would give stronger contribution to marketing. More money is also always needed, but, on the other hand, we must understand that the VCs have also limited resources“.</i>
Public Sector VC
<i>“The biggest disappointment has been the lack of the VCs know-how in many fields”.</i>
<i>“Nothing concrete has happened. We, as probably all other portfolio companies of this public sector VC, expected that having a VC would help us to receive funding from other investors”.</i>
<i>“The VC involvement has not fulfilled our expectations in any respect. There is no area, in which the VCs are adding value. They are inexperienced in this industry and extremely passive. The lack of co-operation with the management team in building this business has been a big disappointment”.</i>
<i>“Our expectations are mostly fulfilled, one must be realistic. However, the VC has been more passive in acquiring finance than we expected”.</i>
<i>“Acquiring additional financing has just been inadequate. In addition, the VC required that we transfer our production facilities in another commune, which has been problematic and money consuming”.</i>
<i>“The VCs are nice people, but... Public sector VCs do not invest their own money, which leads to the fact that they do not take active role as an owner in the company, and are not interested in working in the board of directors. If a person invests his money, he monitors how the money is used. And if this person do not understand the industry in which he invests, who is the stupid one?! In addition, the financial markets in Finland are ineffective, and there is not enough money to invest. As the investments are small, the VCs are not interested in participating in the portfolio companies”.</i>
<i>“The financing of biotechnology industry was started on an amateur-basis in Finland after mid-1990s. The managers of the major public and private sector VCs did not have bio-business know-how and international contacts what so ever. The basic principle was to provide seed financing to biotechs, after which they would be sold and further financing is sought from international capital markets. This strategy has failed totally. The biggest problem is still a lack of know-how and international contacts”.</i>
<i>“We just expected more than we actually received. We hoped that setting objectives would have been made more in co-operation. However, positive thing is that we have received funding as we planned in the beginning”.</i>
Private Sector VC
<i>“We have not received as many contacts as we expected, and, moreover, the quality of the ones we have received has been unsatisfactory. Surprisingly also, the understanding of the financing process of the VC has been poor. Our first VC investor wanted to stand aside from the board of directors and continue as a passive owner, due to which we were particularly searching for active venture capitalist. Now the new VC has been in on the business for a few months and the VC has been fussing around. The future shows how this situation evolves”.</i>
<i>“The VC gives very little time to this company. A small company like us appreciates always the opinions and advices of an experienced person, as we are not able to by expertise. On the other hand, we are satisfied with help we have received”.</i>
<i>“Based on the conversations with the VC in the beginning we expected much more active involvement in obtaining additional finance, especially from foreign investors. The networking, even inside Finnish boarders, has been very exiguous. We have only met one representative of the VC company and not any of other portfolio companies, which could be very useful for the investee firms”.</i>
<i>“The VC has been positive and active. However, we expected stronger contribution in interfacing with investor group, providing business contacts and in strategic planning. Still, the biggest deficiency has been the lack of international biotechnology business network, which has made the internationalization slower and more difficult”.</i>
<i>“The VCs lack know-how in this industry and in international business. They have too scarce resources, as each partner has too many portfolio companies to look after”.</i>
<i>“We expected stronger contribution in acquiring additional finance, providing business contacts and in internationalization of the business”.</i>

In most of the cases (N=6), the CEOs admitted that they had hoped that the VCs would have helped them to receive additional financing. However, nearly as often (N=5), the VCs lack of know-how on the biotechnology business, especially in the case of public sector VCs, was mentioned as a reason for a failure of fulfillment of the CEOs' expectations. Other comments included, for example, a passive role of the VC (N=4), poor networking (N=3) and a lack of co-operation with the managers (N=2).

5.1.6 Relationship with Venture Capital Investor

Aiming at understanding the nature of relationship between the CEOs and the venture capitalists, the respondents were asked to estimate the perceived closeness of the relationship on a five-point Likert-type scale¹. Overall, the CEOs suggested that the relationship with their lead investors was close (Figure 10), as only around 10 % of the respondents evaluated their relationship distant. Of the different types of venture capitalists, the informal investors were found be the closest with the CEOs of their portfolio companies and private sector venture capitalists the most distant.

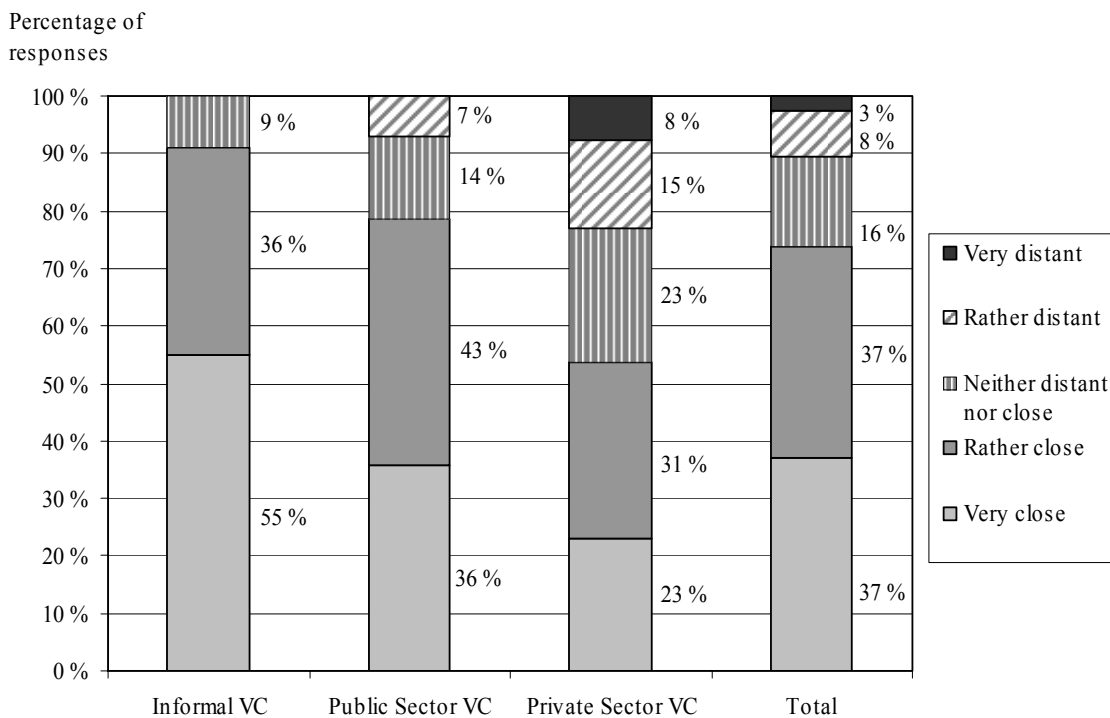


Figure 10: Perceived closeness of the relationship between the CEOs and the VCs (N=38).

¹ The scale used when estimating the closeness of the CEO-VC relationship was: 1 = Very distant, 2 = Rather distant, 3 = Neither distant nor close, 4 = Rather close, 5 = Very close.

To find out the reasons behind dissatisfaction among the CEOs concerning the active involvement of their VC investors, the respondents were asked to tell about the negative outcomes of the VC involvement. When asked whether the active involvement of the VCs has caused tensions inside the company, nearly half of the respondents admitted that tensions had ensued (Figure 11). However, whether active involvement caused tensions, was found to depend on the type of VC, even statistically significantly ($p < 0.05^1$), informal VCs emerging as a group that had caused tensions inside their portfolio companies clearly less than other types of VCs.

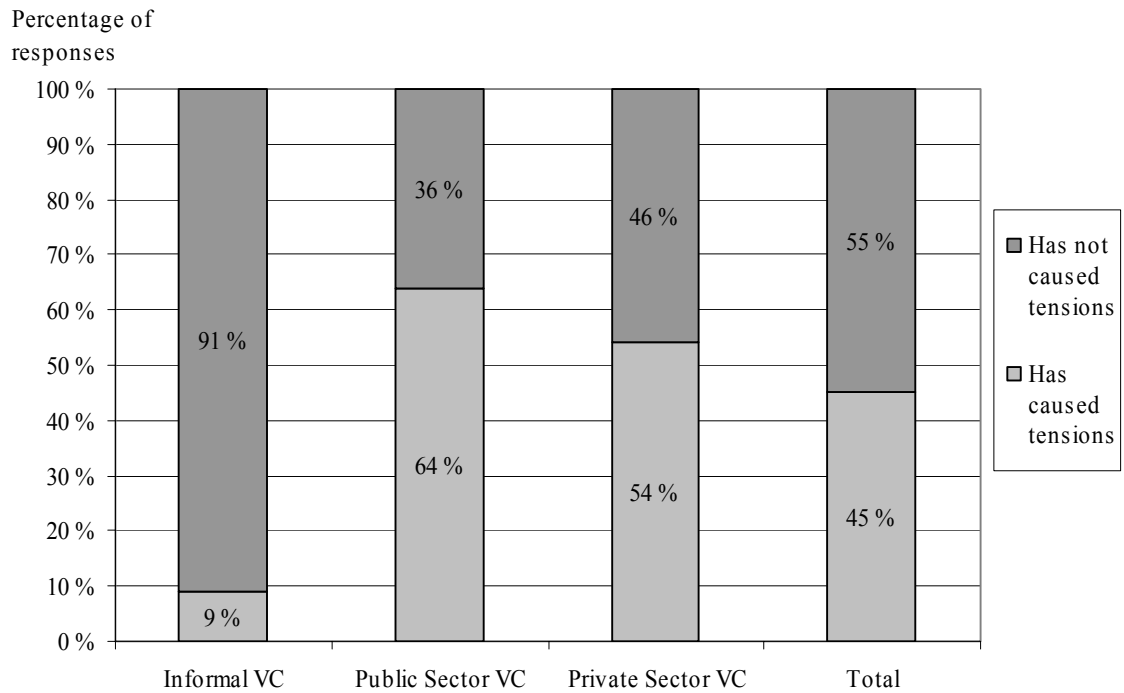


Figure 11: Tensions inside the company caused by the active involvement of the lead investor by VC type (N=38).

Table 22 summarizes the responses of the CEOs concerning the nature of the tensions evolved as a result of the active involvement of the venture capitalists. Usually, tensions have been evolved when the VC has required the downsizing of the business or within the owners concerning changes in the ownership structure of the investee company.

¹ Pearson Chi-Square Test:

$\chi^2 = 8,25$, Degrees of freedom = 2, Sig. = 0,02 < 0,05

(38 of Valid Cases; 16.7% > 20 % of the frequencies have expected count less than 5. The minimum expected count is 4.92.)

Table 22: Tensions caused by the active involvement of the VC

Informal VC (N= 11)
<i>“At times we have differing views on things, but serious conflicts have not occurred, so far”.</i>
Public Sector VC (N=18)
<i>“There has not evolved any tensions inside the company, but rather within the owners. Specially, the VC’s suggestions concerning the ownership structure of the company has caused these tensions”.</i>
<i>“Not exactly inside the company, but among the owners. All the founders have, for example, left the company, because of disagreements with the venture capitalist”.</i>
<i>“We had already signed contracts with another Finnish company, when the VC did not do its part to finish the deal of. The VC was supposed to fund the project, and as it backed off, the company went nearly bankrupt. This forced us to fire employees, which naturally caused tensions. In the end, we had to cancel the merger and buy back the shares. Due to this we are aiming at reducing the ownership of the VC”.</i>
<i>“The previous CEO has let me know that there were tensions among the board members. So far, I have not personally experienced tensions of any kind”.</i>
<i>“We have continuous concern about financing and closing the whole business”.</i>
<i>“Currently there are no tensions, but earlier there were, when the actions of the VC caused uncertainty among the employees about the stability of their jobs. However, within the ten years of history together these things have not happened often”.</i>
<i>“We have had conflicts when making plans for the company’s future. The venture capitalist wants to focus on certain fields, which the management team strongly disagrees. The VC has its own conception of the business and the technology”.</i>
<i>“There have been tensions among the owners. American and Finnish business cultures have a lot of differences and implementing the America culture in decision making is not an easy task. In US-based companies the resources are totally in different class and they managers are used to spending money carelessly. At the same time, the Americans think that we Finns are stingy”.</i>
<i>“The director of the VC labeled the whole biotechnology industry unsubstantial. In addition, the requirement to downsize our business lead to high distrust among the employees towards the VC”.</i>
Private Sector VC (N=16)
<i>“There have not been any severe tensions. However, they evolve at times, when the VC sees the company’s state somewhere, where it really is not and will never be”.</i>
<i>“At times, there have been raging debates, as the venture capitalist is waiting for his profits eagerly. This could be normal board working, but I do not have experience on other boards. However, the co-operation still works and any permanent tensions have not evolved”.</i>
<i>“Lately, there have been severe tensions among the individual owners resulting from the recent actions of the VC, which I prefer not to tell more about. However, due to this one of the founders even decided to leave the company”.</i>
<i>“There have been tensions between the individual owners and the lead VC, and between the venture capitalists alike. Our lead VC is, actually, not too diplomatic direction. Tensions have evolved especially in things related to the ownership structure of the company”.</i>
<i>“The VC brought along requirements to downsize the business. Arrangements concerning the employment cause a lot of tensions inside the company”.</i>
<i>“There have been, at times, tensions among the owners concerning strategies and the ownership structure of the company. The investors want profits for their investments, which is, on the other hand, understandable”.</i>

In summary, the relationship between informal VCs and their portfolio companies seem to be the closest and most frictionless of all VCs. According to the results by Sapienza (1992, p. 21), this would mean that the value of the involvement of the informal VCs is greater than of other VCs.

5.2 Factors Influencing the Perceived Value-Added

After finding out what value-adding mechanisms venture capitalists use in their portfolio companies in Finnish biotechnology industry, this chapter aims at revealing how these companies perceive the overall contribution of their VC, and what factors influence their perceptions. Therefore, this chapter finds answers to the second specific research question of this study, namely

- 2) What factors influence the perceived value added by venture capital investors?

To measure the overall value-added of the VCs the respondents were asked to rate the importance of the non-financial support provided by the lead investor for the company's success on a five-point Likert-type scale. The results shown in Figure 12 suggest that most of the CEOs of Finnish biotechnology companies perceive that their lead VC's involvement has been important for the success of their company. Moreover, in terms of this study, the perceived overall value-added of informal VCs is greatest and of public sector VCs the lowest.

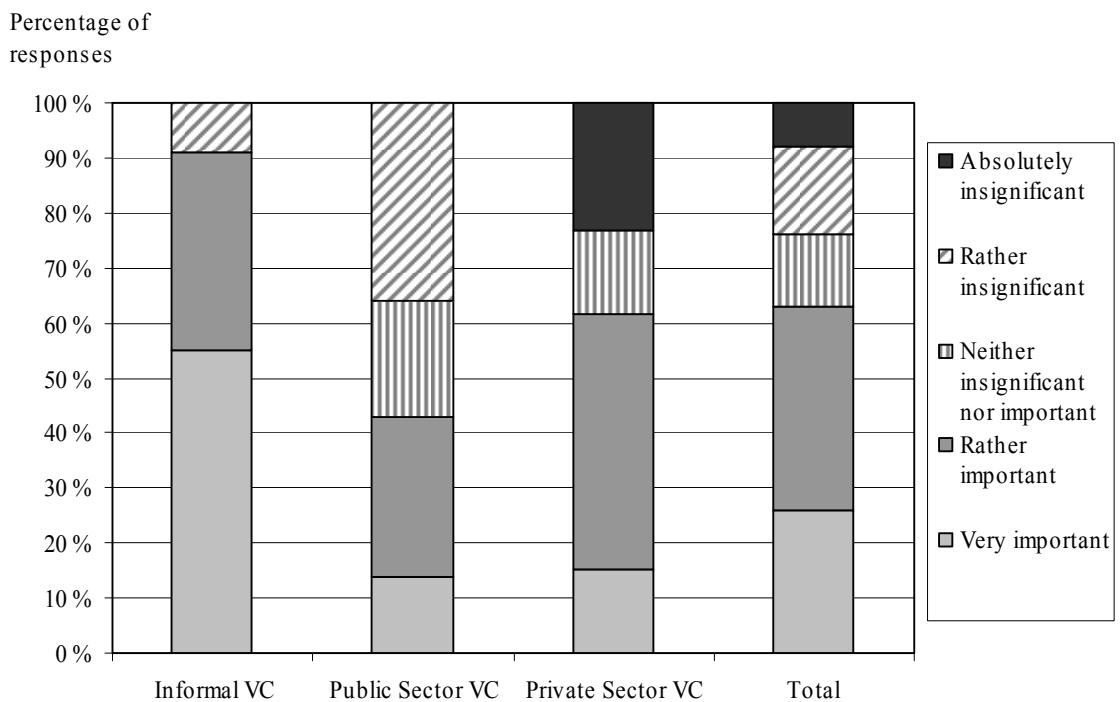


Figure 12: Perceived value-added of VC by VC type.

In order to find out the factors influencing the perceived value-added OLS regression analysis was used. Table 23 shows the results from the regression analysis on four separate models. The construction of the models is discussed in Chapter 4.3.1 and the variable construction in Appendix 1.

Table 23: Results from OLS regression analysis of perceived value-added.

Descriptives	Model 1	Model 2	Model 3	Model 4	Expected sign.
Adjusted R Square	0,181	0,199	0,225	0,345	
F	2,588**	2,117*	2,818**	3,826***	
N	37	37	37	37	
Constant	1,242	1,168	1,462	1,480	
Venture characteristics					
R&D-intensity	0,005	0,006	0,006	0,008	+
Stage (dummy)	0,243	0,453	0,182	0,730	-
Number of employees		-0,010	-0,002	-0,013	-
CEO characteristics					
Industry Experience	-0,024	-0,024	-0,032	-0,043**	-
Relationship Characteristics					
Perceived Closeness	0,628***	0,763***	0,576**	0,662***	+
Frequency of Contacts	-0,092	-0,212	-0,198	-0,070	+
Tensions (dummy)				-1,096***	-
VC Characteristics					
Informal VC (dummy)			0,984*		?
Public sector VC (dummy)		-0,708*			?
Control variables					
Drug Discovery (dummy)		0,113	0,280		?

*p<0.1; **p<0.05; ***p<0.01

In general, the models were found only to explain 18–34 % of how the CEOs perceive the value-added of their VCs. These values are similar with the R Squares for the models in the study of Sapienza et al. (1996, p. 460), which were 20–35%. However, the models in this study seemed to be suitable for the explanation of the phenomenon (p<0.05, p<0.1, p<0.05, and p<0.001).

Some factors were found to be significant predictors of the perceived value-added. First of all, the results of all the models suggest that the *closer the relationship* between the CEO and the VC, the greater is the perceived value-added (p<0.001 or p<0.01). This finding supports the results by Sapienza (1992, p. 21), who suggested that the more open or informal the relationship, the greater would be the value of the VC involvement. In addition, the *VC type* was found to explain significantly (p<0.1) the perceived value-added. According to the results of the second model, having a public sector VC seemed to result in lower levels of perceived value-added, whereas having an informal VC seemed to increase the perception of the CEOs of the VC value-adding.

The results of the fourth model suggested also that *tensions* caused by the active involvement of the VC would explain the lower levels of value-added (p<0.001), as could be expected. Quite similarly, in his study, Sapienza (1992, p. 19) found that less divergence of views in VC-CEO interaction was associated with a higher value of VC involvement.

In fourth model, the short *experience of the CEO in the venture's industry* was significantly associated with greater perceived value-added (p<0.001), which confirms the findings by Sapienza (1992, p. 20), who found only moderate association between similar variables.

However, in the study of Sapienza et al. (1996, p. 461), CEOs' industry experience was found to be unrelated to value-added.

No relationship was found to exist between *frequency of contacts* and perceived value-added in any of the models. Unlike expected, the beta coefficients were negative, suggesting that as the frequency of interaction in the VC-CEO pair increased, the perceived value-added would decrease. These results differ from the results of Sapienza (1992, p. 20) which significantly supported that the greater the frequency, the greater the value of the VC's involvement.

The stage of the company was not found to significantly explain the perceived value-added, unlike in the sample of US-based companies in the study of Sapienza et al. (1996, p. 461). Surprisingly, the beta coefficients for stage were positive, unlike predicted based on the results by Sapienza (1992, p. 19) and Sapienza et al. (1996, p. 457). In this study, later stage companies were defined as companies that have already products or services in the market. Although the company stage was not a significant predictor of the perceived value-added, the positive beta could, however, suggest that companies that have products on market receive valuable support from their VCs, for example, in market penetration or production related issues. In addition, neither *R&D-intensity* of the company nor *number of employees* was found to be related to value-added. While betas for the variables were, as predicted, positive and negative, respectively, they were not statistically significant.

6 DISCUSSION AND CONCLUSIONS

6.1 Main Results

In previous chapter, answers to three specific research questions were discussed. This chapter concludes the main findings, and provides the answer to the main research problem, namely:

What non-financial value-added do the different types of venture capital investors bring to Finnish biotechnology growth companies?

The VCs were found to add value to Finnish biotechnology companies, besides directly through monitoring and providing non-financial support, also indirectly through screening and signalling. Although not commonly recognized in the value-adding literature, this research suggests that these indirect ways of value-adding are also relevant for investee companies. Screening function was found to add value to investee companies by enhancing the pre-investment development activities as they were striving for fulfilling the investment criteria of VCs. VCs added value through signalling when the investee companies were acquiring different resources as the CEOs admitted that they mention the name of their VCs in order to improve the image of their company.

The venture capitalists in Finnish biotechnology industry seem rather active hands-on investors, especially in terms of frequent contacts. Although the VCs were usually found to have a seat in the investees' board of directors, the findings suggest, however, that the value-adding of the VCs is not merely vested in the VCs role in the boards, as commonly argued in the literature. The lead venture capitalists in Finnish biotechnology companies are actually in contact with their investee firms more often outside the board meetings, especially indirectly (e.g. via telephone or email). Moreover, VCs were seldom found to hold a majority of the seats in the investees' board of directors. Although this means that geographical proximity between VC and company may not be as important determinant of the investment decisions of VCs, it would be interesting to find out, whether this affects on the quality and nature of value-adding. Moreover, the reduced share of face-to-face contacts of all contacts in a relationship may also result from shortage of time VC has to devote to each portfolio company and not from prevalence of new ways of communication.

As could be anticipated, VCs were usually serving as a sounding board to the CEOs of Finnish biotechnology companies and they were rarely responsible for implementation of activities in different business areas. Areas in which the VCs most often provided advice included strategic planning, acquisition of additional finance and monitoring of financial performance. The most common activity for which the VCs were responsible

instead of management teams, was obtaining additional finance. These results confirm the general view described in the literature of the value-adding of VCs.

By and large, the CEOs of Finnish biotechnology companies found the business areas in which the VCs are involved useful. Providing business contacts and internationalization of the company and/or markets are examples of areas mentioned by the CEOs in which the VC contribution would have been useful, but, in reality, the VCs had been less active. This is not surprising since biotechnology companies are operating in international markets characterized by intense competition. Having a VC with wide international contact network would, therefore, be especially valuable for them.

Close relationship with no tensions between CEO and lead VC was found to increase the perceived value-added of VC involvement. However, as predicted, short experience of the CEO in investee company's industry was associated with greater perceived value-added. On contrary to the expectations, evidence was found that frequency of contacts or size of the investee company contributed significantly to perceived value-added. In addition, neither stage nor R&D intensity of the company were found to have a significant impact on perceived value-added. These results illustrate also the limitation of this study, a subjective evaluation of a phenomenon as, in this study, the value-adding of VCs is measured only from the viewpoint of the CEOs. Hence, it is not surprising that CEOs perceive the value of the involvement of a close friend greater than of a distant outside investor. However, whether the actual value of the VC involvement to the investee company is associated with, for example, needs of the venture, uncertainty of the business environment or VC characteristics, is not explored here.

In following chapters, a profile of the value-adding of each VC is represented based on main findings of this study.

6.2 Profiles of each VC type

6.2.1 The Value-Adding of Informal Venture Capitalists

Of all respondents, the CEOs of informal VC-backed companies perceived the value-added of their VC the greatest. The involvement of nearly all informal VCs was found to fulfill the expectations of the CEOs of their portfolio companies. In addition, the active involvement of informal VCs had very rarely caused tensions inside the portfolio company and the relationship between the informal VC and the CEOs was mostly perceived as close.

Of all VCs, informal VCs were clearly most actively in contact with their investee companies, some of them even working full-time in the companies. Therefore, it is not surprising that

informal VCs were found to be more active in the development of actual products and/or services than their formal colleagues. However, it is interesting that the informal VCs were clearly more active in providing business contacts and in operations aiming at internationalization of the investee as larger venture capital companies are usually thought to have wider contact network. Although informal VCs were found to sign contracts, they usually did not prefer to include special veto-rights or agreements upon follow-on investments in them like most of their formal colleagues did. These findings suggest that informal VCs prefer to monitor their investments by being actively in contact with their portfolio companies and not by using more formal contractual arrangements.

Informal VCs were found to add value indirectly through signalling clearly less than the other VCs. This finding suggest that just having a venture capital investor is not expected to improve the company image, but rather, the name and profile of a well-known venture capitalists is expected to do so. However, the measure used in this study tests only whether the CEOs had used the name of their VC in resource acquisition without paying attention whether this has had successful outcomes. In addition, in this study, the potential of the value-adding through signaling is exploited only if the CEOs perceive that it could be useful for the investee to mention their VC in discussions with stakeholders.

6.2.2 The Value-Adding of Private Sector Venture Capitalists

Private sector VCs stood out from other VCs in only few instances. This may result from the fact that, in this study, the group of private sector venture capitalists was rather heterogeneous including companies from large, international venture capital companies to small entrepreneurial venture capitalists or family businesses due to which there was variation in the responses. However, the small study population and limited information of the VCs restricted banding the group into more specific classes.

Nearly half of the CEOs of companies with private sector VC claimed that their expectations concerning the involvement of the VC were not fulfilled, which could result, for example, from too high expectations or underperformance of the private sector VCs. However, most of these CEOs perceived that the non-financial support of VC had been important to the company's success.

Private sector VCs were found to add value indirectly through screening more than other VCs. Biotechnology companies were found to implement pre-investment development activities when attracting funding from private sector VCs somewhat more often than from informal of public sector VCs. However, this study does not explain whether this results from that the CEOs believe that there are differences between the investment criteria of different types of VCs or from that the private sector VC-backed companies require development activities more than other VCs.

In addition, private sector VCs were quite often found to add-value to investee companies through signalling, as more than two thirds of the CEOs of their investee companies believed in that having the VC would improve the company image in the eyes of other stakeholders. Private sector VCs were promoted usually when the investee was trying to obtain financing from other investors, but never when recruiting new employees.

The fact that private sector VCs were found to be more actively involved in corporate governance of their portfolio companies and to have board meetings more often than other VCs reveals the professional nature of their operations. Developing these areas could improve the transparency and attractiveness of the investee company in the eyes of other financiers and therefore improve the exit possibilities of the VCs.

6.2.3 The Value-Adding of Public Sector Venture Capitalists

The CEOs of the companies with public sector VC were found to perceive the non-financial support of their VCs the lowest of all respondent groups. In half of the cases, the involvement of public sector VC had not fulfilled the expectations of the CEOs of their portfolio companies. Even though the relationship between public sector VCs and the CEOs of their portfolio companies was usually perceived close, of all VCs, the active involvement of public sector VCs had caused most often tensions inside their investee companies.

However, public sector VCs were found to add value to their investee companies indirectly quite often. The public sector VCs were found to add value through signaling more than other VCs. Nearly all the CEOs of public sector VC-backed companies admitted that they had mentioned their VC in order to improve the company image when attracting different resources, especially when acquiring financing from other investors. In addition, nearly two thirds of the CEOs of the public sector VC-backed companies admitted that they had implemented pre-investment development activities in order to attract their VC, and therefore, in terms of this study, had received value-added indirectly from their public sector VCs. Besides developing business strategies or business plan and R&D function, the public sector VCs were found to indirectly have an influence on the composition of the management teams and the ownership structures of the investees more often than the informal and the private sector VCs.

The findings suggest that public sector VCs tend to monitor their VCs more through contractual arrangements and less by being personally in contact with the investee company. Of all VCs, the public sector VCs were found to be least frequently in contact with their investee companies, and to include most often veto-rights and agreements upon follow-on investments in their contracts.

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APPENDICES

Appendix 1: Variable Construction for Regression Analysis

Dependent variable

Perceived Value-Added. To measure perceived value added the CEOs were asked to rate the importance of the non-financial support provided by the lead investor for the company's success (on a five-point Likert-type scale from one to five, where 1 = "Absolutely insignificant" and 5 = "Very important". This measure was simplified from the example of Maula (2001, p. 119), who operationalized the construct of perceived value-added using three measures, namely the extent that the investor had provided the investee company valuable value-adding support in addition to the financing, the extent that the CEO is happy about having the investor and the extent that the value-adding support provided by the investor had been critical to the investee's success. In their studies on value-added, Sapienza (1992) and Sapienza et al. (1996) measured value-added with a proxy that was constructed by weighing the perceived effectiveness of the VCs' involvement in different roles by its perceived importance.

Independent Variables Predicting VC Value Added

R&D-intensity of Venture

Usually the R&D-intensity of companies is measured with the ratio of R&D expenditure to sales (cf. Hyytinen & Pajarinen 2003, p. 220). However, in this study, as large amount of companies in the population do not have sales yet the overall R&D-intensity of the companies was measured with the ratio of R&D-expenditure to total expenditure. The data on R&D-intensity were obtained from the VCs and the financial statements of the companies. The CEOs were asked to estimate the R&D-expenses of the company and the total expenditures were calculated of the income statements.

Stage of Venture (dummy)

According to European Private Equity and Venture Capital Association early stage companies (i.e. companies in seed and start-up phase) may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially (EVCA 2006). In this study, the CEOs were asked how many products or services they have on market and here the companies that have no products or services were defined as early stage companies (value 0) and the others as later stage companies (value 1).

Number of Employees

Here the only measure for the size of the company was the number of employees, as it could be anticipated that the human capital that the companies hold would explain the need for outside assistance. The data were initially obtained from the CEOs and the latest data was checked from the financial statements.

Industry Experience of the CEO

To measure the needs of the CEOs for managerial assistance they were asked how many years of experience they had both in the management and in the industry of the company. As these variables correlated strongly with each other (i.e. the CEOs that had long experience in the management had usually also long experience in the industry of the company) only one of them was included in the models in order to avoid multicollinearity. The years of experience the CEOs had in the industry of the company was finally included in the model as it was found to explain the dependent variable better than the management experience. In addition, the industry experience was used by Sapienza (1992, pp. 26–27) and Sapienza et al. (1996, p. 453).

Perceived Closeness of the Relationship

The data to measure the perceived closeness of the relationship between the CEO and the lead VC was obtained from the CEOs. They were asked to rate how close they find their relationship with the lead investor on a five-point Likert-type scale where 1 = very distant and 5 = very close. Similar measure has not been used in earlier studies, although Sapienza (1992, p. 25) used quite similar variable. They measured the openness of VC-CEO relationship with a multi-item construct summed from the responses of the CEOs and the VCs whether they agreed (on a five-point scaled from 1 = strongly agree to 5 = strongly disagree) upon two statements, namely “this CEO/VC and I are very friendly” and “aside from work-related functions, this VC/CEO and I do not have frequent social interaction” (ibid.). However, the author argues that even though the CEO and VC are friendly to each other this does not mean that the relationship is open as it could be even vice versa and, moreover, the professional relationship could be open and co-operation work well even though the counterparts are not in contact outside the work. Therefore, to best measure the nature of the relationship the CEOs were asked to indicate the closeness of the relationship.

Frequency of Interaction

The CEOs were asked how often they were in personal contacts with the investee company, either directly face-to-face or indirectly via e-mail or telephone, for example. The responses were banded into four categories due to the complicated multi-unit responses as the CEOs responded the times per year, month or week. The values used were

4=Daily or almost daily, 3=Maximum of three times in a week, 2=Maximum of once a week, 1=Maximum of once a month. The frequency of interaction was also used by Sapienza (1992, p. 25) who in turn asked the CEOs and VCs to respond in a seven-point scale Likert-type scale.

Tensions (dummy)

The data was obtained from the CEOs who were asked whether the active involvement of the VC had caused tensions inside the company. Here, a dichotomic variable was used, where 0 indicated that no tensions had occurred and 1 that there had been tensions.

Informal VC (dummy) and Public Sector VC (dummy)

To test whether the VC type explains the level of perceived value-added, two variables were constructed. To be able to use nominal scale variables in the regression analysis they need to be recoded as dichotomic dummy variables (Heikkilä 2005, p. 237). Here, the dummy variable *Informal VC* appointed a value of 1 in case of an informal venture capital backed company and 0 in case of private or public sector venture capital backed company, whereas the dummy variable *Public Sector VC* appointed a value of 1 in case of public sector venture capital backed company and 0 in case of informal or private sector VC-backed company. This way the private sector VC-backed companies are a control group.

Control Variables

Drug Discovery Company (dummy)

The CEOs were asked to select from a list all the industry application segments in which their company was active. In this dichotomic dummy variable, all the companies that claimed to be active in the drug discovery were appointed a value 1 whereas the companies that were not active in this field were appointed 0. It is to be noted that the responses of the CEOs concerning the industry application segment were not exclusive and many companies that were appointed here as drug discovery companies could also be active in other fields.

The statistics of the variables are depicted in Table 24.

Table 24: Summary statistics of the independent and control variables.

	N	Mean	SE.	Std. Dev.	Median	Min	Max
Dependent variable							
Perceived Value-Added	38	3,58	0,21	1,27	4	1	5
Independent variables							
Venture characteristics							
R&D-intensity	37	57,19	6,02	36,63	70	2	100
Stage	38	0,68	0,08	0,47	1	0	1
Number of employees	38	15,87	2,80	17,26	11	1	80
CEO characteristics							
Industry Experience	38	14,34	1,63	10,08	13,5	0	42
Relationship Characteristics							
Perceived Closeness	38	3,97	0,17	1,05	4	1	5
Frequency of Contacts	38	2,42	0,15	0,92	2,5	1	4
Tensions (dummy)	38	0,45	0,08	0,50	0	0	1
VC Characteristics							
Informal VC (dummy)	38	0,29	0,07	0,46	0	0	1
Public Sector VC (dummy)	38	0,37	0,08	0,49	0	0	1
Control Variable							
Drug Discovery Company (dummy)	38	0,47	0,08	0,51	0	0	1

Appendix 2: Reliability and Validity Analysis

One of the biggest threats to the reliability of this study derived from the small study population due to which having high enough response rate was essential. In case the response rate would have been lower the reliability of the study would have suffered because a sample from a population that includes less than 40 cases would have restricted making conclusions concerning the whole population. Fortunately, the response rate in this study was exceptionally high (98 %), and the data can be said to cover the whole population.

As most of the data were obtained from the CEOs of the companies in the study population, one could assume that the responses given by the same CEOs would probably be rather similar, if the study was repeated within the same time frame. In addition, the quixotic reliability, i.e., the extent to which a particular technique of observation yields an unvarying measurement (Järvinen 2004, p. 157), of the study was assured as the author was able to make sure that the respondents understood the questions as the data were gathered via telephone interviews by the author. However, the as the study is cross-sectional by nature and describes the current stage of the value-adding phenomenon which takes place in dynamic environment, the results could be different, if the study was repeated at different points of time, therefore, making the diachronic reliability of this study is limited (Järvinen 2004, p. 157). The possible differences in the data gathered with similar methods on the same study population in another period of time could result, for example, from that new CEOs are interviewed, that other VCs are acting as lead investors, and that the companies may have different needs for VC assistance. Thus, caution must be exercised in the application and interpretation of the results of this study.

To ensure the validity of this study several aspects have been taken into considerations in this study. First of all, the measures and methods used in this study are derived from previous research and literature ensuring that the model and the concepts used describe the reality. In addition, comments about the questionnaire were asked from several experts in the area of both biotechnology and venture capital. The questionnaire was also pre-tested in one personal interview with a CEO of a biotechnology company that had long experience in co-operation with venture capitalists. Furthermore, the data was obtained from the most knowledgeable person in the portfolio companies as the CEOs were interviewed.

Concerning the validity of the results of this study, it is to be noted that nearly all the measures in this study rely on the perceptions of the CEOs and, therefore, bias and inaccuracy are potential threats, as usually when perceptual measures are used. However, for most of the measures of interest, for example, the nature and frequency of the VC involvement and the information of the privately held portfolio companies, there are no data publicly available. In addition, the primary data obtained from the CEOs is complemented only by the secondary data from the financial statements of the companies.

However, in order to ensure the validity of the measures used in this study, data should have been collected also from the venture capitalists, and thereafter the consistency of the responses of both the VCs and the CEOs should have been tested. Therefore, the results in this study reflect only how the CEOs perceive the value-adding of the VCs. Finally, as the results can be seen to be in consonance with the theoretical framework and the results from the previous studies, within the limitations the validity of the study can be assumed rather high.

Generalizability of this study to other contexts is rather limited as the study covers only companies from one industry, which is in addition rather unique in many ways. In addition, the strong contribution of the Finnish economy as a provider of venture capital to biotechnology companies sets limitations to the generalization of the results in cross-country comparison within the biotechnology industry.

In addition to the general discussion of the reliability and validity of the study, it is important to discuss separately the limitations of the statistical methods used in the analysis. First of all, as discussed earlier, the small amount of companies in the study populations restricts the use of some of the statistical methods. However, as the aim of the study is to shed light into the value-adding phenomenon in the Finnish biotechnology companies, descriptive statistics, cross-tabulations and graphs based on nearly whole study population are a reliable ways to represent the results.

Limitations of the Multiple Regression Analysis

Besides the basic statistical methods, multiple regression analysis was used in one particular part of the study. In order to understand the limitations that using this method in the context of this study have, it is important to shed light into the restrictions and assumptions of this method. The use of multiple regression analysis is based on few assumptions concerning the data analyzed: 1) use of reasonable predictors, 2) sufficient sample size, 3) low multicollinearity and 4) normal distribution of the dependent variable (Metsämuuroinen 2003, pp. 580–581).

First of all, the regression model should only include variables that are expected to explain the phenomenon. In this study, this was assured as only the variables that were either found to explain the level of value-added in previous studies, or expected to explain the perceived value-added in the study context based on literature review on the research environment.

The second assumption in the regression analysis is that the sample size used should be high enough compared to the number of variables used in the model. According to Metsämuuroinen (2003, p. 581) the number of cases in the sample should be as high 40 for each independent variable used. As in this study, the study the population is only 38, it would strictly speaking allow only the use of one variable to explain the perceived

value-added. In the models, however, was five to seven independent variables used, which may increase the overall value of the Adjusted R Square, meaning that the model does not explain the variation of the dependent variable in reality as much as the results may suggest.

The third assumption is that the independent variables correlate moderately with the dependent variable, but not with each other (Metsämuuroinen 2003, p. 581). In case the correlations are too weak, useful models can not be built. However, if the correlations between the predictors are too high, this, so called, multicollinearity may cause problems when interpreting the coefficients of the variables in the model. In the beginning, in the model, only variables that did not correlate strongly with each other were chosen. Table 25 shows that the independent and control variables used in the model do not correlate highly with each other, in general. In addition, the statistical significant correlations ($p < 0.01$) between were taken into considerations in the models as, for example, tensions and informal VC variables were not included in the same model to avoid multicollinearity. Finally, the intercorrelation was tested afterwards as the low enough level of tolerance was checked (Metsämuuroinen 2003, p. 591). Therefore, multicollinearity does not seem to cause problems in this study. In addition, if the regression model is not used in making interpretations of the coefficients, the multicollinearity is not a restriction to the use of the method (Heikkilä 2005, p. 251).

Table 25: Correlations of the variables used in the OLS regression

	1	2	3	4	5	6	7	8	9
1 R&D-intensity									
2 Stage (dummy)	-0,271								
3 Number of employees	-0,077	0,380*							
4 Industry Experience	0,289	0,163	-0,041						
5 Perceived Closeness	0,128	-0,194	0,101	-0,035					
6 Frequency of contacts	0,373*	-0,106	0,074	0,042	0,414**				
7 Tensions	-0,021	0,156	0,147	-0,194	-0,125	0,003			
8 Informal VC (dummy)	0,106	0,059	-0,337*	0,207	0,291	-0,248	-0,458**		
9 Public Sector VC (dummy)	-0,037	0,049	0,092	0,027	0,039	0,197	0,300	-0,487**	
10 Drug Discovery (dummy)	0,043	0,078	0,159	0,005	-0,333*	-0,096	0,206	-0,373*	0,040

Spearman's rho correlations. * $p < 0.05$ (2-tailed); ** $p < 0.01$ (2-tailed)

Finally, the regression model assumed that the residuals are and dependent variable are normally distributed. In this study, the dependent variable used is ordinal number derived from a five-point Likert-type measure. Even though, the use of a discrete dependent variable violates the assumption of normal distribution it is still commonly used in the literature (e.g., Sapienza 1992, Sapienza et al. 1996).

Despite the strict assumptions that the regression analysis is based on, the method is widely used in the related literature (Sapienza 1992, Sapienza et al. 1996, Fredriksen & Kloftsen 2001, Barney et al. 1989). However, the results from the regression analysis in this study should be analyzed carefully and considered only as indicative.

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