

THE USE OF COST- BENEFIT ANALYSIS IN VENTURE CAPITAL INVESTMENT DECISIONS

JENNIFER ABENA AMOAKOH DUAH

A MASTER OF SCIENCE THESIS SUBMITTED TO THE ECONOMICS AND SOCIAL
SCIENCE DEPARTMENT OF AGDER UNIVERSITY, NORWAY IN PARTIAL
FULFILLMENT FOR THE AWARD OF A MASTER OF SCIENCE DEGREE.

**AGDER UNIVERSITY
KRISTIANSAND, NORWAY**

JUNE 2009

FOREWORD

This research work aims to contribute to the advancement of educational literature and training materials on cost benefit analysis in the context of venture capital investment decision when evaluating potential investments. It reveals the use of different valuation methods by venture capitalist and how cost benefit analysis (CBA) could be used as a valuation technique. The study shows that venture capital firms seldom use CBA when evaluating potential investment in Norway. However, the use of CBA can provide significant pay-backs by improving the quality of returns and enhancing financial decisions that minimize the potential risk of loss if venture capitalist strictly adhered to it before negotiating the deal.

Special thanks to my supervisor, Professor Jan Inge Jenssen who provided excellent tutoring, guidance and suggestions. Investment managers and chief financial officers of venture capital firms in Norway used in this research work provided invaluable support with their co-operation, contribution and suggestion during the data collection period.

I am deeply indebted to my class mate Andrew Musau, friends and my family especially my husband, Francis Yaw Duah, for his understanding and support throughout my period of study in Agder University.

And finally to the Almighty God be praise forever!

TABLE OF CONTENT

<u>FOREWORD</u>	<u>1</u>
<u>LIST OF FIGURES.....</u>	<u>5</u>
<u>LIST OF TABLES.....</u>	<u>5</u>
<u>ABSTRACT.....</u>	<u>6</u>
<u>KEYWORDS.....</u>	<u>7</u>
<u>ACRONYMNS.....</u>	<u>7</u>
<u>DEDICATION</u>	<u>8</u>
<u>CHAPTER ONE: INTRODUCTION</u>	<u>9</u>
1.1 BACKGROUND STATEMENT	9
1.2. PROBLEM DEFINITION	10
1.3 RESEARCH QUESTION.....	10
1.4 SIGNIFICANCE OF THE STUDY	10
1.5 LIMITATION OF THE STUDY	10
1.6 ORGANISATION OF THE STUDY.....	11
<u>CHAPTER TWO: LITERATURE REVIEW.....</u>	<u>12</u>
2.1 INTRODUCTION.....	12
2.2 COST-BENEFIT ANALYSIS.....	12
2.3 HOW VENTURE CAPITALIST CAN USE CBA TO EVALUATE POTENTIAL INVESTMENT.	13
2.3.1 IDENTIFYING THE COST AND BENEFITS.....	13
2.3.2 MEASURING THE COSTS AND BENEFITS.....	19
2.3.3 CONSIDERING THE COSTS AND BENEFITS OVER THE LIFE OF THE PROJECT	20
2.3.4 DECISION CRITERION: PERFORMING COST-BENEFIT ANALYSIS .	23
2.3.5 SELECTION CRITERION	24
2.3.5.1 NET PRESENT VALUE	24

2.3.5.2 <i>BENEFIT-COST RATIO (BCR)</i>	26
2.3.5.3 <i>INTERNAL RATE OF RETURN</i>	27
2.5 CONCEPTUAL FRAMEWORK	28
2.5.1 RESEARCH PURPOSE: COST-BENEFIT ANALYSIS IN THE CONTEXT OF VENTURE CAPITAL INVESTMENT DECISIONS	29
2.5.2 CALCULATING THE NET PRESENT VALUE	30

CHAPTER THREE: SETTING – VENTURE CAPITAL INVESTMENT**32**

3.1 NORWAY’S VENTURE CAPITAL INVESTMENT	32
3.2 VENTURE CAPITAL VALUATION	35
3.3 VENTURE CAPITAL PRE- INVESTMENT ACTIVITIES	37
3.3.1 DUE DILIGENCE	37
3.3.2 INFORMATION FOR VALUATION	38
3.3.3 VALUATION METHODS	40
3.6 POST-INVESTMENT ACTIVITIES	43

CHAPTER FOUR: METHODOLOGY.....**45**

4.1 INTRODUCTION	45
4.2 DATA COLLECTION	45
4.3 EXPERT EVALUATION	47

CHAPTER 5: RESULTS.....**48**

5.1 INTRODUCTION	48
5.2 RESULTS	48
5.2.1 DUE DILIGENCE	48
5.2.2 SOURCES OF INFORMATION FOR VALUATION	49
5.2.3 VALUATION METHODS USED	51
5.4 COST-BENEFIT ANALYSES AS A VALUATION TOOL	53

CHAPTER SIX: CONCLUSION**59**

6.1 INTRODUCTION	59
6.2 SUMMARY	59

6.2.1 HOW DO NORWEGIAN VENTURE CAPITAL FIRMS EVALUATE POTENTIAL INVESTMENT.....	59
6.2.2 COST-BENEFIT ANALYSIS IN THE CONTEXT OF VENTURE CAPITAL INVESTMENT DECISIONS	60
6.3 IMPLICATIONS.....	60
6.4 SUGGESTIONS FOR FURTHER RESEARCH.....	61
<u>REFERENCES</u>	<u>63</u>
<u>APPENDIX A.....</u>	<u>71</u>
QUESTIONNAIRE 1.....	71
QUESTIONNAIRE 2.....	73
<u>APPENDIX B</u>	<u>75</u>
GLOSSARY OF SELECTED VENTURE CAPITAL TERMS	75
<u>APPENDIX C.....</u>	<u>77</u>

LIST OF FIGURES

Figure 1: Changes in Total Investment and New Funds	33
Figure 2: American Venture Capital Investments by Stage of Development in 2006	34
Figure 3: Norwegian Venture Capital Investments by Stage of Development in 2006....	34

LIST OF TABLES

Table 1: Venture Fund Cost and Returns.....	16
Table 2: Venture Capitalists' Discount Rate for Different Stages of Development.....	22
Table 3: Appropriate Decision Criterion for Policy Types	24
Table 4: Conceptual Framework – Listing of Costs and Benefits	29
Table 5: The Domestic / Foreign Matrix of Number of Portfolio Companies in Norway	35
Table 6: Summary of VC Due Diligence Process	38
Table 7: Relative Importance of Key Factors in Venture Capitalists' Valuation of New Ventures. Hill and Power (2001).....	39
Table 8: Sources of VC Information for Valuation	40
Table 9: The Importance of the Due Diligence Sources for the Total Venture Capital Firms.....	49
Table 10: Venture Capital Evaluation vs. Source of Information [Manigart <i>et al.</i>, (2000)].....	50
Table 11: Valuation Methods in the Total Venture Capital Firms (% of the respondents)	51
Table 12: CBA Survey Responses.....	56
Table 13: Correlation between the Sources of Information in Evaluating Potential Investments and Cost-benefit Analysis	77

ABSTRACT

This research work focuses on the differences in the approaches and methods used by venture capital firms to evaluate potential investment. This includes: due diligence, sources of information in preparing valuations and the valuation methods used. Then how cost-benefit analysis could be used in such investment in Norway is further explored. The study aims to describe the cost-benefit analysis process by which venture capital firms operating in Norway use to evaluate funds to minimize the loss of capital invested and enhance a good return on investment. The dissertation is based on a 2-staged questionnaire survey process with venture capitalists operating in Norway. In the first phase of the study, fifteen (15) venture capitalist firms participated in a telephone interview followed by a set of questionnaires via email aimed at discussing the differences in the approaches and methods used in evaluating potential investment. In the second phase of the study, five (5) venture capital firms gave insight into the role of cost-benefit analysis in the investment decision processes. The questionnaire survey reveals that a relatively high proportion of Norwegian venture capital firms place special importance on the curriculum vitae of management and interview with entrepreneurs, in evaluating their potential investments. At the same time, they use the payback period and capitalized maintainable earning (P/E multiples) as the valuation method and not cost-benefit analysis. However, it seems that venture capital firms who performed cost-benefit analysis used the internal rate of return as a measure of the discount rate and the determination of the discount rate is the most important factor taking into consideration systematic and non-systematic risk. The discount rate used by Norwegian venture capitalists is more intuitive and have about the same interval as in the rest of the world depending on the company stage.

DEDICATION

This research work is dedicated to the only man I love, my husband and best friend; Francis Yaw Eduonu Duah and my wonderful children: Obaasema Nana Afua Duah and Oheneba Abeku Duah.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND STATEMENT

Venture capitalists have played an important role in fostering the new technology based firms, many of which have become today's large businesses such as Google, Apple and Intel (Florida and Kenney, 1988). VC firms basically raise money from both institutions and individuals for the investment in high-risk, high-return unlisted firms. They also play a part in investment selection by acting both as "scouts" able to identify future potentials and as "coaches" who can help realize them (Baum and Silverman, 2004).

Determining the economic valuation of a company is one of the more challenging and important discussions an entrepreneur can have with investors (Quindlen 2000). Research that provides operational guidance on such economic valuation, is, however, lacking. Indeed, Wright and Robbie (1998:558) conclude that: "little work is available on the valuation of venture capital investments". Furthermore, some venture capitalists maintain that: "the truth about valuing a start-up is that it's often a guess" (May and Simmons, 2001:129). Wright and Robbie (1998) point out that most venture capital investments typically have large amounts of private information. The research reported in this paper seeks a better understanding of the information sources used and the valuation methods applied by venture capitalists in the face of this information deficit. Importantly we explore how venture capitalist can use cost-benefit analysis as a valuation tool to evaluate potential investments.

Venture capital firms can be seen as seeking a return on their specific and distinctive skills in identifying, investing in and monitoring new projects and risky projects in established firms. Barry (1994) argues that intensive screening and evaluation allows the venture capital firms to gather substantial amounts of information prior to investing, reducing the extent of any adverse selection among projects. Venture capitalists are agents for providers of funds. If they do not perform satisfactorily then they may fail to attract further funding. There is thus pressure on venture capital firms to use a wide range of accounting and non-accounting information. This involves the process of due diligence, such as verifying the robustness of accounting information, particularly profit and cash flow forecasts (Wright and Robbie, 1998)

and acquiring other information for valuation purposes. A variety of valuation techniques and adjustments to expected rates of return can be used and this includes cost-benefit analysis.

1.2. PROBLEM DEFINITION

What are the key factors that influence the economic value of an entrepreneurial firm when such a firm seeks equity financing from a venture capitalist, what valuation tools are used and how can CBA be used in light of these other valuation tools? If we are to know whether the venture capital market allocates resources properly, we need to understand how VCs make investment decisions yet, how to place an economic value on a new venture is still one of the most difficult tasks in venture capital decision-making (Mechner, 1989). In this study, I show valuation methods used and the importance of venture capitalists weighing the costs and benefits that a CBA reveals and whether, in the light of their objectives, an investment option is worth pursuing given both its costs and benefits.

1.3 RESEARCH QUESTION

The main research problems that are discussed in this research work can be stated as follows: “How do VC firms evaluate their potential investments?” and “what is cost benefit analysis as a valuation tool in the context of venture capital investment decision?” This is with emphasis on Norwegian firms.

1.4 SIGNIFICANCE OF THE STUDY

The outcome of this study will enable us to review literature regarding how venture capitalists can effectively use cost-benefit analysis in their investment and financing decision to determine whether a particular investment decision is economically feasible and which of two or more investee companies when invested in provides the best return on capital invested.

The findings of this paper could also serve as a good source of reference for interested researchers, practitioners and investors.

1.5 LIMITATION OF THE STUDY

The non-co-operation and lack of interest from majority of the venture capital firms made it difficult to have a fair representation of opinion from all the primary venture capital firms in Norway and makes our findings statistically insignificant because of the relatively small sample size. This limited our scope of work and our ability to acquire an in depth information as much as possible from a more practical source to be representative of the Norwegian venture capital market.

1.6 ORGANISATION OF THE STUDY

This research work is organized into five main chapters. The first chapter covers Introduction and deals with background information, a statement of the problem, the objectives of this study as well as the outline of the Study. In chapter two, the relevant literature is reviewed on cost-benefit analysis. It provides a literature review on the steps to an effective cost-benefit analysis and a discussion of the conceptual framework of CBA in venture capital investment decision making. The review gives a theoretical framework on the study. Chapter 3 reviews venture capital investment decisions and discusses the pre and post investment decisions used by most venture capital companies. Chapter four will describe the methodology of the analysis i.e. the data and sample characteristics of Norwegian VC firm survey conducted in this paper are described. In Chapter 5, the empirical results are presented and my evidence and some implication discussions are summarized in Chapter six.

CHAPTER TWO: LITERATURE REVIEW

"Of all the techniques of investment appraisal which in recent years have come to be applied to investment projects, none has attracted more attention than cost-benefit analysis". (Blaug, 1 970).

2.1 INTRODUCTION

In this section, literature on cost-benefit analysis is reviewed and provides insight and validation for an analysis of venture capitalist using this analysis as a valuation tool.

2.2 COST-BENEFIT ANALYSIS

Prest and Turvey (1965) explains cost-benefit analysis as a practical way of assessing the desirability of projects, where it is important to take a long view (in the sense of looking at repercussions in the further, as well as in the nearer, future) and a wide view (in the sense of allowing for side-effects of many kinds on many persons, industries, regions, etc.), i.e. it implies the enumeration and evaluation of all the relevant costs and benefits (Prest and Turvey, 1965). The Financial Services and Market Act (FSMA) define CBA this way: "Cost-benefit analysis means an estimate of the costs together with an analysis of the benefits..." In other words, FSMA requires at a minimum that CBA be a quantification of the costs and a qualitative analysis of the benefits in a form of return in capital invested to the venture capitalist for example.

Cost-benefit analysis (CBA) in my opinion is a powerful tool which aids in assisting a decision making process in that it follows economic principles that resources are scarce and they should be utilized wisely to increase net welfare. Cost-benefit analysis increases efficiency through the effective allocation of scarce resources. The quantification of costs and benefits is one of CBA's strength. However, it is also a weakness in that, there is the problem regarding the quantification of all the cost and benefit for a particular investment project. The weighing is judged on preferences and these preferences can differ among groups Thus, I

think that judging something based on preference is not credible. Also there is the difficulty in quantifying intangible benefits and cost. This problem is conceivable in that most researchers (e.g. Fugitt and Wilcox, 1999) advise the qualitative analysis of any cost and benefit which cannot be quantified in numerical terms.

Another weakness is the fact that costs can be overstated. It can come from the way the costs are estimated, the size of the projects or action needed, and the cost factors (i.e. to include costs that are irrelevant to the project). Empirically, the costs and benefits can be overstated. As it can be overstated, it means that inaccuracies happened and thus CBA's result should be treated with caution (Flyvbjerg *et al.*, 2005). Also CBA deals only with optimal allocation of scarce resources, yet it does not take into account distribution problems. For example consider two potential investments which provide different returns to the venture capitalist; after conducting a CBA, the VC selects the project investment which gives him a superior return on capital invested or positive NPV within the shortest possible time regardless of other factors.

2.3 HOW VENTURE CAPITALIST CAN USE CBA TO EVALUATE POTENTIAL INVESTMENT.

In conducting a cost-benefit analysis, venture capital firms must follow the methodology in enumerating and evaluating all the relevant cost and benefits. Galambos and Schreiber (1978) have identified four steps for a successful cost-benefit analysis. These steps are: 'identifying the cost and benefits of the project, measuring the costs and benefits in dollars, considering the costs and benefits over the life of the project and finally, reaching a decision' Galambos and Schreiber (1978, 62-63).

2.3.1 IDENTIFYING THE COST AND BENEFITS

Cost of venture capital

Most venture capital funds are structured as limited partnerships. These partnerships generally have two types of investors: Limited partners and a general partner. The investors in the fund are called limited partners (LP) many of whom are pension funds, corporations and high net worth investors. The venture capital team is called the general partner (GP). The GP finds the

investments, negotiates the deal, monitors the investment (hopefully adding value along the way), exits the investment and returns the proceeds to the LPS. These funds usually have an active life of ten years (Black& Ronald, 1998).

The venture capitalist incurs cost in proceeding to negotiate the deal. Some of the direct costs for the purpose of this research identified by most VC include: the startup cost which happens to be one of the components of the total financing cost. Maintenance cost comprising management fees, carried interest and other expenses are part of other direct cost the VC should identify. Regarding management fees, Partners and staff of a venture capital receive about 2% of the total amount of the fund they manage each year. Implying that over the ten year life span of the fund, the general partners receive 20% of the total fund. For example, if the fund had total commitment of 100million dollars and a 2% management fee, the fund would pay the management company 2million per year which is expected to cover the operating cost of the management company including investment personnel salaries, office expenses, travelling expenses and all other expenses related to managing the business (Berkery, 2007).

With Carried interest, the VC firm managing a fund generally will be allocated 20% carried interest in the fund. This means that the firm is entitled to 20% of all the gains, once the LPs have received 100% of the capital of the fund (Berkery, 2007). The general idea is that if the fund is profitable, the general partner will receive a reward. For example, if a fund was able to pay \$200 million in distributions to investors who contributed \$100 million, 20% of the \$100 million gain (\$200 million in distributions - \$100 million in contributions) or \$20 million would go to the general partner. This is a form of motivation to the general partners but inflates the operating cost. Expenses incurred that clearly relate to specific investments are charged against the fund and not from the 2% management fee. These other expenses include due diligence expenses, legal Fees, organizational and Syndication Costs, audit and tax fees among others (Berkery, 2007).

The other cost is indirect financing cost which is associated with the various expenses that a firm incurs to obtain the funding. These costs invariably increase the total financing cost and decrease the financing amount. However, these indirect costs are not easy to estimate (Carpentier & Suret, 2005). According to Timmons & Spinelli (2004) entrepreneurs grossly tend to underestimate the real cost of getting the cash into the bank and also underestimate

real time, effort and creative energy required. The degree of effort fund raising requires is perhaps the least appreciated aspect in obtaining capital. In both cases, there are opportunity costs in expending these resources in a particular direction when both time and calendar are moving.

Carpentier & Suret (2005) identify 4 non-independent elements that collectively generate high indirect cost of financing that VC must inculcate into their cost assessment. They include risk, size, information asymmetry and market structures. Young companies with the desire to grow are characterized by high risk. According to Stromberg and Kaplan (2003), VC are faced with three types of uncertainty when considering the cost of a potential investment 'internal uncertainty - the relevant information is internal to the firm and it is more likely that the VC is less informed than the entrepreneur; external uncertainty - the relevant information is external to the firm and it is more likely that the VC and the entrepreneur are equally informed; and difficulty of execution, different from both previous notions of risk, which captures the complexity of the task and the reliance on the entrepreneur's human capital' (Stromberg and Kaplan, 2003). According to Berkery (2007), if an investee company performs more poorly than expected, the fund manager writes down the valuation of the investment to signal the LP that money has been impaired written in the form of 25%, 50% , 75% or 100% is often used. Poor investments are apparent after 6 to 12months but good investment take quite some time (Berkery, 2007). However, in Europe there are guidelines for portfolio firm valuation from EVCA (European private equity and venture capital association) Regarding size, small investment made at an early stage represent an additional risk and cost and comprise only a minimal proportion of their operations borne by these VC firms (Murray, 1999). Information asymmetry exists in most small companies, where key information is not easily assessable to external stakeholders (Denis, 2003). Bollingtoft *et al.*, (2003) note that asymmetry generates agency cost that is suboptimal behavior by management to the detrimental of shareholders. Efforts to control asymmetry and agency problems only increase cost (Cressy & Olofson, 1997). In a competitive market, capital suppliers tend to reduce cost and negotiating times to attract the best projects. If a company lacks real alternatives, it may incur significant additional cost because capital providers hold discretionary power which may unduly prolong the financing time (Carpentier & Suret, 2005). Other recurring cost VC must be on the lookout for when negotiating the deal among others include: File preparation cost which is the effort of complying with standards in terms of internal and accounting practices. The cost of searching for investors, cost involved in the due diligence procedure, cost involved in the

protection of intellectual property rights, the cost of negotiation and conclusion of financing conditions and the cost of reorganization and use of funds (Carpentier & Suret, 2005).

Benefits of venture capital

Before making an investment and designing the financial contracts, VCs spend a significant amount of time and effort evaluating and screening the benefits in undertaking a given investment. VCs explicitly consider the attractiveness of the external environment -- the market size, customer adoption, and competition - the feasibility of the strategy and technology, the quality of the management team, and the deal terms (Stromberg and Kaplan, 2003). According to National Venture Capital Association in America, the venture capitalist only realizes a return on their investment if the company goes public (IPO) or is merged or purchased by another company (M&A). Venture Economics (2000) reports a 25.2% 5 year return and 18.7% 10 year return for all venture capital funds in their data base as of 12/21/99, a period with much higher stock returns. This calculation uses year-end values reported by the funds themselves. Chen *et al.* (2002) examine the 148 venture capital funds in the Venture Economics data that had liquidated as of 1999. In these funds they find an annual arithmetic average return of 45%, an annual compound (log) average return of 13.4%, and a standard deviation of 115.6%. As a result of the large volatility, however, they calculate that one should only allocate 9% of a portfolio to venture capital. Kaplan and Schoar (2003) find that average fund returns are about the same as the S&P500 return. They find that fund returns are surprisingly persistent over time. To understand the venture fund returns, the researcher uses a model from Wilson (2008) who provides some real numbers in his model (Table 1).

Table 1: Venture Fund Cost and Returns

Assumptions:					
Fund size	100,000,000				
Term	10	Years			
Management fee:	2.50%	In first 4 years			
	2.25%	In year 5			
	2.00%	In year 6			
	1.75%	In year 7			
	1.5%	In year 8,9&10			

Carry	20%	of gains net of management fees			
Average initial investment	2,088,235	1mm concept,2.5m trial,3.5 revenue			
Average follow on investment	2,500,0000	For concept stage and trial stage investment			
	3,500,000	For revenue stage investment			
Average total investment	5,300,000	Per deal			
Total deals	15				
Initial investment per year	3	Year 1			
	4	Year 2 &3			
	3	Year 4			
	1	Year 5			
Winners	5	33%			
Money backs	5	33%			
Losers	5	33%			
Rounds per investment:	1	For loser			
	2	For money back			
	3	For winner			
	4	For concept stage winner			
	4	Concept	2 losers	1 money back	1 winner
Deals by stage:	7	Trial	2 losers	2 money back	3 winners
	4	Revenue	1 loser	2 money back	1 winner
Average return multiple:	-	For loser			
	1.25	For money back			
	6.5	For winner			
Average Holding period(years)	6	Concept			

	5	Trial			
	4	Revenue			
	2	Loser			

From the model \$100mm venture fund model produces the following; Total Management Fees: \$20mm-this is debatable in that management fees are most commonly calculated from net committed capital. That means that when exits have been made and the money has been returned to the investor, management fee drops as committed capital drops ; Total Invested Dollars: \$80mm; Total Proceeds on Investments: \$322mm; Total Gain on Investments: \$242mm; Gross Multiple: 4x (\$322mm/\$80mm); Gross IRR: 39.2%; Multiple including Management Fees: 3.2x; Gain Including Management Fees: \$222mm; IRR Including Management Fees: 32.9%; Carried Interest Fees: \$44mm (20% of \$222mm); NET Multiple: 2.56x; Net IRR: 28.6%.

It is clear from the above model and its assumptions that, if a venture capitalist invest \$100M fund, management fees can take \$20M off the top, so there is only \$80M left to invest. That 2% annual management fee over the 10 year life of a fund really adds up. Also note that if the fund returns 4X on invested capital (4 X \$80M = \$320M) that the VC gets 20% of the NET profit above a predefined yearly hurdle rate.

According to (Wilson, 2008), the average investment in the fund from the model is \$5.3mm. If the fund invested that much in one company over a number of years and owns 20% of the business and the business is sold for \$500mm, then the fund's 20% is worth \$100mm. It's a 20x multiple on the investment. This is mostly rare but it happens in the venture capital business. When the \$100mm is distributed, one deal has returned the entire fund. That is huge because then the other winners will typically collectively return from one times the fund's value to three times the fund's value. After carried interest fees, that gets you to the 1.5x to 3x net to Limited Partners.

Berkery (2007) explains that, a fund that gives back three or more times the capital committed is viewed as having done very well. Two and a half times would be considered good. Anything under two would be considered disappointing. Venture capital investors generally say that they will invest in a company only where they can see a way to earning a 10 times or higher multiple on investment (Berkery, 2007). According to Berkery (2007), empirical

evidence on fund return shows that big hits are the difference between the highest performing venture capital firms and average ones i.e. A big hit repays one-third, one-half, all or even a multiple of the fund.

Furthermore, as control issues are very important in venture capital financing, financial contracts between venture capitalists and entrepreneurs include detailed descriptions of how control rights are divided. Kaplan and Strömberg (2003) found that in VC financings cash flow rights, board rights, voting rights, liquidation rights, and other control rights are separately allocated and that allocation of control rights between VC and entrepreneur is a central feature of the financial contract. These rights are often contingent on observable measures of financial and non-financial performance (*Ibid*). A benefit of such venture capital financing is that control rights received by venture capitalists are usually disproportionately large to what they would get under the “one share one vote rule” (Sahlman, 1990). Gompers (1997) found that the control rights received by venture capitalists are greater when the problem of asymmetric information is larger (Kirilenko, 2001).

2.3.2 MEASURING THE COSTS AND BENEFITS

Once the venture capitalists’ benefits and costs have been identified, the second step is to measure or assign a dollar amount to each benefit and cost. The indirect cost and benefit identified by most VC cannot be measured based on financial statements which incidentally are not available in the case of private companies. A dollar amount can nonetheless be assigned to tangible benefits and costs (Carpentier & Suret, 2005).

Many scholars argue that flaws of cost-benefit analysis occur during the measurement of costs and benefits. Too often analysts will leave out or incorrectly measure costs and benefits. Often there will be benefit and cost variables that are difficult to measure in market value. These are referred to as intangibles. Fuguitt and Wilcox (1999) have three principles for measuring intangible variables: ‘When a policy has hard-to-measure effects, the analyst should (1) value as many benefits and costs as possible using monetary units; (2) if unable to assign a monetary value to a particular policy consequence, try to quantify it in physical units; and (3) in the especially difficult situation where the consequence eludes quantification of any kind, identify and describe it qualitatively’ (Fuguitt & Wilcox 1999, 173).

When performing a cost-benefit analysis using unmeasured variables, the venture capitalist can estimate a threshold. “Intuitively, the decision maker can weigh the unmeasured benefits and consider whether or not these exceed the threshold” (Fugitt & Wilcox 1999, 173).

2.3.3 CONSIDERING THE COSTS AND BENEFITS OVER THE LIFE OF THE PROJECT

Venture capital funds are created for a fixed term, typically ten years. They are formed as limited partnerships. The venture capital firm serves as the general partner and wealthy individuals, families and university endowments are the limited partners. The funds invest in entrepreneurial companies and distribute returns to their limited partners as they harvest their investments (Berkery, 2007). The managers of venture capital funds compete with each other to obtain funds from investors. Therefore, they are mostly interested in the relative performance of the fund - that is, the fund is successful if its performance is better than the performance of competitors. The goal of the venture capitalist is to cultivate an investment to the point where they can successfully exit the investment with a positive return and of the companies that a venture fund is invested in the venture capitalist only expects to take 20 to 35 percent of these public (Gompers and Lerner, 1999). Of the remaining companies the venture capitalist expects to have about 35 percent partial to total loss and the remainder to return a zero or small profit (Sahlman, 1990). Going public is not the only means of successful exit available to the venture capitalist but recently it has become the most desirable and profitable and only a small portion of venture capitalist investments reach a level where they can have an initial public offering (IPO) but when they do, they produce some of the highest returns (59.5% per year on average as compared to 25% when combined with acquisitions) (Gompers, 1995). Other methods of exit are to sell the investment to another company, a management buyout for companies that stay private or mainly for failures, liquidation. Venture capitalists are given strong incentives through the structure of the partnership to try and have every investment exit as successfully as possible (Gompers and Lerner 1999).

In case of listed companies, the cost of equity can be determined by using the Capital Assets Pricing Model (CAPM) or some other market equilibrium model. The simplicity of CAPM has made it a standard benchmark in the industry. According to the CAPM, the required rate of return depends on the risk-free rate, the systematic risk of the company (or project)

measured by beta, and the market risk premium. In the case of well developed capital markets, obtaining that data is not a very difficult task. Although there are some fundamental and technical issues associated with the use of CAPM (Damodaran, 2005), it is still by far the most widely used model for estimating the cost of equity (Pereiro, 2002). However, in the case of venture capital, the use of CAPM is difficult for the following reasons as enumerated by Koomagi & Sander (2006) as follows:

- Investments are made to a non-listed company and therefore liquidity risk exists.
- The unsystematic part of the total risk is much greater due to technological risks.
- The entrepreneur is sometimes forced to invest most or even all his wealth into one project, which makes it difficult to diversify the risks. In that case, he wants compensation for the total risk not only for the systematic part of it. Jones and Rhodes-Kropf (2004) argued that diversifiable risk should be priced even if the investor is fully diversified.
- The technological uncertainty declines during the project life cycle, i.e. the risk and thus the required rate of return depends on the stage of the project.
- Using staged financing instead of lump sum financing reallocates the risks between entrepreneurs and venture capitalists and thus may affect the cost of outside equity.
- Quite often, the distribution of control and voting rights does not correspond to the distribution of cash flow rights. This, however, affects the risk taken by an outside investor and his required rate of return.

Historically, the discount rate by which venture capital funds calculate the value of companies lies in the range of 20–80% per year, depending on where the company stands in its lifecycle. This rate is materially higher than the customary discount rate for equity investments or for investments in other traded securities, even if the latter are very risky (Kolle, 2006). These discount rates reduce as the firm develops: Seed up: 80%, startup: 50-70%, First stage: 40-60%, second stage: 30-50%, Bridge/Mezzanine: 20-35%, public expectation: 15-25% (Manigart *et al.*, 2002). This is partly because the bigger the company, the smaller is its systematic risk since its growth rates are more moderate and its expenses lower in relation to the turnover. In addition, the investment becomes more liquid as the company grows and succeeds since there are more potential buyers for its stock. Furthermore, as the company develops, it hires its own skilled management team and is less dependent on the assistance of

venture capitalists. Therefore, the payment for the added value contributed by such investors is reduced. In addition, the uncertainty with respect to the company's terminal value also decreases as it develops and accumulates an operating history, which may be used to judge how far it meets targets stated in the business plan (Kolle, 2006).

The survey by Ruhnka and Young (1987), and Wetzel (1981) agrees with Manigart *et al.*, (2002) that, venture capitalists expect that the risk of loss associated with venture capital investments decreases steadily as a venture reaches higher stages of development.

Table 2: Venture Capitalists' Discount Rate for Different Stages of Development

DEVELOPMENT STAGE	DISCOUNT RATE	DISCOUNT RATE
	Wetzel (1981)	Ruhnka & Young(1987, 1991)
Seed	73%	50.0%
Start-up	54.8%	50.0%
Third stage	42.2%	37.5%
Fourth stage (Expansion)	35.0%	30.0%
Exit stage	35.0%	22.5%

Source: Seppä and Laamanen (2001)

Table 2 shows that venture capitalists use very high discount rates in assessing potential investments at the seed and startup phase. This phenomenon is caused by the very optimistic cash-flow projections made by entrepreneurs, but there is evidence that high discount rates are used even in the case of internal projections (Jones and Rhodes- Kropf, 2004).

The discount rate (r) is calculated depending on the stage of the company (see Table 2). In standard setting r is a summation of the opportunity cost and a risk premium. The opportunity cost is the rate the invested money could be earning if it were invested at the risk free rate. This is the base of what the investor would demand assuming that there was no risk. The risk premium for the discount rate in the standard setting is attempting to make up for the risk inherent to the market, the systematic risk (Damodaran, 1994). With both of these, the VC gets the rate that would compensate him for an investment (Eq.1).

$$r_{std} = [\text{Time Value}] + [\text{Systematic Risk Premium}] \quad (\text{Eq.1})$$

In the standard setting this is a fairly straightforward calculation that contains little to no error. However, in the venture capital setting the discount rate contains the same two factors plus several more. The additional factors within the discount rates used by venture capitalist in valuing start-up companies cause them to be significantly higher than in the standard situation. According to Scherlis and Sahlman (1986) the discount rate is a creation of several premiums stacked upon the risk free rate. They state that these additional premiums are: unsystematic risk (company specific), liquidity, value added and cash flow adjustment (Eq. 2). (Scherlis and Sahlman, 1986)

$$r_{vc} = [\text{Time Value}] + [\text{Systematic Risk}] + [\text{Unsystematic Risk}] + [\text{Liquidity}] + [\text{Value Added}] + [\text{Cash Flow Adjustment}] \quad (\text{Eq. 2})$$

The reasoning behind these additions is fairly easy to see. The venture capitalist is investing in a very different market when compared to the standard setting and so they are exposed to more types of risk and they have less opportunity to diversify this new risk away.

2.3.4 DECISION CRITERION: PERFORMING COST-BENEFIT ANALYSIS

Once the costs and benefits of the project have been identified and measured, the time horizon determined, and discount rate established, the analysis can be performed to evaluate the project. There are three kinds of general decision types that have been identified by Fuguitt and Wilcox (1999, 81);

- (1) One decision
- (2) Several alternatives that is mutually exclusive
- (3) Several alternatives that is not mutually exclusive.

“Cost-benefit analysis is intended to evaluate options or alternatives. In the case where only one program or project is being evaluated (1), the alternatives are to either proceed with the project or not to proceed” (Fuguitt & Wilcox 1999, 81). When a venture capitalist is faced with several alternatives that are mutually exclusive (2) the choice is which one to implement. Mutually exclusive alternatives are those where only one can be executed because of scarce resources. When faced with several polices that are not mutually exclusive (3) the decision

maker can choose a subset of alternatives to employ the best use of funds (Fuguitt & Wilcox 1999, 81). (See Table 3)

Table 3: Appropriate Decision Criterion for Policy Types

ALTERNATIVES	CRITERION
1. One Policy: Implement?	NPV > 0
2. Mutually exclusive policies: Choose one	Maximum NPV
3. Several Policies: Choose a subset	
a. Dependent policies	
i. No budget constraints	Find possible combinations, maximum NPV
ii. Budget constraints	Find affordable combinations, maximum NPV
b. Independent policies	
i. No budget constraints	All policies with NPV > 0
ii. Budget constraints	Find affordable combinations, maximum NPV; rank by B/C for supplementary Information

Source: Fuguitt and Wilcox (1999, 91) *Cost-benefit Analysis for Public Sector Decision Makers*

2.3.5 SELECTION CRITERION

The selection of the best policy depends on three rules in cost-benefit Analysis: Net Present Value (NPV), Internal Rate of Return (IRR) and Benefit-Cost Ratio (BCR) (Nas, 1996).

2.3.5.1 NET PRESENT VALUE

Net Present Value (NPV) simply requires that the benefits exceed the cost of an investment project. “Alternately expressed, the position states that the total improvement by the gainers outweighs the combined setback of the losers, or the benefit-cost ratio is greater than one” (McKenna 1980, 148). This is a strong measure of the worth of a project. The project present value is a measure that is often used in conjunction with benefit-cost ratio. These two criteria

allow for good decision making because they take into account the time value of money. Project present value is essentially the present value of a project using the annual capital flow S which is the annual benefits minus annual expenditures, the discount rate r and, the useful life of the project in number of years n . The present value annuity formula requires constant annual net flow for multiple years.

Figure 2.1 Present Value Annuity Formula (Eq. 3)

$$PV = \frac{S}{r}$$

$$PV = \frac{S}{r} \left[1 - \frac{1}{(1+r)^n} \right] \quad \text{(Eq. 3)}$$

Where S = Annual Net flow, r = Discount rate and n = Number of years

“In a single decision scenario, the best evaluation method is to find if the Net Present Value (NPV) is positive. NPV is the present value of incremental net benefits generated throughout the policy time horizon. The NPV is the present value of the benefits (PVB) minus present value of the costs (PVC). The details of the NPV calculations are (Eq. 5-6).

$$NPV = PVB - PVC \quad \text{(Eq. 4)}$$

In the year in which the initial expenditure is made, the exponent will be set at zero (this is because the cost is already at present value) and increase to represent each year of the project. All of these will be added together to find the PVB and PVC” (Fuguitt & Wilcox 1999, 76-77).

Net Present Value Calculations (Eq. 5-6)

$$PVB = \sum_{i=1}^n \frac{B_i}{(1+r)^i}$$

$$PVB = \frac{B_0}{(1+r)^0} + \frac{B_1}{(1+r)^1} + \frac{B_2}{(1+r)^2} + \frac{B_3}{(1+r)^3} \dots \dots \frac{B_n}{(1+r)^n} \quad (\text{Eq. 5})$$

$$PVC = C + \left[\sum_{i=1}^n \frac{C_i}{(1+r)^i} \right]$$

$$PVC = C + \left[\frac{C_0}{(1+r)^0} + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} \dots \dots \frac{C_n}{(1+r)^n} \right] (\text{Eq. 6})$$

‘The expression B represents the incremental benefits, and C represents the incremental costs in one year. To find the surplus value, the venture capitalist can take the total benefits minus the total costs to find the net benefits. (Fuguitt & Wilcox, 1999). Further, the incremental benefits can be found by taking the benefits with the investment minus the benefits without the investment. The same formula can be used for incremental costs. (Cost with the investment) – (costs without the investment) = Incremental costs’ (Fuguitt & Wilcox 1999, 58). “Net present value is the present value of incremental net benefits generated throughout the investment time horizon. If the PVB outweighs PVC then the net benefits are positive, (NPV > 0) and pursuing the investment promotes greater efficiency than not pursuing it” (Fuguitt & Wilcox 1999, 82).

2.3.5.2 BENEFIT-COST RATIO (BCR)

According to Nas (1996), a BCR is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. All benefits and costs should be expressed in discounted present value. In the absence of funding constraints, the best value for money projects is those with the highest net present value. Where there is a

budget constraint, the ratio of NPV to the expenditure falling within the constraint should be used. In practice, the ratio of NPV to expenditure is expressed as a BCR. The NPV should be evaluated over the service life of the project. It is expressed as:

$$\text{B/C} = \text{Present value of Benefit} / \text{Present value of cost}$$

The project is accepted if the benefit-cost exceeds 1. A major shortcoming of BCRs is that, they ignore non-monetized impacts and the fact that there are no precise definitions of benefits and costs is problematic. B/C is sensitive to discount rate just like NPV. They both decline as discount rate increases. There is therefore an inverse relationship (Nas, 1996). Most venture capitalist seldom use this method when conducting a CBA even though it is the best method for calculating the profitability of an investment, it is applicable for investments which are consumed in less than one year and most venture capitals look beyond that when evaluating potential investment.

2.3.5.3 INTERNAL RATE OF RETURN

‘Internal rate of return is the flipside of Net present value and is based on the same principle and the same math. IRR computes a breakeven rate of return (Berkery, 2007). At any discount rate below the IRR an investment would result in a positive NPV (and should be made). If the appropriate discount rate is above the IRR, then the investment will result in negative NPV (and should be avoided). It’s the breakeven discount rate-the rate at which the value of cash outflows equals the value of cash inflows’ (Berkery, 2007).

The IRR is easier to understand and can be calculated without having to estimate the cost of capital. It’s easier to compare investments of different sizes in terms of percentage rates of return than by dollars of NPV. Investors and analysts often use the required rate of return as a discount rate for future cash flows from an investment. Its main drawback is that, IRR overstates returns and has to be treated with caution and comparison is difficult among projects of various sizes (Nas, 1996).

The Association of Investment Management Research (AIMR) has deemed the IRR as the most appropriate measure of returns presentation for venture and other private equity investor

investments.²The European Venture Capital and Private Equity Association (EVCA) and The British Venture Capital Association (BVCA) have also adopted the IRR as the best measure of performance. For example, Venture Economics calculates annual IRR for each fund as cash-on-cash to the investors on a cumulative year-by year basis, modified to incorporate the year-end valuation of the partnership's unliquidated holdings or residual value (*Ibid*).

It is highly questionable whether a fund level IRR can be used as the discount rate on the project level. First, there is an issue with management fees and other costs associated with the management of the fund. Second, most funds invest their money in the project gradually, which means that they have quite large cash balances in the first years. Lastly such an approach implicitly assumes that all accepted projects are within the same risk class.

2.5 CONCEPTUAL FRAMEWORK

Venture Capitalist using CBA to evaluate potential investment go through the following steps:

1. Identify the cost and benefits in the investee firm
2. Measure the costs and benefits in dollars
3. Consider the costs and benefits over the life of the fund
4. Take a decision

There is therefore a tradeoff between generating return and controlling risk when venture capitalists evaluate potential investment. By identifying these costs and benefits, VCs can fully utilize their expertise and generate superior expected return. The outcome of the analysis will enable the VC decide whether investment in a particular investee firm is financially feasible or not.

These four steps discussed above, provide a “conceptual framework for assisting decision makers in understanding the decision situation” (McKenna, 1980, 127). Table 4 outlines the cost and benefit that venture capitalist should be on the lookout when evaluating potential venture capital investment using cost-benefit analysis and how they are measured.

2 <http://www.ventureeconomics.com/vec/methodology.html> (Accessed 01 Feb 2009)

2.5.1 RESEARCH PURPOSE: COST-BENEFIT ANALYSIS IN THE CONTEXT OF VENTURE CAPITAL INVESTMENT DECISIONS

Table 4: Conceptual Framework – Listing of Costs and Benefits

COST:	MEASUREMENT:
<p style="text-align: center;"><i>Direct Cost (DC)</i></p> <ul style="list-style-type: none"> • start up fund <p>maintenance cost:</p> <ul style="list-style-type: none"> • Management fee • Carried interest • Other expenses 	<ul style="list-style-type: none"> • Estimates investment cost in dollars at various rounds • Management fee is measured at 2% of total fund per annum. • 20% carried interest in the fund
<p style="text-align: center;"><i>Indirect Cost (IC)</i></p> <ul style="list-style-type: none"> • Uncertainty & Risk (UR) • Size • Information asymmetry • Market structures 	<ul style="list-style-type: none"> • Estimates loss at 25%, 50%, 75% or 100%. • Sensitivity analysis
<p style="text-align: center;"><i>Other Indirect Cost (OIC)</i></p> <ul style="list-style-type: none"> • File preparation cost • Investor search cost • Due diligence procedure cost • Protection of intellectual property cost • Negotiation and conclusion of financing cost • Reorganization cost 	<ul style="list-style-type: none"> • Qualitative analysis
BENEFITS:	
<p style="text-align: center;"><i>Direct benefits(DB)</i></p> <ul style="list-style-type: none"> • Superior return on fund invested <p style="text-align: center;"><i>Indirect benefits(IB)</i></p> <ul style="list-style-type: none"> • Control rights 	<ul style="list-style-type: none"> • Estimates investment returns in dollars • Estimated qualitatively

DISCOUNT RATES	
<ul style="list-style-type: none"> • Seed • Start-up • Third stage • Fourth stage (Expansion) • Exit stage 	<ul style="list-style-type: none"> • 73% • 54.8% • 42.2% • 35.0% • 35.0%
DECISION CRITERION	MEASUREMENT:
(PV) Present Value of Benefits and Costs	(PV): The present value of an investment project is derived by using the annual capital flow, which is the annual benefits minus annual costs, in a formula with the discount rate and the useful life of the project in years. These variables will be used to determine the present value of the project today in future dollars.
(NPV) Net Present Value	(NPV): The Net Present Value is derived from the subtraction of the Present Value of the Benefits and the Present Value of the Costs.
(BCR) Benefit-Cost Ratio	(BCR): This is where the Present Value of Benefits and Costs must be divided by the Initial Capital Outlay of the investment.
(IRR) Internal rate-of-return method	IRR: Measures the performance of the fund and computes a breakeven rate of return.

2.5.2 CALCULATING THE NET PRESENT VALUE

In conducting a cost-benefit analysis, the present value of the benefits (**PVB**) and present value of the cost (**PVC**) of investing in a potential investee firm are summed and then the costs associated with taking that action are subtracted by the venture capitalist as a means of evaluating all potential costs and revenues that may be generated when the deal is structured.

Then the costs and benefits are considered over the life of the fund (**T**) .i.e. the future exit date in time that the VC plan to exit typically 4-7 years after the investment is made in the investee company. This is illustrated graphically below (Eq. 7-9);

Total cost (**TC**) of the investment will thus be the sum of direct (**DC**), indirect (**IC**) and other indirect cost (**OIC**). Total Benefits (**TB**) comprises both direct (**DB**) and indirect benefits (**IB**).

$$PV(C) = TC + \sum_{i=1}^T \frac{DC+IC+OIC}{(1+r)^i} \quad (\text{Eq. 7})$$

$$PV(B) = \sum_{i=1}^T \frac{DB+IB}{(1+r)^i} \quad (\text{Eq. 8})$$

The discount rate (r) used by venture capital firms is high due to the substantial risk inherent in this type of investment and the lack of diversification particularly during the early stages of investment (Manigart *et al.*, 2002).

$$NPV = PV(B) - PV(C) \quad (\text{Eq. 9})$$

If the PVB outweighs PVC then the net benefits are positive, ($NPV > 0$) and so the venture capitalist can invest in that particular investee firm with NPV greater than zero.

Internal Rate of Return is the flip side of Net Present Value (NPV), where NPV is the discounted value of a stream of cash flows, generated from an investment. IRR thus computes the break-even rate of return showing the discount rate, below which an investment results in a positive NPV as discussed above. Therefore the VC evaluating with the IRR can decide to invest in a particular project if its Internal Rate of Return exceeds the discount rate and rejected if this IRR is less than the discount rate.

CHAPTER THREE: SETTING – VENTURE CAPITAL INVESTMENT

"Venture capital investments are like inefficiently priced stocks, with two differences. First because there are no short-selling mechanisms, a venture capitalist, like a commodity investor, faces potential overpricing. Second, unlike stocks, which represent existing assets, an early-stage venture capital project may be an idea."
James H. Scott, Jr., "Managing Asset Classes," Financial Analysts Journal, January-February 1994

3.1 VENTURE CAPITAL INVESTMENT IN NORWAY

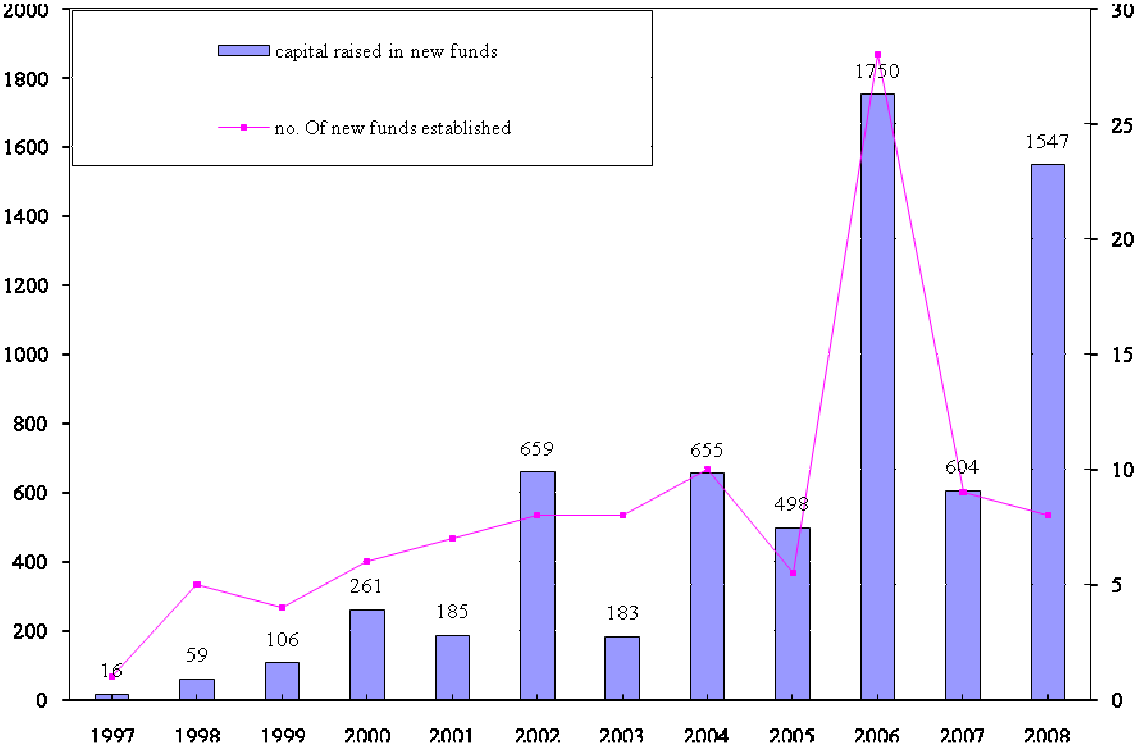
The National Venture Capital Association (NVCA) in America defines venture capital as: “money provided by professionals who invest alongside management in young, rapidly growing companies that have the potential to develop into significant economic contributors. Venture capital is an important source of equity for start-up companies. Professionally managed venture capital firms are generally private partnerships or closely-held corporations funded by private and public pension funds, endowment funds, foundations, corporations, wealthy individuals, foreign investors, and the venture capitalists themselves.” (NVCA, 2006)

The Norwegian Venture Capital & Private Equity Association (Norsk Venturkapitalforening – NVCA) was founded in March 2001 by the 12 leading players in Norway’s venture capital sector. Primary members of the association are independent professional investment companies and venture entities in corporate structure (Corporate Venture) with seed, venture or buyout investments as a substantial part of their business, and with a capital base of at least 100 MNOK. The Norwegian Venture Capital & Private Equity Association had as of 10th of February 2009 a total of 90 members; 37 primary members and 53 associated members.

(Norsk Venturkapitalforening – NVCA, 2008)

According to the VC and seed survey in 2008 by the Norske venture capital association, there are 54 management companies administrating 110 funds with EUR 6,7bn in total capital under management and EUR 540 million in total investments. In 2007, there was a 30%

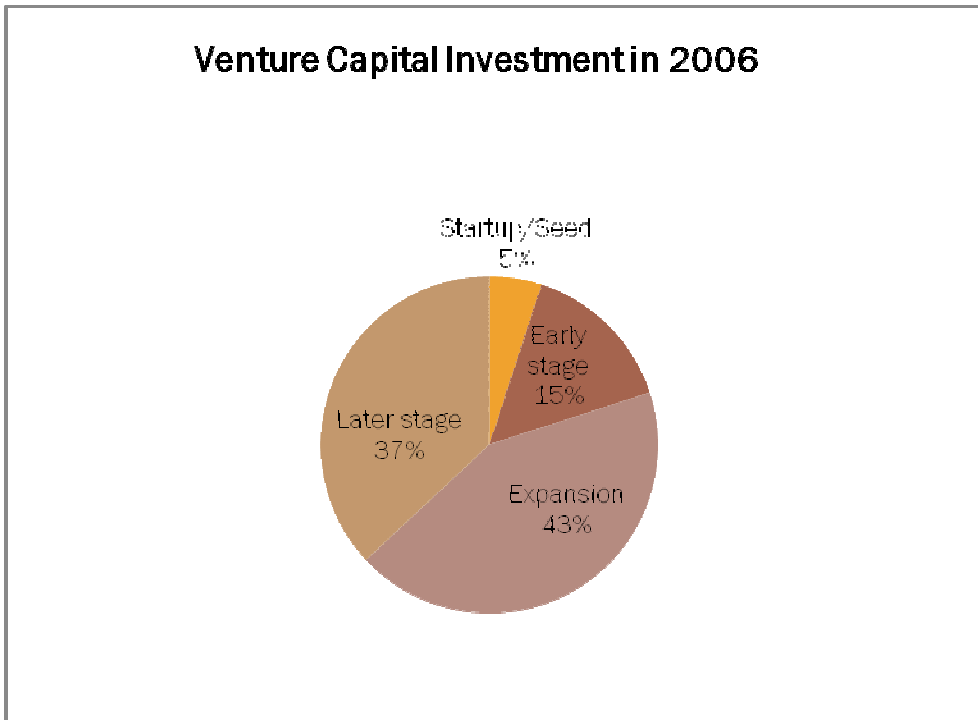
increase at the end of the year and a 60% capital growth in buyout. A year-to-year change in the total investment amount and annual new and additional investment in capital raised in new funds indicates a general fluctuating trend. (See Figure 1)



Source: Norske venture capital association survey, 2008

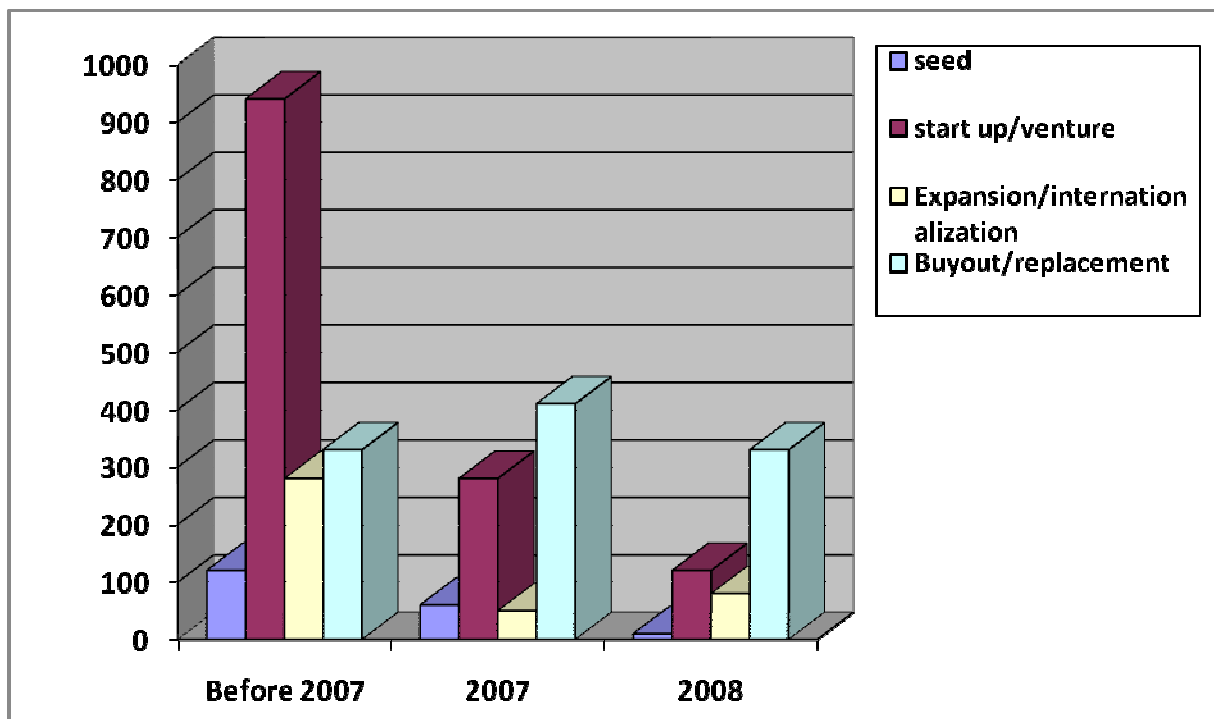
Figure 1: Changes in Total Investment and New Funds

A survey on the new annual investment by growth stage indicates a rapid increase in investment in the Startup stage firms. Notably, there has been a rapid shift of investment to buyout/replacement firms among Norwegian VC firms since the late 2003. According to the National Venture Capital Association in America, in 2006 most venture capitalist in America invested in companies in their later and Expansion stages with few VCs investing in seed and start-up stage firms. This assertion does not directly apply to the Norwegian venture capital firm in that, in the same year (2006), most Norwegian VC firm’s investment was in startup and not in the expansion and buyout stage in America as depicted in the Figure 2 and Figure 3 below.



Source: National Venture Capital Association in America, 2006

Figure 2: American Venture Capital Investments by Stage of Development in 2006



Source: Norske venture capital association survey, 2008

Figure 3: Norwegian Venture Capital Investments by Stage of Development in 2006

Norwegian funds have invested in 607 portfolio companies and the bulk of new companies are in energy, environment, computer and consumer Electronics. In 2007, there were larger investments into Norway than out of Norway. Yet, the presence of foreign funds through investments in Norway is limited to relatively few cases. Foreign presence as lead investor in early stage is relatively rare. See Table 5

Table 5: The Domestic / Foreign Matrix of Number of Portfolio Companies in Norway

FUND TYPE	NORWEGIAN COMPANIES	FOREIGN COMPANIES
Norwegian Funds	431	185
Foreign Funds	35	

The domestic / Foreign matrix of investments (Mill EURO) 2008

FUND TYPE	NORWEGIAN COMPANIES	FOREIGN COMPANIES
Norwegian Funds	478	58
Foreign Funds	92	

Source: Norske venture capital Association survey, 2008

3.2 VENTURE CAPITAL VALUATION

The VC investment process is a complex and unclear process (Benoit, 1975) and mostly starts with the decision to invest or not. They choose to invest in successful ventures that promise good returns and capital gains (Zacharakis and Meyer, 2000). According to Fichera (2001) venture capitalists follow a specific process called “Venture capital process” to make their investment decisions. The first step in the VC process is screening business plans, followed by a personal meeting with the entrepreneur and then the conduct of due diligence before the investment is sunk (Fichera, 2001).

The topic of how venture capitalists evaluate potential investments was first considered by Norton and Tenenbaum (1993), and Gupta and Sapienza (1992). Both papers use questionnaires and small samples of VC funds. Their specialization measures reflect the subjective intentions of VCs, but not the true investment patterns of the fund. Mayer *et al.*, (2005) compare VC fund investment focus and sources of finance across Germany, Israel,

Japan, and the United Kingdom. Their empirical results show some relationship between fund specialization and VC financing. However, much of the within and cross-country variation is not mainly due to sources of funds. The authors finally conclude that the pronounced differences of VC investment focus in these four countries are not primarily related to either financial systems or sources of funds. This study seeks to analyze how venture capitalists value potential investment.

There several valuation methods available to venture capitalist when dealing with unlisted firms. Dittman *et al.*, (2004) found that valuation methodologies had a statistically and economically meaningful impact on the investment performance of venture capitalists. Therefore, the proper choice of valuation method and the correct application of methodology are rather important.

Standard finance textbooks recommend valuation methods based on discounted cash flow (DCF) analysis (Brigham *et al.*, 1999, Brealey and Myers 2000). It is also possible to value companies by using multiples (comparable company method) or based on the value of a company's assets. Nowadays, asset based valuation is usually not recommended any more, as the role of intangible assets and human capital in value creation is growing steadily. Still, there are some occasions, when the use of different variants of asset-based valuation may be appropriate. Probably the most innovative approach to valuation is a technique based on option pricing theory. Black and Scholes (1973) have argued that all corporate securities could be viewed as combinations of properly selected options.

Valuation techniques developed in mainstream corporate finance are applicable in venture capital too, but access to information may pose a particular problem (Wright and Robbie 1998). Early stage investments require valuation approaches that can handle uncertain and/or rapidly growing future cash flows in markets, which may scarcely be established (*Ibid*). From the techniques listed above, the option pricing approach has characteristics that fulfill most of those requirements. Most venture capital projects have many real options (e.g. growth options, options to stage investment etc.) attached to them. Besides, if staged financing is used, an additional flexibility is created. Traditional valuation techniques are not capable of valuing those real options correctly. Therefore it is of no surprise, that most of the recent academic research has taken this direction [Seppä and Laamenen (2001)].

Here once again the differences between the theory and practice are quite remarkable. While academic research has taken the direction of applying option pricing models in the valuation of venture capital projects, these are rarely used in practice.³The National Venture Capital Association (NVCA) in the United States recommends that the Private Equity Industry Guidelines Group (PEIGG) guidelines should be taken as the basis for valuation procedures. These guidelines emphasize the use of the concept of fair value (US Private Equity Valuation Guidelines 2004). In order to obtain fair value, an analyst should rely on recent cost or the latest round of financing data (*Ibid*). However, if subsequent events may have material impact on company value, one should perform multiples or comparable companies transaction methods (*Ibid*). DCF methods are recommended only on specific occasions (*Ibid*).

3.3 VENTURE CAPITAL PRE- INVESTMENT ACTIVITIES

Venture capitalists face information asymmetries with respect to potential investee company-specific data; hence the entrepreneurs may only disclose that information they consider necessary to get the funding. Therefore, I expect that venture capitalists will tend to collect comparatively more information from their own and/or external sources compared to that produced by the potential investee company. We discuss the decision making process under three headings: due diligence, information for valuation and valuation methods used.

3.3.1 DUE DILIGENCE

Prior to the application of valuation methods the venture capital company will apply the process of due diligence. Information included in the business proposals of those companies seeking funding will be subject to extensive scrutiny by the venture capital firm to ascertain the robustness of the proposal (Fried and Hisrich, 1994). Due diligence involves using information from multiple sources. This information can be collected from references, reports or by visiting potential investee companies.

In this process, the company's key employees, customers, suppliers, and creditors are consulted. The key evaluation criteria include product, management, market, returns, etc. (Tyebjee and Bruno, 1985; Fried and Hisrich, 1994). It is this informing process that has come to be called “venture capital due diligence” Though the general objective of this due

³ <http://www.nvca.org> (Accessed 23 Feb 2009)

diligence process is to gain a thorough understanding of all business aspects, the focus of investigation may vary from deal to deal (Silver, 1985). Table 6 summarizes the factors VC looks for when performing their due diligence as discussed.

Table 6: Summary of VC due diligence process

SOURCES
Hire experts to review specific parts of business plan
Enquire from largest and critical suppliers of firms credibility
Enquire about customers loyalty
Depend on associations to know data on the market, its size and its growth rate
Own market evaluation
Independent accounting & audit report
Never use the same reporting accountant as management's accounting advisors
Great reliance on personal references

Source: extant literature

3.3.2 INFORMATION FOR VALUATION

Venture capital firms rely on a variety of information generated either by the entrepreneurs or within the venture capital firm itself, or an external source may be used. Examples of information sources are interviews with the entrepreneur, the business proposal, contacts with other venture capital firms, statistical information services, trade journals etc. The process of due diligence itself can generate pertinent information (Wright and Robbie, 1996). The reliance upon such diverse sources of information reflects the information gap when dealing with unquoted companies. Two studies have examined the sources of information used when preparing a valuation (Wright and Robbie, 1996; Manigart *et al.*, 1997).

In their UK study, Wright and Robbie (1996) examined 22 sources of information in preparing a valuation. The results indicated that the main source of information was the venture capital firm's own due diligence; this was considered more influential than the due diligence requested from accounting and consulting firms. Accounting statements included in the business proposals was the next most influential set of information, especially the profit and loss account. Also of considerable influence were the latest un-audited financial statements and management projections for one year ahead. The C.V. of the management,

sales and marketing information, interviews with management and proposed exit timing were all considered important. Publicly available sources of information such as the financial press trade journals and external statistical and information services were lowly rated. Manigart, *et al.*, (1997) conducted a comparative study of the UK, the Netherlands, Belgium and France. The results in general supported Wright and Robbie but with some differences between countries.

Besides several teaching notes on financial valuation methods (e.g., Gompers, 1999; Lerner and Willinge, 2002), the most relevant industry report on startup valuation is perhaps Hill and Power (2001), which asks venture capitalists to rate a number of factors when evaluating a deal, with a rating of 5 being the most important and 1 being the least important. The top factors are reported below (Table 7):

Table 7: Relative Importance of Key Factors in Venture Capitalists' Valuation of New Ventures. Hill and Power (2001)

Key Factor	Points
Quality of Management	4.5
Size of the market	3.8
Product qualities	3.7
Rate of market growth	3.5
Competition	3.5
Barriers to entry	3.4
Company's stage of development	3.2
Industry that the company is in	3.0

Manigart *et al.*, (2000) also identified the sources of VC information for valuation in Table 8

Table 8: Sources of VC Information for Valuation

SOURCES
Curriculum vitae of management
interview with entrepreneurs
production capacity/technical information
own due diligence report
due diligence by accounting/consulting firms
Business plan (overall consistency of plan)
Business plan (more than 1 year ahead)
interview with other firm personnel
sales and marketing information

Source: Manigart et al., (2000)

The sources of information identified by Manigart *et al.*, (2000) and Hill and Power (2001) among other researchers influence the decisions of most venture capitalist in the economic valuation of a new business venture.

3.3.3 VALUATION METHODS

After the venture capital firms have carried out their due diligence and collected information needed for valuation they decide upon the pertinent valuation methods to use. A number of researchers have identified some characteristics of unquoted companies, or its shares. The lack of publicly available information, the poor initial cash flows, the profit prospects, the high risk and uncertainty are considered to be salient features of this class of company. Moreover, any shares are less marketable and the company generally has a shorter track record and a less experienced management team (Tyebjee and Bruno, 1984; Pike and Neale, 1998). These characteristics of unquoted companies pose obvious problems for valuation. Manigart *et al.*, (2000) notes that in the US and Europe venture capital firms demonstrate differences in the valuation methods they adopt.

Two valuation approaches that have received particular attention in the literature are discounted dividend yield methods and discounted future cash flow methods. In fact venture capital firms, for two reasons, rarely use the dividend yield method. First, most venture capital investments are placed in the early stages of a company's development, in which dividends are rarely being distributed. Second, if the investment is in the expansion, or later stages, in the potential investee companies a request for funds from a venture capitalist is likely to reflect cash constraints and thus dividends may not be evident (Wright and Robbie, 1996; Manigart, *et al.*, 1997).

Research into the use of discounted cash flow techniques by venture capital companies has produced contradictory results. The results of the UK study, Wright and Robbie (1996) found that discounted cash flows appeared to be used much more frequently than the valuation of the assets of the company. Despite the results of this research Wright and Robbie (1998) did not recommend the use of such methods for startup companies, because it is very difficult to forecast future cash flows. In their international comparative study, Manigart, *et al.*, (1997) proposed overcoming this disadvantage by using sensitivity analysis. The venture capitalist conducts sensitivity analysis by themselves or with outside help from accountants and/or consultants. Dixon (1991) reported that, for the United Kingdom, sensitivity analysis is used by the venture capitalists to affirm that the financial projections are based on reasonable assumptions. Dixon found that 63% of his sample had used sensitivity analysis. Tyebjee and Bruno (1984) found, for the United States, that venture capitalists prefer to use sensitivity analysis to determine the expected rate of return.

Accounting-based valuation methods include the accounting valuation of the company's assets at historical cost, replacement or liquidation value and the book value of the equity. Lorenz (1989) has argued that in the early stages of venture capital investment these asset based valuations are not credible. However, such approaches may be used as a secondary basis for valuation in the later stages of financing, particularly in the case of buy-outs. In a UK study, Wright and Robbie, (1996) noted that accounting methods may be common for bank debt analysis, two-fifths of the respondents almost never used replacement cost asset value or liquidation value asset methods, and a third did not use historic book value methods. One of the main methods for analyzing earnings is the use of the price-earnings ratio. Lockett *et al.*, (2002) argue that comparators and rules of thumb may be used due to the difficulties of making cash flow forecasts. For the P/E ratio, the most important issue is the appropriate

benchmark P/E to apply. Some UK researchers prefer to use the P: E ratio of a peer quoted company that is one similar in all or most respects, to the unquoted company (Lorenz, 1989).

Other US researchers prefer to take a sample of similar quoted companies and find a weighted average P: E based upon the individual P: E figures and use market capitalizations' as weights (market value for all shares issued) (Pike and Neale, 1998). Previous research generally agrees that the valuation methods applicable to quoted companies are problematic when applied to unquoted companies. It might be advisable for the valuer of unquoted companies to use a variety of complimentary techniques (for example using sensitivity analysis alongside the application of discounted cash flow techniques). It is also possible for the valuer to use the valuation of similar quoted companies, when valuing unquoted companies (for example, using the P/E of similar quoted company). The research reported in this paper empirically evaluates the use of different methods of valuation by venture capital firms in the Norwegian venture capital market.

Corporate finance literature reports four valuation methods most commonly used in startup valuation: discounted cash flow, earnings multiple, net asset, and venture capital method. However, none of these approaches is fully satisfactory for new entrepreneurial firms. A fundamental assumption underlying these financial valuation methods is that there is an efficient capital market for the ownership of the firm. This assumption may be workable for the public capital market, as legal rules are in place, which regulate public firms to release all material information to the market and private information is not as common (Fama, 1991). Traded in a competitive market, the ownership of these firms is also highly liquid. This perfect capital market assumption may approximately hold for public companies, but may not hold in capital markets for new ventures. The venture capital market is arguably an inefficient market and quite different in several aspects from the public capital market (Lerner, 2000). First, venture capitalists invest in private and new ventures. New ventures have a short operating history, and thus accounting information is limited, making the new venture's future cash flows difficult to estimate. Second, the law does not require that private firms report any financial or management information. Such information is difficult to collect and to verify. Thus, the information asymmetry between entrepreneur and potential investors is typically high. Finally, most of the assets of these entrepreneurial firms are intangible and highly firm specific (Gompers and Lerner, 2001).

The inefficiency of the venture capital market renders the four major financial valuations methods less satisfactory in valuating new ventures (Timmons and Spinelli, 2004). For DCF approach, it is difficult to estimate the future cash flows and to determine the appropriate discount rate. For the earnings multiple approach, three challenges exist. First, most new ventures do not have earnings. Second, defining the boundary of the reference group (to determine the multiple) is not always easy or even possible (e.g., for some breakthrough innovations – such as the personal computer or biotechnology firms at their infant stage). Third, even if the reference group is defined, it is still quite subjective to choose the multiples and there is no theoretical guidance for this choice. The limitation of the net assets approach is that it ignores the economic value of growth opportunities and, most new ventures do not have substantial levels of tangible assets. Finally, the venture capital method is very subjective and the valuation computed is not easy to justify (Gompers, 1999).

The deficiencies of the above methods are well documented in Waldron and Hubbard (1991). Inviting thirty-one valuation experts (e.g., venture capitalists, valuation consultants and business professors) to place an economic value on a small avionic company acquired by Goodyear, Waldron and Hubbard (1991) find these financial valuation experts provided valuation estimates ranging from \$6 million to \$17.5 million for the same company based on exactly the same information. Waldron and Hubbard conclude that: "From these results it is easy to see why so many consider the valuation of a closely held business akin to alchemy" (1991:49). ⁴The National Venture Capital Association (NVCA) in the United States recommends that the Private Equity Industry Guidelines Group (PEIGG) guidelines should be taken as the basis for valuation procedures. These guidelines emphasize the use of the concept of fair value (US Private Equity Valuation Guidelines, 2004). In order to obtain fair value, an analyst should rely on recent cost or the latest round of financing data (*Ibid*). However, if subsequent events may have material impact on company value, one should perform multiples or comparable companies transaction methods (*Ibid*). DCF methods are recommended only on specific occasions (*Ibid*).

3.6 POST-INVESTMENT ACTIVITIES

Venture capitalists' active involvement in their investee firms is related to information asymmetry and an extended period of illiquidity. Any information asymmetry venture

⁴ <http://www.nvca.org> (Accessed 09 March 2009)

capitalists face can cause significant agency risks. An extended period of illiquidity, in turn, can result in a questionable exit scenario and poor returns. In order to reflect current market conditions and changes in business opportunity, business plans, operational goals, and shareholder agreements need to be regularly evaluated and revised, from time to time, after the initial deal is closed (Sadler, 1993). While venture capitalists' participation in an investee firm varies from deal to deal, new ventures require more assistance than developed businesses (Sapienza, 1992; Barry, 1994).

Achieving an exit, or divestment, is the most important of the post-investment activities. Divestment is driven by a venture capitalists need to generate a profit for their capital providers and partners. This process can be achieved through two common routes: a public offering (IPO), or a trade sale to strategic investors. Regardless, each exit route has a different consequence for both venture capitalists and entrepreneurs (Rind, 1997). Investee firms generally favor a public offering because it preserves the independence of both the firm and the entrepreneurs, in addition to providing the firm with continued access to capital. For venture capitalists, a public offering rarely concludes their relationship with the investee firm, as the underwriters can prevent venture capitalists from disposing of all shares at the time of an initial public offering (IPO). Private sales, in comparison, will almost certainly end a venture capitalists involvement with the investee firm (Rind, 1997). Depending upon the venture capitalists' investment strategy, VC firms exit in 3-4 years and 10 years (Bygrave and Timmons, 1992).

CHAPTER FOUR: METHODOLOGY

4.1 INTRODUCTION

This section explains how data for the research work is gathered. Explaining the methodology aids in validating that the study was thorough in its approach and accurate in its finding.

4.2 DATA COLLECTION

A questionnaire survey was conducted with the Norwegian VC firms directly through 15 venture capital firms who are among the primary members of the Norwegian Venture Capital Association (NVCA). A total of 37 questionnaire forms were distributed from late March to mid April of 2009. Following the sending of the first questionnaire form, non-responding VC firms were approached directly via telephone and E-mail on a number of times. This paper analyzes the responses returned by 15 VC firms in Norway representing 40.5% (15 completed and usable replies out of 37 potential respondents) before the end of May 2009 and this is defined as the population for the research.

Interviews constituted the second most important method of the research. Structured interviews were carried out among Norwegian venture capitalists at their offices with managing partners, and sometimes with financial managers and accountants. Each person interviewed is associated with an established venture capital fund. The amount of funds under management varies from \$75 to \$448 million, with a mean fund size of \$215.4 million and a median fund size of \$200 million. Almost all interviewees wanted to remain anonymous.

Although the interviews with the venture capitalists were not recorded, the researcher can assure the reliability of the study. A case study protocol was used and written notes were taken concerning those VC firms using cost-benefit analysis. The reliability is high because of the interview technique. Case study interviews were used, which enabled the interviewer to explain and discuss the problems and questions. This ensured that the interviewee really had understood the question. As it was an advanced finance research, this technique was in accordance with the objectives.

The data collected from the questionnaire is both continuous and discrete involving measurements on both ordinal and nominal scales. This means that the appropriate form of

statistical analysis of the data is non parametric. Descriptive data about the firm, such as fund size and investment stages and focus of particular interest were available on the company websites. Descriptive statistics are also used to highlight the apparent degrees of consensus or difference in processes of due diligence and valuation methods as well as the cost-benefit findings.

The analysis of Cost-benefit analysis includes five venture capital cases. The cases are not sampling units, but experiments or multiple surveys — a multiple-case study design is used. The author takes a holistic view and use a single unit of analysis to make analytical rather than statistical generalizations. The cases and written questionnaires were analyzed for specific activities performed by venture capitalists. The descriptions of the cases are presented as follows.

CASE A: Invest in almost any industry, except shipping and real-estate in its start-up-phase. It is located in Bergen.

CASE B: Focuses on technology companies within electronics, software, oil & gas, materials and clean technology companies originating in the Nordic countries. It is based in Trondheim. They only invest in companies in their expansion stage.

CASE C: It has no industrial limitations, but invests in naturally based IT/technology, energy and manufacturing companies in their second stage. It is located in Stavanger.

CASE D: Invest in small, but established companies with roots in Scandinavia, primarily in Norway. They finance companies in their mezzanine stage and they are based in Oslo

CASE E: Targets companies where it foresees significant potential for top-line growth, strategic repositioning and/or operational improvements in engineering/technology, food and beverage, IT and telecommunication, maritime equipment, oil Services, power and energy, retail, services and outsourcing in their startup phase. It is based in Oslo

4.3 EXPERT EVALUATION

After the analysis, we presented the results of the initial study to different individuals in a selected VC firms based on their co-operation and willingness to contribute mindfully to this research work. Two of the five are large Oslo firms emphasizing late and early stage investments; one is a large Trondheim firm that invests in early stages; one is a Stavanger venture capital firm that focuses on large, late-stage investments; and one is a moderately small, Bergen-based VC firm that also invests in late-stage investments.

Each was mailed a summary of the analysis and we made further modifications based on their responses.

CHAPTER 5: RESULTS

'If you want to succeed, you should strike out on new paths rather than travel the worn paths of accepted businesses - John D. Rockefeller

5.1 INTRODUCTION

This section empirically evaluates the results of a statistical analysis of differences in the behavior of venture capital firms in their use of due diligence, information sources for valuation, and their choice of valuation method. I further validate Cost-benefit analysis in the context of venture capital investment decisions as a valuation method. The discussion, which follows, presents and evaluates the results of the findings.

5.2 RESULTS

The findings on how venture capital firms evaluate potential investment are categorized under three headings as discussed in chapter 3: due diligence, information for valuation and valuation methods used.

5.2.1 DUE DILIGENCE

In a telephone interview, respondents were asked to rate the importance of the sources of information for the application of due diligence in the valuation of potential investment. To determine which firms to invest in, VC were asked to rate the following items on a five-point scale of 1 (least important) to 5 (very important). Table 9 presents the main sources of due diligence information for the preparation of a valuation and reports the frequency of responses in each level of importance for each source of information to the whole population of venture capital firms in our sample frame. The list of information sources is derived from the extant literature in this area and covers the examples previously discussed and the results are expressed in percentages and in absolute numbers.

Table 9: The Importance of the Due Diligence Sources for the Total Venture Capital Firms

No	SOURCES	5*	4	3	2	1
1	Hire experts to review specific parts of business plan	26.7% (4)	40% (6)	13.3% (2)	13.3% (2)	6.7% (1)
2	Enquire from largest and critical suppliers of firms credibility	46.7% (7)	33.3% (5)	6.7% (1)	13.3% (2)	-
3	Enquire about customers loyalty	60.0% (9)	33.3% (5)	6.7% (1)	-	-
4	Depend on associations to know data on the market, its size and its growth rate	6.7% (1)	40% (6)	33.3% (5)	13.3% (2)	6.7% (1)
5	Own market evaluation	53.3% (8)	33.3% (5)	6.7% (1)	6.7% (1)	-
6	Independent accounting & audit report	6.7% (1)	13.3% (2)	46.7% (7)	26.7% (4)	6.7% (1)
7	Never use the same reporting accountant as management's accounting advisors	-	26.7% (4)	40% (6)	6.7% (1)	26.7% (4)
8	Great reliance on personal references	86.7% (13)	13.3% (2)	-	-	-

* Score 5: Very important, score 4: Important, score 3: Moderately important, score 2: Slightly important, Score 1: Least important.

The results from this survey reveals that, the large percentages that call on customers (60.0% score 5), carry out their own market valuation (53.3% score 5), do not depend upon trade associations etc (6.7% score 5) but place great reliance upon personal references (86.7% score 5). The results confirm the importance of a wide range of sources of information when dealing with unquoted companies.

5.2.2 SOURCES OF INFORMATION FOR VALUATION

I further asked the respondents to value how the following sources of information affected their valuation of potential investment. To determine which firms to invest in, VC were again

asked to rate the following items on a five-point scale of 1 (least important) to 5 (very important). Table 10 presents the main sources of information for the preparation of a valuation and the items selected were based on the study by Manigart *et al.*, (2000); the curriculum vitae of management, interview with entrepreneurs, production capacity/technical information, own due diligence report, due diligence by accounting/consulting firms, business plan (overall consistency of business plan), business plan (management projections, more than 1 year ahead), interview with other firm personnel, and sales and marketing information.

Table 10: Venture Capital Evaluation vs. Source of Information [Manigart *et al.*, (2000)]

	SOURCES	*(5)	(4)	(3)	(2)	(1)
1	Curriculum vitae of management	86.7% (13)	13.3% (2)	-	-	-
2	interview with entrepreneurs	6.7% (1)	66.7% (10)	20% (3)	6.7% (1)	-
3	production capacity/technical information	26.7% (4)	26.7% (4)	26.7% (4)	13.3% (2)	6.7% (1)
4	own due diligence report	6.7% (1)	46.7% (7)	13.3% (2)	20% (3)	13.3% (2)
5	due diligence by accounting/consulting firms	6.7% (1)	13.3% (2)	6.7% (1)	40% (6)	33.3% (5)
6	Business plan (overall consistency of plan)	-	33.3% (5)	6.7% (1)	6.7% (1)	53.3% (8)
7	Business plan (more than 1 year ahead)	40% (6)	26.7% (4)	-	20% (3)	13.3% (2)
8	interview with other firm personnel	40% (6)	26.7% (4)	20% (3)	-	13.3% (2)
9	sales and marketing information	-	26.7% (4)	26.7% (4)	26.7% (4)	6.7% (1)

* Score 5: Very important, score 4: Important, score 3: Moderately important, score 2: Slightly important, Score 1: Least important.

The results expressed in percentages and absolute numbers reveal that, the curriculum vitae of management was rated the most important on average followed by interview with

entrepreneurs. (See Table 9) These appear to be more important than financial statements including the business plan. Comparing my results to Manigart *et al.*, (2000) substantiates the claim that Norwegian venture capital firms are keen on the curriculum vitae of management and interview with entrepreneurs in making their investment decisions in relation to VC from the rest of the world

5.2.3 VALUATION METHODS USED

Then respondents were asked what methods they used in evaluating potential investment. VC were asked to rate the followings items on a scale of 1 (never use) to 5 (always use). These items were selected based on the studies by Timmons (1992) and Manigart *et al.*, (2000) adjusted to include cost-benefit analysis option and sensitivity analysis for the purpose of this research work. The options are: Cost-benefit analysis, discounted value of free cash flows (DCF), capitalized maintainable earning (P/E multiples), capitalized maintainable earning (EBIT multiples), payback period, dividend yield basis and sensitivity analysis.

Table 11: Valuation Methods in the Total Venture Capital Firms (% of the respondents)

	METHODS	*(5)	(4)	(3)	(2)	(1)
1	CBA	33.3% (5)	-	-	-	66.7% (10)
2	DISCOUNTED FUTURE CASH FLOW	-	6.7% (1)	6.7% (1)	13.3% (2)	73.3% (11)
3	P/E MULTIPLES	66.7% (10)	26.7% (4)	-	-	6.7% (1)
4	EBIT MULTIPLES	20% (3)	20.0% (3)	20.0% (3)	20.0% (3)	20.0% (3)
5	PAYBACK PERIOD	80% (12)	13.3% (2)	-	-	6.7% (1)
6	DIVIDEND YIELD BASIS	-	6.7% (1)	6.7% (1)	6.7% (1)	80.0% (12)
7	USE OF SENSITIVITY ANALYSIS	33.3% (5)	20.0% (3)	33.3% (5)	6.7% (1)	6.7% (1)

* Score 5: Always use, score 4: Usually, score 3: Sometimes, score 2: Seldom, score 1: Never use.

Table 11 presents the frequency with which the main methods of valuation are used by venture capital firms in Norway. The responses expressed in percentages and in absolute numbers reported in the table above relates to the whole population in our sample frame. A five-point scale is used to ascertain the regularity of use of the method ranging from always use (score 5) to never use (score 1). The table reports the frequency of responses in each level of usage for each valuation method.

Among Norwegian venture capital firms, the payback period (80% score 5) was ranked the highest on average, followed by capitalized maintainable earning (P/E multiples) (66.7% score 5) (See Table 11). Interestingly cost-benefit analysis and sensitivity analysis are used equally in potential investment evaluation. However, the CBA is either used or not used at all as compared to the sensitivity analysis which is fairly used by most VC firms in Norway. Despite the informational advantages of sensitivity analysis discussed above just few VC firms in our sample used this technique. This result contradicts evidence from the UK study of Dixon (1991) who found that sensitivity analysis was considered important in helping to determine a project's potential returns by 63% of the sample in his study.

Despite the weaknesses in valuation with the payback period such as not taking into account the time value of money, opportunity cost, potential risks, and other factors most VC in Norway use the payback period in evaluating potential investment. This contradicts the findings by Manigart *et al.*, (1997) who found that the valuation methods usually used in the UK are earnings multiples and not the payback period.

I investigated why Norwegian VC firms use the payback period in evaluating potential investment. In a telephone interview with VC firms who invariably used the payback period, 67% of the respondents opted for that option because it eliminates projects whose returns do not materialize until later years and thus emphasizes the earliest returns and because time is crucial to the venture capitalist, using that method is rewarding. Also, payback period could be used as a rough screening device to filter out those riskier projects, which have long lives. Those VC firms who are not listed on the stock exchange preferred that method because of its ease of use and understanding but were quick to add that, as the company developed, other valuation methods will be adopted.

Gompers (1999) identified three flaws in the use of the earnings multiple approaches: First, most new ventures do not have earnings. Second, defining the boundary of the reference

group (to determine the multiple) is not always easy or even possible Third, even if the reference group is defined, it is still quite subjective to choose the multiples and there is no theoretical guidance for this choice. Notwithstanding, this method appears to be the second most important method used in Norway which was also found to be the mostly used method in UK by Manigart *et al.*, (1997). My investigation revealed that, most VC use this approach because it shows how much they are willing to pay per earnings but its usage was also subjective.

5.4 COST-BENEFIT ANALYSES AS A VALUATION TOOL

The analysis includes five venture capital firms in Norway who use cost-benefit analysis in evaluating potential investment in our sample frame. The analysis is presented as cases.

Galambos and Schreiber (1978, 62-63) identify four steps for a successful cost-benefit analysis as discussed in the literature review. These steps are: identifying the cost and benefits of the project, measuring the costs and benefits in dollars, considering the costs and benefits over the life of the project and finally, reaching a decision. Respondents were therefore asked whether they went through this cost-benefit analysis process in evaluating potential investment and to describe an alternative procedure other than this. Interestingly, all the firms admitted using this process in evaluating potential investment. (See Table 12)

I further asked respondents which investment rule they used in performing their cost-benefit analysis. 4 out of the 5 firms use the internal rate of return (IRR), only one uses the net present value (NPV) and none uses the benefit-cost ratio (BCR). Dixon (1991) reported that 93% of his sample evaluated projects in terms of their internal rate of return (IRR) which is similar to VC firms in Norway using cost benefit analysis. (See Table 12) These VC preferred the IRR to the NPV because they deemed the NPV as a cumbersome measurement process and it was highly improbable to keep score year by year to ascertain whether the project is generating positive values. Also, the higher a project's internal rate of return, the more desirable it is to undertake the project and IRR can be used to rank several prospective investee firms the VC is considering. NPV only gives an indication of the value of the money today but not the exact discount rate of the project. Thus, whiles IRR spells out your safety margin, the NPV only assumes a discount rate. Notwithstanding this, IRR is the flip side of the net present value (NPV) and much of the same method is followed in its calculation.

According to most VC interviewed, determination of the discount rate in deciding the net worth of an investee firm is the most important factor. Notwithstanding this, most venture capitalists in Norway using CBA do not have a measure of the discount rate used. Even though they preferred to use the internal rate of return (IRR), I gathered that the determination of discount rate by these VC firms were more intuitive. In that, some VC considered the systematic and non-systematic risk which results in an otherwise large discount rate as a result of the enormous risk. This is peculiar to Case A

'We invest in seed and start up staged companies. Superior return on capital invested is what keeps us in business. Returns greater than what ordinary financial intermediaries anticipate is our goal. As a result, the internal rate of return (IRR) is considered the discount rate in evaluating each investment project. We do not have a model for the cost of capital –this is determined intuitively and also we do not take the systematic risk into consideration when determining the discount rate.'

CASE A REPRESENTATIVE

It is interesting that systematic risk is not taken into consideration when deciding the discount rate in this highly illiquid and risky business. This could partly be because they understand that ultimate success depends mostly on business and technological risk (non-systematic risk) than on interest and exchange rate (systematic risk) and that non-systematic risk can be eliminated through diversification even though VC are limited to the extent of their diversification.

The required rate of return mostly depends on different risks. A mean-variance model as a close approximation of the required rate of return is used in case B.

'We consider the internal rate of return (IRR) as our discount rate and do not use any complicated financial models. We are convinced that the calculation of the cost of capital is an art: there is no difference between returns like 30% and 35%. We only invest in expansion stage and the discount rate is at 30% but we accept any rate less than that at a much lower standard deviation. To us, there is no difference between getting high returns with large risks, or a lower return with no risk at all. Systematic risk is not strictly adhered to.'

CASE B REPRESENTATIVE

In case C, D and E, the internal rate of return is a measure of the discount rate as well and all these firms take the systematic risk into consideration when evaluating the discount rate. These firms invest in the second stage, mezzanine stage and start-up stage of the company development respectively. According to Manigart *et al.*, (2002) the discount rate at Seed up: 80%, startup: 50-70%, First stage: 40-60%, second stage: 30-50%, Bridge/Mezzanine: 20-35%, public expectation: 15-25% (Manigart *et al.*, 2002).

'Our mission statement is an expectation of high returns on capital invested. As traditional venture capitalist and second stage financiers our minimal discount rate is at 28% and we do our best to avoid all forms of non-systematic risk but invariably pay particular attention to systematic risk. The IRR is the measure of discount rate and realized returns.'

CASE C REPRESENTATIVE

There are other venture capital firms who are strategist and believe that achieving corporate goal of high return on capital invested is conceivable by strategically positioning itself below the expected discount rate. To this firm, the determination of the discount rate is connected to risks and type of financing. This applies to case D.

'The discount rate is derived by positioning. Most retail banks require interest rate of 4-8%, second stage VC firms require around 30-50% and mezzanine financiers 20-35%. Even though we invest in companies in the Mezzanine or bridge phase, we use a much lower discount rate between 15-20% and make sure we at least break even. To us, systematic risk is an extremely important factor in the determination of the discount rate.'

CASE D REPRESENTATIVE

The Net present Value is an important criterion. Most venture capitalist never accepts to fund investment project with a negative NPV. Case E uses the Net present value (NPV) in evaluating potential investment.

'We use the Net present value and not the IRR .We do not accept the financing of any investment project with a negative NPV and non- systematic risk is of little importance to us in determining the discount rate to use, however, the overall risk is very important because

we cannot take chances. As startup financiers, we use a relatively higher discount rate in our computation invariably. However, there have been situations we have acted against the norm.

CASE E REPRESENTATIVE

The results are found in Table 12. It can be deduced that, these VC firms require quite a high rate of return due to the risky nature of the business. The survey conducted among Norwegian venture capitalists showed that the discount rate was within approximation depending on the financing stage of potential investee firm which is in conformity with the study made by Manigart *et al.*, (2002). This substantiates the fact that Norwegian venture capitalist returns are around the same interval as in the rest of the world as expressed below.

Table 12: CBA Survey Responses

CASES	CASE A	CASE B	CASE C	CASE D	CASE E
INVESTMENT RULE	IRR	IRR	IRR	IRR	NPV
DISCOUNT RATE	50-70%	20-30%	28-30%	15-20%	50-70%
SYSTEMATIC RISK	NO	NO	YES	YES	NO
CBA PROCESS?	YES	YES	YES	YES	YES

Nonetheless, firms using cost-benefit analysis also used other valuation methods when making financing decisions. Some firms used CBA and other valuation methods concomitantly while others used alternatives to avoid unbiased estimate during evaluation.

Case A uses the discounted cash flow methods, and the representatives from case B, C, D, and E basically agreed on the same approach. Below are the views expressed by these representatives on other valuation methods used:

‘We use venture capital and the discounted cash flow (DCF) methods and comparable prices to evaluate enterprises. Illiquidity premium determination is the most complicated issue in the valuation process. We make the projected statements for 5 years. The most important is the human capital valuation not the numerical analysis. We also use some elements of the real option method because we evaluate the outgoing option and make sure we rule out all forms of biases. We sometimes introduce multiples due to its simplicity nature.’

CASE A REPRESENTATIVES

Capital budgeting and the estimation of future cash flows are the problems. We can make a profound prognosis and find a return based on complicated models, but it may not materialize due to risk and uncertainty. We make the estimations ourselves because we cannot trust the entrepreneurs. The valuation is based on payback period, but we do not use the whole model due to continuous value problems. It may give a very biased estimate and so we sometimes introduce PE Multiples and other subjective models peculiar to our firm.

CASE B, C, D&E REPRESENTATIVES

The author concludes that all the venture capitalist that used cost benefit analysis also used multiples and other valuation methods subjective to the VC firms. I deduced that their main goal was superior return on investment and so they all used methods via experience that made their goals attainable.

CHAPTER SIX: CONCLUSION

6.1 INTRODUCTION

This final chapter provides a summary of the analysis that has been performed. Recommendations for future cost-benefit analysis for venture capitalist are provided in this chapter. These recommendations are related to this study of cost-benefit analysis for venture capital investment decisions.

6.2 SUMMARY

This paper discusses the results of the analysis for the following research questions; “How do Norwegian VC firms evaluate potential investments?” and “How could cost benefit analysis (CBA) be used in the context of venture capital investment decisions?” The results can be summarized as follows.

6.2.1 HOW DO VENTURE CAPITAL FIRMS IN NORWAY EVALUATE POTENTIAL INVESTMENT?

There are a variety of factors that influence how venture capital firms make their evaluation decisions beyond the scope of this research work. However in Norway, VC firms rely significantly on their personal references and take customer loyalty to the investee firm coupled with their own market evaluation very seriously in the due diligence process.

With regards to the sources of valuation information to equip these VC firm to make meaningful choices, Norwegian venture capital firms place special importance on the curriculum vitae of management followed by interview with entrepreneurs. In addition, a relatively high proportion of Norwegian venture capital firms use the payback period and capitalized maintainable earning (P/E multiples) as the methods used in valuating potential investments. Cost-benefit analysis is seldom used as a valuation tool.

6.2.2 COST BENEFIT ANALYSIS IN THE CONTEXT OF VENTURE CAPITAL INVESTMENT DECISIONS IN NORWAY

VC firms who used cost benefit analysis also strictly adhered to its inherent process of identifying the cost and benefits of the project, measuring the costs and benefits in dollars, considering the costs and benefits over the life of the project and finally, reaching a decision. The researcher also found out that the IRR was the most used investment rule when performing the CBA and that the determination of the discount rate was a crucial factor and determined more intuitively when calculating the internal rate of return and net present value. Most VC used the internal rate of return as a measure of the discount rate taking into consideration the systematic and non-systematic risk. The researcher also found out that, the discount rate used in Norway according to the stage of company financing was in perfect alignment with related literature and the rest of the world.

6.3 IMPLICATIONS

Due diligence emphasizes understanding and quantifying the risk of the proposed venture to be funded and so in understanding due diligence, Norwegian venture capital firms pay particular attention to personal references, customer loyalty and their own market valuation which will help improve the information flow between them and potential entrepreneurs leading to better investment decisions and better long term partnerships.

While the research by Manigart *et al.*, (2000) indicated that the VC in the U.S. and U.K. place a greater importance on own due diligence report than any other means for their source of information for potential investment, I have found out that Norwegian venture capital firms emphasize more on the curriculum vitae of management, and interview with entrepreneurs, similarly to those in France, Belgium, and the Netherlands. In terms of methods used in evaluating potential investments, it should be noted that a relatively high proportion of Norwegian venture capital firms use the payback period followed by capitalized maintainable earnings (P/E multiples). Hasegawa (2004) maintained that many VC adopt the book value, and recent transaction prices in the sector as their valuation methods, the reality is that capitalized maintainable earnings (P/E multiples) which is considered to be commonly used in countries with well-developed capital markets (Manigart *et al.*, 2000) is also widely adopted

by Norwegian venture capital firms. Considering the study of Hasegawa's (2004), I may say that Norwegian venture capital firms have come to attach a greater importance to capitalized maintainable earnings (P/E multiples) in evaluating potential investments next after the payback period in recent years just as those in the U.S. and U.K.

The venture capitalist aims to earn a good return on capital invested and accomplishing this goal entails weighing the costs and benefits of potential investment before doing cost-benefit analysis. CBA sorts those economic impacts into costs and benefits, and, where possible and worthwhile, quantifies them using statistical techniques and economic analysis. While doing a CBA does require time and effort, the information gained from a good quality CBA can provide significant pay-backs by improving the quality of returns to the venture capitalist and increases the confidence of the entrepreneur in the investment decision process.

CBA is particularly useful when considering costly investment projects like initial startup fund undertaken by venture capitalist which is mostly associated by inherent risk of potential loss of the capital invested. As a result, scarce financial resources should be effectively allocated to produce the best return on capital invested which is the ultimate goal of most venture capitalist. Venture firms that have the mandate of conducting cost-benefit analysis prior to funding are also better able to make informed financial decisions and minimize the potential risk of loss. Doing cost-benefit analysis from the beginning helps the venture capitalist in ruling out unsuitable options before time and effort have been expended on converting them from ideas to polished options. Thus, it will usually be worthwhile to integrate cost-benefit analysis into the investment decision process from the earliest possible stages rather than leaving it as an "add-on" at the end.

6.4 SUGGESTIONS FOR FURTHER RESEARCH

The study has multiple implications for academics and practitioners. Firstly, for academics, the study provides in-depth insight into cost-benefit analysis in the context of venture capital investment decisions in Norway. The study highlights many areas of the process which still need to be researched by academics. Some areas of potential research are as follows:

First, because the number of VC firms involved in this study is small, the model needs to be validated further on a larger sample through a structured mail questionnaire and telephone interview. Second, this study was developed to cover all types of VCs and as it is known, not all VCs are the same, so the differences between various VCs need to be explored.

Nonetheless, our study follows only Norwegian VC funds and Bygrave and Timmons (1992) point out that the nature of the industry varies from country to country.

Another interesting research area will be doing a cost-benefit analysis for the entrepreneur. Much of the same data that has been used in this analysis can be used to find out how entrepreneurs stand to gain by conducting a cost-benefit analysis before approaching a particular venture capitalist for funding.

Other questions worth investigating are: to what extent could the cost-benefit analysis process be used as a competitive tool in the venture capital industry? How important is a cost-benefit analysis to investment committees and supervisory boards in the venture capital decision-making process? How do newly created and more mature venture capital firms differ in their investment processes with and without cost-benefit analysis?

For practitioners, the study may be useful for that venture capitalist that does not use cost-benefit analysis in evaluating their decisions in Norway. Firstly, for such VCs, while doing a CBA does require time and effort, the information gained from a good quality CBA can provide significant pay-backs by improving the quality of returns to the venture capitalist and by increasing the confidence of the entrepreneur in the investment decision process. For more mature venture capital firms, the analysis may serve as the blueprint for formalizing their investment process.

REFERENCES

Association for Investment Management & Research (1997), *AIMR Performance Presentation Standards Handbook*, Association for Investment Management and Research, Charlottesville, VA.

Barry, C.B., (1994), “New Directions in Research on Venture Capital Finance”, *Financial Management*, 1994, Vol. (23), No. (3), Autumn, pp. 3-15.

Baum, Joel A. C. & Brian S. Silverman, (2004), Picking Winners or Building Them? Alliance, Intellectual, and Human Capital as Selection Criteria in Venture Financing and Performance of Biotechnology Startups, *Journal of Business Venturing*, 19(3), pp.411-436.

Benoit, J., (1975), Venture Capital Investment Behaviour. Austin, USA: The University of Texas at Austin. Dissertation.

Berkery, Dermot, (2008), *Raising Venture Capital for the Serious Entrepreneur*, McGraw Hill, 2008. ISBN 10: 0-07-149602-5

Black, Bernard S. & Ronald J. Gilson, (1998), “Venture Capital and the Structure of Capital Markets: Banks vs. Stock Markets.” Corporate Governance Today: The Sloan Project on Corporate Governance at Columbia Law School, May 1998: 8

Black, F. & Scholes, M., (1973), The Pricing of Options and Corporate Liabilities - *Journal of Political Economy*, Vol. 81 (3), pp. 637–654.

Bollingtoft, A., J.P. Ulhoi, H.Madsen & H.Neergaard, (2003), The Effect of Financial factors on the Performance of New Venture Companies in High Tech and Knowledge Intensive Industries: An Empirical Study in Denmark, *International Journal of Management*, 20 (49) pp.535-547

Brealey, R.A. & Myers, S.C., (2000), *Principles of Corporate Finance*, 6th edition, Irwin/McGraw-Hill, 1093 p.

Brigham, E. F., Gapenski, L. C. & Daves, P. R., (1999), *Intermediate Financial Management, 6th edition*, The Dryden Press, 1083 p.

Bygrave, W.D. & Timmons, J.A., (1992), *Venture Capital at the Crossroads*. Boston, USA: Harvard Business School Press.

Carpentier, Cécile, & Jean-Marc Suret, (2005), “On the Usefulness of Tax Incentives for Business Angels and SME Owners: An Empirical Analysis.” CIRANO Scientific Paper 2005s-13. Montreal: Centre Interuniversitaire de Recherche en Analyse des Organisations

Chen, P., Baierl, G. & Kaplan, P., (2002), Venture Capital and its Role in Strategic Asset Allocation. *The Journal of Portfolio Management*, 28, No. 2, 83-89.

Cressy, R.C & C. Olofson, (1997), European SME Financing: An overview, *Small business Economics*, 9 (2), pp.87-96.

Damodaran, Aswath, (1994), *Damodaran on Valuation: Security Analysis for Investment and Corporate Finance*. New York: John Wiley & Sons, Inc., 1994.

Denis, D. J., (2003), Entrepreneurial Finance: An Overview of the Issues and Evidence, *Journal of Corporate Finance*, 10(2), pp.301-326.

Dittmann, I., Maug, E., Kemper, J., (2004), How Fundamental are Fundamental Values? Valuation Methods and their Impact on the Performance of German Venture Capitalists - *European Financial Management*, Vol. 10(4), pp. 609–638.

Dixon, R., (1991), “Venture Capitalists and the Appraisal of Investments”, *Omega*, 1991, Vol. (19), No. (5), pp. 333-344.

EVCA (2006), *European Private Equity and Venture Capital Association Yearbook 2006*. Belgium.

Fama, E. F., (1991), Efficient capital markets: II. *Journal of Finance*, 46 (5): 1575-1617.

Fichera, D., (2001), *“The insider’s guide to Venture Capital,”* California, USA: Prima Publishing

Florida, Richard & Martin Kenney, (1988), Venture Capital-Financed Innovation and Technological Change in the USA., *Research Policy* 17(1), pp.119-137.

Flyvbjerg Bent, Mette K. Skamris Holm, & Søren L. Buhl, (2005), "How (In) accurate Are Demand Forecasts in Public Works Projects? The Case of Transportation." *Journal of the American Planning Association*, vol. 71, no. 2, Spring 2005, pp. 131-146

Fried, V., Hisrich, R., (1994), "Toward a Model of Venture Capital Investment Decision Making", *Financial Management*, Vol. 23 No.3, pp.28-37.

Fuguitt, Diana & Shanton J. Wilcox, (1999), *Cost-Benefit Analysis for Public Sector Decision Makers.* Quorum Books, Connecticut. USA.

Galambos, Eva & Arthur F. Schreiber, (1978), Making Sense out of Dollars: Economic Analysis for Local Government. National League of Cities, Washington D.C.

Gompers, Paul A., (1995), “Optimal Investment, Monitoring, and the Staging of Venture Capital.” *The Journal of Finance* Vol. L, No. 5 (1995): 1464

Gompers, Paul A., (1997), "Venture Capital and the Creation of Public Companies: Do Venture Capitalists Really Bring More than Money?" *Journal of Private Equity* (fall 1997): 15-32.

Gompers, Paul A., (1999), "Ownership and Control in Entrepreneurial Firms: An Examination of Convertible Securities in Venture Capital Investment." 1999.

Gompers, P. & J. Lerner, (2001), *The Money of Invention - How Venture Capital Creates New Wealth.* Boston: Harvard Business School Press.

Gupta, A.K. & Sapienza, H.J., (1992), Determinants of Capital Firms' Preferences Regarding the Industry Diversity and Geographic Scope of their Investments, in: *Journal of Business Venturing*, 7 (1992), S.347-362

Hasegawa Hirokazu, (2004), “Bencha Kyapitaru karamita Bencha Kigyo no Baryueshon” (Venture Capitalist’s Valuation of firms), *Business Insight*, pp.8-25

Hill, B.E. & Power, D., (2001), *Inside Secrets to Venture Capital*. New York, USA: John Wiley & Sons, Inc.

Hisrich, Robert D., (1994), Toward a Model of Venture Capital Investment Decision Making, *Financial Management*, September 1994.

Jones, Charles M. & Matthew Rhodes-Kropf, (2004), “The Price of Diversifiable Risk in Venture Capital and Private Equity,” July 2004. Graduate School of Business, Columbia University.

Kaplan, S. N., & Strömberg, P., (2003), Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts - *Review of Economic Studies* Vol. 70. pp. 281–315

Kirilenko, A. A., (2001), Valuation and Control in Venture Finance. *Journal of Finance*, Vol. 56 (2), pp. 565–587.

Kolle Peter, (2006), The Discount Rate used by Venture Capital Fund, article published (December 2006)

Lerner, J., (2000), *Venture Capital and Private Equity: A Casebook*. New York, NY: John Wiley & Sons.

Lerner, Josh & John Willinge, (2002), “A Note on Valuation in Private Equity Settings.” HBS Teaching Note 9-297-050

Lockett, A. M. Wright, Sapienza, H. & S. Pruthi, (2002), “Venture Capital Investors, Valuation and Information: A Comparative Study of the US, Hong Kong, India and Singapore”, *Venture Capital*, 2002, Vol. 4, pp. 237-252.

Lorenz, A., (1989), *Venture Capital Today: A Practical Guide to the Venture Capital Market*, 1989, 2nd ed. Woodhead-Faulkner, London.

Manigart, S., K. De Waele, M. Wright, K. Robbie, P. Desbrieres, H. J. Sapienza & A Beekman, (2002), “Determinants of Required Return in Venture Capital Investments: a Five-country Study”, *Journal of Business Venturing*, 2002, Vol. (17), pp. 291-312.

Manigart, S., M. Wright, K. Robbie, P. Desbrieres, & K. De Waele, (1997), “Venture Capitalists’ Appraisal of Investment Projects: An Empirical European Study.” *Entrepreneurship: Theory & Practice*, 1997, Vol. (21), No. (4), pp. 29-43.

Manigart, S., De Waele, K., Wright, M., Robbie, K., Desbrieres, P., Sapienza, H., Beekman, A., (2000), Venture Capitalists, Investment Appraisal and Accounting Information: a Comparative Study of the USA, UK, France, Belgium and Holland - *European Financial Management* 6(3), pp. 389–403.

Margus Kõomägi & Priit Sander, (2006), "Venture Capital Investments And Financing In Estonia: A Case Study Approach," University of Tartu - Faculty of Economics and Business Administration Working Paper Series 44, Faculty of Economics and Business Administration, University of Tartu (Estonia).

May, J. & C. Simmons, (2001), *Every Business Needs an Angel*. New York, NY: Crown Business.

Mayer, C., K. Schoors, & Y. Yafeh, (2005), "Sources of Funds and Investment Strategies Of Venture Capital Funds: Evidence from Germany, Israel, Japan and the UK", *Journal of Corporate Finance* 11, 586-608.

McKenna, Christopher K., (1980), *Quantitative Methods for Public Decision Making*. McGraw-Hill, New York.

Mechner, F., (1989), Present Certainty Equivalents and Weighted Scenario Valuations, *Journal of Business Venturing*, 4: 85-92.

Murray, G., (1999), Early-Stage Venture Capital Funds, Scale Economies and Public Support, *Venture Capital*, 1(4), pp.351-384

Nas, Tevfik F., (1996), *Cost-Benefit Analysis, Theory and Application*. SAGE Publications Inc., 219 pp, 1996. ISBN 0-8039-7133-8.

Norton, E. & Tenenbaum, B., (1993), Specialization versus Diversification as a Venture Capital Investment Strategy: *Journal of Business Venturing* 8 (1993), S.431-442

Norske Venture Capital Association, (2008), Activity Survey for Private Equity, Venture Capital and Seed Funds in Norway.

Pereiro, L. E., (2002), *Valuation of Companies in Emerging Markets*, John Wiley & Sons, p.507

Pike, R. & B. Neale, (1996), *Corporate Finance & Investment Decision and Strategies*, 1996, Prentice-Hall, London.

Prest, A. R. & Turvey, R., (1965), "Cost-Benefit Analysis: A Survey," *Economic Journal* 75: 683-735.

Quindlen, R., (2000), *Confessions of a Venture Capitalist: Inside the High-stakes World of New Venture Financing*. New York, NY: Warner Books.

Rind, K.R., (1997), "Profitable Exiting: Forming Strategic Partnerships, IPOs, Sale Backs, Mergers and other Mechanisms", Atlanta, GA, paper presented at 1997 Venture Capital Institute Conference.

Ruhnka, J.C. & Young, J.E., (1987), A Venture Capital Model of the Development Process for New Ventures: *Journal of Business Venturing* 2 (1987), S.167-184

Sadtler, D.R., (1993), "How Venture Capitalists add Value", *Journal of General Management*, Vol. 19 pp.1-16.

Sahlman, W.A., (1990), The Structure and Governance of Venture Capital Organizations. - *Journal of Financial Economics* 27(2), pp. 473–521.

Sahlman, William A. & Daniel R. Scherlis, (1987), *A Method for Valuing High-Risk, Long-Term Investments: The "Venture Capital Method,"* No. 9-288-006. Boston: HBS Publishing, 1987

Sapienza, H., (1992), "When do Venture Capitalists add Value?" *Journal of Business Venturing*, Vol. 7 pp.9-27.

Seppä, T. J., & Laamanen, T., (2001), Valuation of Venture Capital Investments: Empirical Evidence. - *R&D Management* Vol. 31(2), pp. 215–230.

Silver, A.D., (1985), *Venture Capital: The Complete Guide for Investors.* 1985, New York: John Wiley and Sons.

Timmons, J. & S. Spinelli, (2004), *New Venture Creation.* New York, NYL McGraw-Hill/Irwin.

Tyebjee, T. & Bruno, A.V., (1984), A Model of Venture Capitalist Investment Activity. *Management Science*: Sep 30, 9; ABI/INFORM Global, p.1051- 1066.

US Private Equity Valuation Guidelines (2004)

Venture Economics, (2000), *National Venture Capital Association yearbook.* 2000. Arlington, VA.

Waldron, D. & C. Hubbard, (1991), Valuation Methods and Estimates in Relationship to Investing versus Consulting. *Entrepreneurship: Theory and Practice*, 16 (1): 43-52.

Wetzel, W.E., (1981), Informal New Capital in New England. In K.H. Vesper (ed). *Frontiers of Entrepreneurship Research*, 1981, Wellesly, MA: Babson College, pp.217-245

Wilson, Fred, (2008), Venture Fund Economics: When One Deal Returns the Fund. *Silicon Alley Insider*. 2008.

Wright, M. & K. Robbie, (1996), “Venture Capitalists, Unquoted Equity Investment Appraisal and the Role of Accounting Information.” *Accounting and Business Research*, 1996, Vol. (26), No. (2), pp. 153-168.

Wright, M. & K. Robbie, (1998), “Venture Capital and Private Equity: A Review and Synthesis”, *Journal of Business Finance Accounting*, 1998, Vol. 25, No. 5-6, pp. 521-570.

Zacharakis, A. & Meyer, D.G., (2000), The Potential of Acturial Decision Models: Can they Improve the Venture Capital Investment Decision? - *Journal of Business Venturing*; 15, pg 323-346

APPENDIX A

QUESTIONNAIRE 1

Please select as many options as possible that is peculiar to your firm

1. Do you go through the benefit- cost analysis process of identifying the cost and benefits of the investment, measuring the costs and benefits in dollars, considering the costs and benefits over the life of the investment and finally deciding on a decision?.

- a) Yes b) No c) Sometimes d) Never e) Other

2. What discount rate depending on the company stage of development do you use?

.....

3. What is the time limit of exit for your company?

- a) 4 b) 5 c) 6 d) 7 e) 8 f) other

4. Which type of risk do you consider when deciding the discount rate to use?

- a) Systematic risk b) Non-systematic risk c) Both d) None e) Other

5. Which phase in the company development stage do you invest in?

- a) Start-up stage b) Second stage c) Mezzanine d) Growth stage

6. What are the likely benefits derived by your company for every investment undertaken?

- a) Return on capital invested
- b) Risk diversification
- c) Control of ownership right
- d) Other

7. What are the likely costs incurred by your company for every investment undertaken?

- a) Initial Cost of fund invested
- b) Conflict of interest with entrepreneur
- c) Risk of loss of the capital invested
- d) Other

8. Which investment rule do you use to measure each investment decision when conducting cost benefit analysis?

- a) Net present Value
- b) Internal rate of return
- c) Benefit- cost ratio

9. List some indirect cost incurred for every investment decision.

.....
.....
.....
.....
.....
.....

10 List some indirect benefits derived for every investment decision

.....
.....
.....
.....
.....
.....

QUESTIONNAIRE 2

1. How important are the influence of the following due diligence sources in evaluating potential investment?

N0	SOURCES	5*	4	3	2	1
1	Hire experts to review specific parts of business plan					
2	Enquire from largest and critical suppliers of firms credibility					
3	Enquire about customers loyalty					
4	Depend on associations to know data on the market, its size and its growth rate					
5	Own market evaluation					
6	Independent accounting & audit report					
7	Never use the same reporting accountant as management's accounting advisors					
8	Great reliance on personal references					

* Score 5: Very important, score 4: Important, score 3: Moderately important, score 2: Slightly important, Score 1: Least important.

2. How important are the influence of the following sources of information in evaluating potential investment?

	SOURCES	*(5)	(4)	(3)	(2)	(1)
1	Curriculum vitae of management					
2	interview with entrepreneurs					
3	production capacity/technical information					
4	own due diligence report					
5	due diligence by accounting/consulting firms					
6	Business plan (overall consistency of plan)					
7	Business plan (more than 1 year ahead)					
8	interview with other firm personnel					
9	sales and marketing information					

* Score 5: Very important, score 4: Important, score 3: Moderately important, score 2: Slightly important, Score 1: Least important.

3. What methods do you use to value potential investments?

	METHODS	*(5)	(4)	(3)	(2)	(1)
1	CBA					
2	DCF					
3	P/E MULTIPLES					
4	EBIT MULTIPLES					
5	PAYBACK PERIOD					
6	DIVIDEND YIELD BASIS					
7	SENSITIVITY ANALYSIS					

* Score 5: Always use, score 4: Usually, score 3: Sometimes, score 2: Seldom, score 1: Never use.

APPENDIX B

GLOSSARY OF SELECTED VENTURE CAPITAL TERMS

Buyout: Refers to a financing used to buy a controlling interest in a company from the prior owners. A **buyout** is often accomplished through use of a combination of borrowed capital and **private equity**, in which case it may be called a leveraged buyout (LBO) if the borrowed funds exceed the new capital invested. If the managers of the business are buying it, it is called a management buyout (MBO).

Cash flow: Cash receipts from all sources less cash expenditures over a designated period of time, usually a month or a year. Cash flow positive means receipts exceed expenditures. Cash flow negative means expenditures outpace receipts.

Early stage: Generally refers to a business that has passed the start-up phase and is beginning to generate revenue. When referring to financing, it usually includes funding rounds through and including first round financing.

First round: A financing round for companies that have passed the start-up phase, have developed a marketable product or service, and are ready to ramp-up to begin to generate revenues. Usually follows friends and family round, a seed stage round, or both.

Internal rate of return (IRR): A measure of the return on an investment taking into account the time between the investment and the return, and usually expressed as the percentage returned per year. Internal rate of return is calculated as the rate of return on an investment that would make the present value at the time of investment equal to all future returns on that investment.

Mezzanine investment: An investment made later in the growth cycle of a company, usually after the initial venture capital rounds and in anticipation of, an initial public offering or merger. It is sometimes considered to be within the broad definition of venture capital.

Seed capital: Money invested in the earliest stages of a business, typically used for research and proof-of-concept of a product or service, as well as for assembling a business plan needed to seek later financing rounds.

Seed stage: The earliest stages of a new business, in which the entrepreneur develops and proves a concept for a product or service and determines whether it might support a successful business.

Start-up: A business that is at, or close to, its beginning.

Lead investor – Each round of Venture Capital has a lead investor who negotiates the terms of the deal and usually commits to at least 50% of the round.

Fund size – The total amount of capital committed by the investors of a venture capital fund.

Carried interest – The portion of any gains realized by a Venture Capital Fund to which the fund managers are entitled, generally without having to contribute capital to the fund. Carried interest payments are customary in the venture capital industry to create a significant economic incentive for venture capital fund managers to achieve capital gains

APPENDIX C

Table 13: Correlation between the Sources of Information in Evaluating Potential Investments and Cost-benefit Analysis

N0	SOURCES	MEAN	STD	VAR	SUM	MIN	MAX	RAN GE	CORR
1	Curriculum vitae of management	3	5.66	32	15	0	13	13	0.198
2	Interview with entrepreneurs	3	4.06	16.5	15	0	10	10	-0.550
3	Production capacity/technical information	3	1.41	2	15	1	4	3	-0.593
4	Own due diligence report	3	2.35	5.5	15	1	7	6	-0.477
5	Due diligence by accounting firms	3	2.35	5.5	15	1	6	5	0.238
6	Business plan (overall consistency of plan)	3	3.39	11.5	15	0	8	8	0.577
7	Business plan (more than 1 year ahead)	3	2.24	5	15	0	6	6	0.125
8	Interview with other firm personnel	3	2.24	5	15	0	6	6	0.12
9	Sales and marketing information	3	1.41	2	15	1	4	3	-0.982
	CBA	3	4.47	20	15	0	10	10	