

Strategy- performance approach to Venture Capital Finance process

Introduction of a new strategy-performance
innovation model for VCF context

Karl N. Nikk

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Publisher School of Economics**Unit** Department of Management and International Business**Series** Aalto University publication series BUSINESS + ECONOMY 2/2012**Field of research** Finance, Venture capital, Capital**Abstract**

The present [doctoral dissertation] focuses on venture capital finance of high technology firm. The venture capital finance represents one form of risk finance. The importance of risk finance for newly established companies is growing. It is evident that new high technology companies need external resources to support their development and growth.

Venture capital finance is a negotiation process, where a firm seeks finance for its technology and business development. The venture capital industry is specialised to mobilise both economic and human resources for the needs of a firm. The venture capital finance will be realised, when both parts, a firm and a venture capital investor find common solution to mutual shareholder partnership.

The present [dissertation] deals with the venture capital finance based on the strategy-performance approach. The [dissertation] combines strategic approach to venture capital finance process. The [dissertation] uses ASP-model, which is excellent tool to analyse this complex phenomena. The analyse raises the need to adopt the model into venture capital finance and the writer presents a new model to deal with the domain of VC finance.

The first objective of the [dissertation] is to test ASP-model in the context of venture capital finance and to make proposals to develop the model. The second objective is to raise most relevant factor to a closer analyse as a part of the venture capital finance process. The management team is probably the most relevant factor on the way to successful performance of a high technology firm. The management team is the core element of the development process. The third target is to develop new model strategy-performance innovation model for venture capital finance context. This SPI- model is a relevant contribution to scientific and business community by offering the systematic analysis of innovation process of high technology firm in the venture capital finance domain.

The structure of this [dissertation] consists of four chapters. The first chapter is general part, which integrates three essays. The first essay is dealing with theoretical strategy performance approach and the testing of ASP-model. The second essay focus on management team of a high technology firm. The third essay is focusing on new SPI- model in venture capital finance context.

The findings and results of the present [dissertation] are based on case studies, literature, articles in journals and experiences of the writer from numerous negotiations between VC investors and SME companies.

The [dissertation] introduces new strategy performance innovation model, which combines complex phenomena of venture capital finance process and strategic approach.

The research takes part in discussion of venture capital finance and brings new elements to academic research and to business process applications in the research context.

Keywords venture capital finance, high technology firm, strategy-performance innovation model, management team, substance know-how, innovation

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In Memoriam

Karl Nestor, Nikk

24.1.1950–18.2.2012

Karl valmistui ekonomiksi 1974 ja suoritti kauppatieteiden maisterin tutkinnon Helsingin Kauppakorkeakoulussa vuonna 1976. Työelämässä niin rahoituksen parissa yleisesti kuin yrittäjien ja pääomasijoittajien parissa erityisesti hän hyödynsi monipuolista osaamistaan asiantuntijana liikkeenjohdon konsultoinnissa, yritysjärjestelyissä, rahoituksessa, strategisessa kehittämisessä, pääomasijoittamisessa ja erilaisissa kehittämishankkeissa Suomessa ja EU:n alueella.

Läheisilleen Karl, Kartsa, oli aviomies, isä ja vaari ja työelämän rooliaan hän kuvaili toimimiseksi niin asiantuntijana, projektin vetäjänä kuin sparraajana.

Kun Karl, meille Kalle, vuonna 2005 liittyi yrittäjyyden tohtorikoulutusohjelmaan, hänellä oli jo takanaan tohtoriopintoja Itävallassa vuosina 1995–2000 (Wirtschaftsuniversität Wien) ja SAP-Finance tutkinto vuodelta 1998. Tohtorikoulutusseminaareissa ekstrovertti Kalle osoitti olevansa hyvä kuuntelija ja voivansa toimia myös sparrattavana. ”Useissa jälkiseminaareissa” tuli esiin hänen monipuolinen kiinnostuksensa talouselämän ajankohtaisiin ilmiöihin.

Edellä kuvattuja kokemuksiaan Kalle hyödynsi monipuolisesti pragmaattisessa lähestymisessään tutkimukseensa, joka ei kuitenkaan ehtinyt viralliseen väitöskirjaprosessiin, mutta jo lähes valmiina julkaistaan nyt Kallen muistoksi tutkimusraporttina Aalto-yliopiston Business + Economy -sarjassa.

Olavi Punakivi

Jukka Tuominen

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LIST OF ORIGINAL ESSAYS

The thesis is based on the following three essays.

- I. **Nikk, Karl:** Venture capital finance of a high technology firm in the frame of advanced strategy-performance model

- II. **Nikk, Karl:** Management team in venture capital finance process of a high technology firm in the strategy- performance innovation model context

- III. **Nikk, Karl:** Venture capital finance of a high technology firm in the context of the Strategy-Performance Innovation model

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1 Introduction

1.1 Background

The risk finance market is very interesting domain for research. It is vital part of market economy and it facilitates relevant finance resources for new innovations and new companies. The central part of risk finance market operates around stock exchanges, which by listing values of the companies allocate capital to different objects. The shareholder value is relevant factor in risk finance market and investors and shareholders target the increase of value of their investment.

The stock exchanges are one market place, where venture capital investors are realising their investment on shares. The listing the company in stock exchange has been in the past a good option to get substantial revenue on investments. During recent years this option has been difficult to realise and numerous investors have become sceptical with shares introduced to the stock exchange by the venture capital industry.

Recent development in the risk finance market has led in difficulties in finding risk finance. The weak listing of new companies in stock exchanges and few exits through stock exchanges has led difficulties for collecting funds for risk finance of companies. This has partly led to situation that high technology companies have more difficulties in finding risk finance.

The risk finance market is important for the venture capital investors and for high technology companies, which are seeking risk finance for their operation. The stock exchanges are important for the exits of the venture capital investor. The new listing of high technology companies is also important for the growing new companies. The role of stock exchanges has diminished and so called industrial exits have grown at the exit phase of venture capital investments.

The *venture capital finance* is important part of risk finance market. It has grown by volume and has become important financier of *unlisted companies*. The venture capital finance has become a relevant factor in finance of new companies. These new companies form a substantial finance risk, which makes them difficult to find external finance.

Venture capital companies are prepared to take calculated risks and they are *potential partners for unlisted companies*. Venture capital companies seek actively new investment objects. They are selecting companies primarily with large market and revenue potential in their investment portfolio.

On the other hand high technology companies are seeking finance for their business development. This development process forms relevant operative and financial risks and companies meet difficulties in finding external finance resources. Especially *high technology companies* represent new innovations, which are complex investment objects also for venture capital investors.

The venture capital companies are *specialised to analyse and manage financial and operative risks*. If high technology firm meets the finance criteria of venture capital investor this leads usually to the business partnership. Venture

capital investor becomes minority shareholder and takes *active role in developing* company.

The venture capital finance has in numerous cases open the gates to listing in stock exchange. The venture capital investor supplies necessary equity finance and resources to meet requirements of the stock exchange for listing.

The venture capital finance is a *strategic process*, where *VC investor* and a *high technology firm* combine their inputs into development of business process, which targets synergy, competitive advantage and economic performance.

This partnership lasts several years and it targets to the increase of the shareholder value, which will be realised in exit phase. Venture capital investor has usually time schedule for 3- 5 years during which time it participates actively in adding the value of the company. This venture capital finance process ends to the exit phase, where venture capital investor sells the shares of the company. The venture capital investor harvests investment through exit. It is the phase where *venture capital investor* sells shares of the company and realises profits of the investment and closes the case in portfolio.

The present dissertation *contribute venture capital research by combining strategy performance approach to the venture capital investment process*. The dissertation integrates through three interrelated essays the research context. The dissertation introduces also the new model, SPI-model, which fills the research gap and contributes the theory building in the research domain and increases our knowledge of this complex phenomenon.

The venture capital industry is important part of our finance structure and it is vital important to increase our understanding by analysing it. The development process of high technology companies focuses mainly *intangible assets*. This

requires more knowledge and understanding of new innovations in analysing and estimating business potential (TEKES 2010). The relevant focus of this evaluation is management team of a high technology company, which represents ability to proceed with innovation to the market.

The present dissertation *in first essay* analyses strategic performance approach and tests advanced strategy performance- model *in venture capital finance process of a high technology firm*.

The role and *core competence elements of management team* are analysed *in second essay*. The development of the business idea into business strategy is a demanding process. This takes usually several years and requires various skills, which are represented in a *management team* of a high technology firm. The management team is key factor in generating the necessary profits of the company. The management team plays important role in the success of the venture capital investment.

The *strategic approach* in analysis of venture capital finance is relevant tool. The third *essay* is analysing venture capital finance process by using new *strategy performance -innovation model*. The model focus on innovation of a high technology firm, which combines elements of *external and internal innovation mechanism(networks)*.

1.2 The objectives of the research

The *objective of the dissertation* is to analyse and test venture capital finance as a process by using *strategic performance approach*. The research deals with different strategic components and factors of venture capital finance. The

dissertation consists of three essays, which focus on venture capital finance process from different theoretical approaches. The essays are linked together and they form holistic picture of the research context together.

On the base of *analysis and test of ASP-model*, the *first essay* aims at finding relevant arguments for the future development of ASP-model in the research context.

The target of *second essay* is to analyse and discuss of *management team* of a high technology firm in the frame of venture capital finance process. The target is to find out relevant development stages and the know-how elements, which are important in the composition of a management team. The estimating the *importance of the management team in the venture capital finance process* is one objective. The analysis complement studying area and the target is to increase our understanding of human resources and discuss their role within research domain.

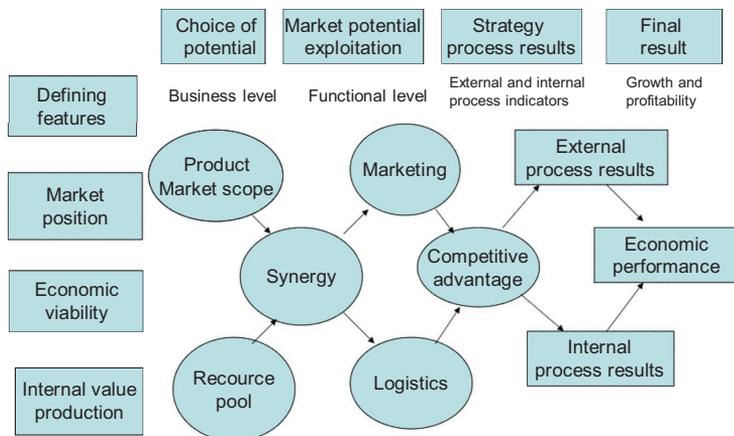
The objective of *third essay* is to combine innovation factors for the success of the venture capital of a high technology firm based on the theoretical frame of strategy- performance model, which is tested by case firms. The target of analysis is to *create new model* for the research domain. This new *strategy-performance innovation –model (SPI-model)* is helping us to analyse and understand complex innovation process in venture capital finance context.

2 Theoretical background

The theoretical structure of this dissertation is based on several theoretical approaches. The most relevant is theoretical structure of *strategy-performance approach*, which is combination of *resource-based view*, *business policy tradition*, and *industrial organisation economics tradition* (Killström, 2005, Lahti, 1983, Krause ,2009).

The venture capital finance process is analysed in the strategy context by using in first essay advanced strategy-performance model. The advanced Strategy-Performance-model (ASP-model), which originally was developed by Lahti (1983) and developed further by Killström (2005).

Figure 1. The Advanced Strategy-Performance-model (Killström 2005)



ASP-model is a result of long development process, where theoretical elements were adopted from *Business Policy Tradition (BP)*, *Industrial Organisation Economics tradition (IO)*, *Strategic group tradition (SG)* and *Resource-based View* (Killström 2005). The model is useful frame to analyse the *strategy process of the firm*. It consists of the most relevant strategic elements of business development process of the firm.

Strategy as a concept has several definitions depending of the approach of the research. Chandler (1962) considers the long range goals and objectives and allocating resources devoted to the firms objectives relevant elements of the strategy. Ansoff's (1965) strategy concept includes product market scope, the competitive advantage, synergy and direction of the growth vector. Lahti (1983) considers the future and present competitive environment factors relevant for strategy.

The *strategic theory* is base for strategic alliances, synergy between companies, comparative advantage, joint ventures and partnerships which are different methods to realise *exit*. The model in figure 2 is primarily a strategic model, which targets to help in analyse and visualisation of different strategic components in venture capital finance.

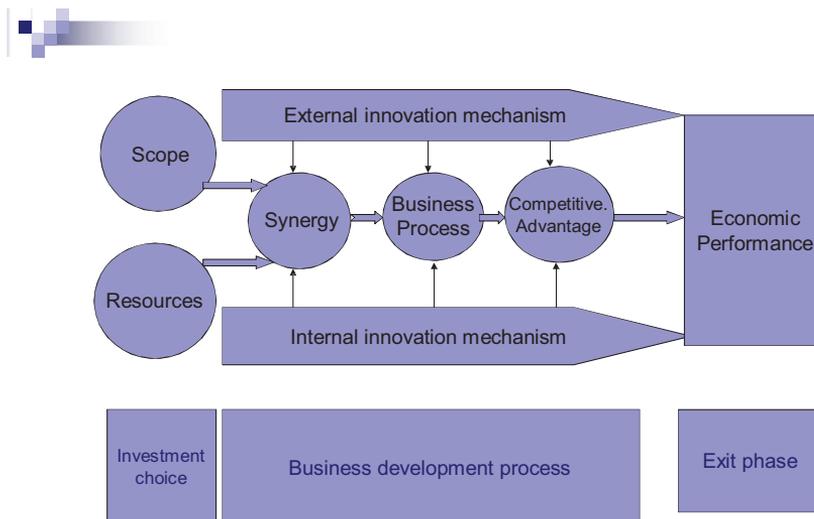
In the *industrial exit* is usually an example which is based on *strategic approach*. The industrial buyer estimates the company acquisition on the strategy base. Resource base view is relevant in building strategy (Barney et al 2007, Barney 1991).

The *agent theory* is relevant in ownership and in benefits between different parties in performing exit (Lehtonen 2000). The agent theory is relevant at exit phase, where selling of shares the revenues of the venture capital investor and majority owner share. The agent theory deals also with executive compensation

and relative performance (Agarwal 1999). The role of the board of directors is a relevant part of corporate governance, which agent theory is focusing (Audretsch et al 2009, Brunninge 2007). Agent costs information asymmetries has impact on exit.(Cumming 2009, Bitler 2006).

During the research process the idea raised to modify ASP-model further to *strategy-performance- innovation model* of high technology firm in venture capital finance. The SPI- model is constructed to focus on innovation process analysis, where the utilisation of *external and internal innovation network* is central element. The introduction of *external and internal innovation mechanism* in the model serves the target of analysing the innovation process of a high technology firm. The development work is increasingly realised in process, which utilises different nets. This network is in the model divided into internal and external innovation mechanism.

Figure 2. Strategy-performance innovation (SPI)- model in venture capital finance



The SPI-model is constructed to fit in analysis of a high technology firm, which is creating new innovation and seeks external risk finance. The model integrates *strategy-performance approach* to *venture capital finance process* through different phases of decision process. The venture capital investment consists of three main decision phases, 1) investment choice, 2) business development process, and 3) exit phase.

The strategy-performance approach gives strategic tools to analyse deeper these decision phases. The first phase includes scope and resource selection, which targets to synergy effect. The second phase is focusing on development of business process, which targets to competitive advantage and economic performance by utilising both internal and external innovation mechanism. The third phase is exit, which focus on realisation of VC investment.

The innovation is a process that proceeds from an idea to profitable business operation. The first step of process analysis is to locate the scope of the business idea. The second step is to combine the scope with resources targeting synergy. The synergy is created by processing business idea and utilising both internal and external innovation mechanism. The synergy based solution is linked to business process, which targets to create competitive advantage. The development of the business process is utilising also both internal and external innovation mechanism.

The economic performance is the final result of operative business, which can be measured in numerous financial figures. The general measure of economic performance is turnover, profit, return on investment (ROI).The execution of business process aims at economic performance. The economic performance is

relevant for the success of the company in a long run. The economic performance is important in seeking external finance. The target of economic performance can be divided into milestones, which covers the development of innovation during several years period.

The *lower part of model* links the model to the venture capital investment process. The VC investor selects the scope and resources for an investment portfolio. If a high technology company meets the scope and resource decision criteria of VC investor the mutual synergy is created. The investment decision of the venture capital investor is followed by business process development, which has strategic elements of synergy, comparative advantage and economic performance. This business process can be also called value adding process (Lehtonen, 2000, Virtanen ,1996).

The innovation process of a high technology firm targets to the successful business. The picture describes the process, which is proceeding from scope to economic performance. The innovation can be based on technology or market based opportunities. This requires processing, which primarily can be internal process.

The intermediation between different organisations, elements and innovators is a common phenomenon in external and internal *networking of technology firms*. Innovation processes in research context is usually *knowledge based*. It leads to development and investments, which focus on *intangible resources*.

The estimation of investments and the resource need is challenging, because the development process requires specific management and substance know-how combinations. The theoretical discussion and *modelling of venture capital finance* deals with several options. The venture capital finance is described as a process, which has different phases. In a model of venture capital investment

decision making Fried & Hisrich distinguish six phases: 1) origination, 2) venture capital firm-specific screen, 3) generic screen, 4) first-phase evaluation, 5) second- phase evaluation, 6) closing (Fried & Hisrich, 1994). The model focus on logical procedure of context of different phases.

The discussion of importance of *strategy selection of SME companies* is becoming more important. (Kraus 2009). The strategy selection process of SME companies is a challenging domain, which requires more research. New approaches to modelling strategic entrepreneurship are important in increasing our understanding of SME finance. The presented SPI-model offers new tools to analysis of strategy in venture capital finance process of a high technology firm.

The *first essay* deals with strategy-performance approach venture capital finance process of a high technology firm. The essay tests the Advanced Strategy-Performance Model (ASP-model) in venture capital finance context.

The second essay deals with *importance of management team* in venture capital finance process of a high technology firm. The theory foundation is utilising also *organisation theories*, which are relevant in analysing motivation and commitment of members of a management team (Harper, 2005; Audretsch et al, 2008; Clarysse, 2004). The theoretical approach is also linked to knowledge based view, social capital theory and resource dependence perspective (Maula, 2001). The *agency theory* is essential in analysing the relationship between venture capital investors and management team (Reid, 1996, Rosenstein, 1993).

The following table presents the link between research focus and the theory. It is necessary to combine different theoretical approaches, when venture capital finance is research object.

Figure 3. Research focus area linked with theories

Focus area	Theory
Market potential	Market Based view (MBV)
Strategy	Cluster analysis,(RBV)
Scope	Industrial Organisation (IO) Stock Exchange Resource Based View (RBV)
Product opportunities	Innovations, Schumpeter
Management team	Entrepreneurship Organisation theory Agent theory
Resources	Resource based view
IPR	Agent theory
Ownership	Agent theory, corporate governance
Prototype	Innovations Industrial economics
Finance, IPO	Finance theory, valuation of shares Finance theory, Signaling theory Asset Pricing model, Agent theory, Theory of asymmetric information The arbitrage pricing theory
Exit opportunities	Sharpes market model Black-Scholes model
Exit opportunities	Economics

It is evident, that the venture capital finance of a high technology firm is a complex phenomenon, which requires the use of several theoretical approaches.

3 Concepts

The present dissertation deals with complex domain, which is constructed numerous concepts. There are several theoretical approaches to deal with the concepts. The concepts in present dissertation are defined from the view point of finance theory. The research domain deals with several factors and it is important to describe concepts, which are used in three essays.

3.1 Risk

Economic fluctuations cause positive and negative effects on capital investments. Future development is uncertain and therefore investments on equity include risk elements. Risk can be divided into 1. *calculative risk*, which can be called uncertainty and 2. *unknown*, which is not possible to calculate. Uncertainty is understood as a *probability for exceptions* from a planned level. The more data we have about an investment object, the *better chance we have to manage the risk* with probability calculations. The risk of investing in company stock which has been listed for years on a stock exchange is more calculative than investment in shares of a recently listed company or unlisted company.

The risk of a *listed company* can be analysed by using beta values and different statistics. This data is based on the past, which does not of course guarantee that the future development will be the same, but the risk is, in any case, calculative. The use of portfolio theory is based mostly on historical data of different investment alternatives.

The risk of an *unlisted company* and a company with no past records includes much more risk elements than the listed company. This is investment which has no calculative base to be used to estimate the risk using its historical data.

Venture capital investors mainly focus risk investment on unlisted companies, where the know-how of analysing and managing risk is an essential business tool. Risk can be calculated by using subjective probabilities, but in investments with no historical data it is very difficult.

Risk concerns firstly negative exceptions from a planned level. A positive exception is not seen as a danger, but an opportunity for an investor. The *standard deviation or variance* of asset indicates stability of the certain asset. The higher the variation is the higher risk involves the certain asset.

Because *risk-averse* investors are more concerned with down ride risk the semi variance is a static that relates to just that risk (Copeland and Weston, 1992).

Both the variance and the semi variance are sensitive to observation as distant from the mean because the mean differences are squared. Squaring gives them greater weight.(Copeland and Weston, 1992).The investors have different attitudes towards risk and they can be grouped in following Categories (Copeland and Weston, 1992):

risk lover if $U[E(W)] < E(U(W))$

risk neutral if $U[E(W)] = E(U(W))$

risk averter if $U[E(W)] > E(U(W))$

where left side utility of *present wealth* and right side *expected wealth*.

The rational investor is usually risk averter. The risk averter can cover the risk with *risk premium*, where

Risk premium= expected wealth- certainly equivalent wealth (Copeland & Weston 1992)

The Pratt-Arrow measure of local risk premium.

$$\pi = \frac{1}{2} \delta^2 z \left(- \frac{U'' W}{U' W} \right)$$

Since $\frac{1}{2} \delta^2$ is always positive, the sign of risk premium is always determined by the sign of the term in parents, which is defined *absolute risk aversion* (ARA) as

$$ARA = - \frac{U''}{U'} \left(\frac{W}{W} \right)^2$$

Absolute risk aversion measures risk aversion for a given level of wealth. ARA will probably decrease as our wealth increases (Copeland and Weston, 1992).

The *venture capital investor* is considered risk lover, because it seeks challenges and takes risk with high revenue target. *The entrepreneur* is considered also to be risk lover and she/he looks partners to share the risk with high revenue expectations. The managing of risk is important for entrepreneur. (Fried H. & Hisrich R., 1994).

3.2 Risk types

When targeted return on investment does not realise there can be several risk factors, which may cause this development. To *general reasons* belong the political risk and economical risk in a certain country (*political/currency risk*).

The *special risks* concern the investor and the stock. The investor can base his decision on false information (*information risk*), the transaction can be miscalculated (*transaction risk*), the stock has very little turnover (*liquidity risk*).

The investor usually expects a stable return on investment and the stability of the stock is measured with standard deviation. The *volatility* (standard deviation) measures the risk of a certain stock. The stock with high volatility is more risky than the stock with low volatility.

The risk is divided in *systematic and unsystematic risk*. Systematic risk depends on market fluctuations. Unsystematic risk is company specific (Fabozzi, 1994; Bauer, 1994). *Beta* factor can partly explain risk (Fabozzi, 1994). The venture capital investor is dealing with company specific risks, where market, product, production process, management etc. include several risk factors. Part of these risk factors can be considered *internal* and part of them are *external*. The role of the venture capital investor is to manage both systematic and unsystematic risk. The venture capital investor is *trying to control risk* by participating actively in management process of a firm.

3.3 Risk finance market

“To total capital market in wider aspect belong all institutions and organisations, which either between asset seeking depositors and capital seeking entrepreneurs in direct relation intermediates as a broker or transforms capital savings to investment capital under own control” (Loistl, 1994)

The risk finance market in this research consists of capital market excluded state guaranteed deposits in banks.

Risk finance market = Capital market – Guaranteed bank deposit

The *state guaranteed deposits can be considered risk free* (Loistl, 1994).

The risk finance market can be grouped in following segments:

- Stock Exchanges (shares, options, warranties etc)
- Venture capital finance market
- Other Equity(mezzanine) finance market

The research focuses on *venture capital finance market*.

The *credit finance market is excluded* from this research. *The stock exchanges* are relevant part of the equity finance and it is important option for *exit phase* in venture capital finance. Other equity finance, (mezzanine) which is the combination of equity and credit finance is grouped in equity finance. In this market segment operate private investors, which are often named “business angels”.

3.4 The Venture capital finance

The venture capital (VC) finance focuses on *companies*, which are *not listed in a stock exchange*. The VC- finance is usually *equity finance* , which can be directly placed on the share capital or through mezzanine finance form indirectly to shares. Venture capital investment is timely limited, in general for *3 - 5 years*.

The *venture capital management* company collects for a certain focus funds for a limited time. The main source of venture capital is coming from institutional investors (FCA, 2010). The venture capital financier takes a *full risk of capital losses* and *no collaborations are required*. The venture capital investor is usually a *minority shareholder*.

Venture capital financier has a target to bring with capital also *the know-how* which investor supplies to the company in a form of consulting or advising the company. The venture capital investment is based on *the shareholders agreement* between investor and the company. The agreement includes of the pricing principles of the shares from the *start* phase to the *exit* stage.

The *revenue of the investment is based on the profit* of the company and on the value increase of the shares. The realisation of the venture capital investment passes through *the exit stage*, where the shares of the company are *listed in a stock exchange* or sold to the shareholders or to a new investor. The target revenue of venture capital investor is high, because of risk premium.

The venture capital investor is prepared to cover probable losses in some objects with profits from *investment portfolio*. Venture capital investors select the market segment they invest along brand e.g. ICT. Some venture capital investors exclude the development phase e.g. start up companies out of their portfolio.

The venture capital investor takes the full risk and has no collaboration on investment. The difference between venture capital finance and bank finance is analysed more in article (Bettignies and Brander 2007)

The VC-finance seeking companies can be classified along development phases

- *seed*

- *start phase*
- *growth phase*
- *expansion phase*

When operative management buys shares of existing company with the venture capital investor, it is called MBO/MBI (management buy out/in).

The venture capital investors have in recent years collected funds, which make it possible for venture capital investors to *buy out listed company shares from stock exchange*. This is an indication that the share prices in stock market does not always include correct risk premium.

3.5 High Technology firm

A high technology firm in this research is a new company, which primarily develops new products, services or process to market by using innovative technology. This involves often the use of immaterial property rights (IPR), which are targeted to protect company `s rights in competition.

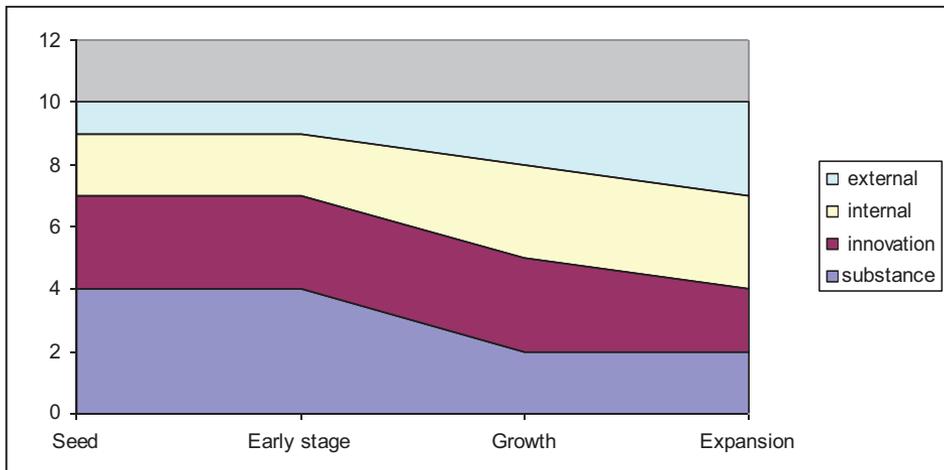
A high technology firm utilises new innovative technology, raw materials and processes in business operations. The competitive advantage is based on innovative products or services. A high tech firm uses relevant part of its turnover for R&D processes in order to reach or preserve its competitive position in market. The strategy of a high tech firm in general is to base success on know-how and specialisation, instead of mass production with large production volume.

3.6 Management team

The management team consists of the high technology firm's key persons and, in many cases, the entrepreneur or entrepreneurs. The management team ideally can be formed so that the most relevant skills for the conducting the strategic business elements are represented in the team. The management team may also be called the new venture team (NVT) (Lehtonen 2000, Sapienza et al 1996). In the start phase the team's specific substance know-how (e.g. ICT technology, nanotechnology) is its important. Later the know-how in a team expands to skills required for the implementation of a business strategy.

The know-how of management team is going through evolution process. The following chart describes the share of each know-how phase: 1) *substance know-how* 2) *innovation know-how* 3) *internal process know-how* and 4) *external process know-how* of firm through the different venture capital stages.

Figure 4: Evolution of the know-how base through VC development stages



The picture shows the diffusion of the relative share of different know-how segments. The *chart is only illustrative* and it is not based on data analysis.

The development of the venture throughout its organizational life is described in different phases (Clarysse et al 2004, Fig. 1).

The chart also indicates the relative cost structure development, as the firm's operative costs increase during the development process. This is one of the main challenges for the allocation of VC finance resources in that they produce optimal results and do not simply lead to increasing costs.

The management team is formed of key persons of the high technology firm and the entrepreneur is a key person, especially at the start phase. The management team ideally can be formed so that the most relevant skills for the running the business are represented in team. In several studies the management team is regarded very important criteria for venture capital investment. Management team is a unit, which finally runs the operative business.

The management team represents the know-how of the firm and the credibility of the firm. The credibility of the company at the start phase is based mainly on the know-how of its top management team members and their experience. The competence in strategic management seems to have a positive correlation to the future success of the company (Kraus and Kauranen 2009). The distinction of what constitutes strategic management in small organisation is difficult because there is often direct link between strategy and operations. Typically, in these companies the same persons create strategy and execute the operative actions. Thus, the management team usually runs the strategic and

operative business and therefore it is important to make the correct strategy decisions, which in turn commit the company's resources.

3.7 Entrepreneur

Entrepreneur is the key person, who creates innovation and he/she is a *founder* of a limited company in present study. An entrepreneur is covering the main financial risk at a start phase of a company. The entrepreneurs are often *risk oriented persons* in the case of their own company.

The entrepreneurship has a central role in creation new products and in exploiting new opportunities in market. (Lumpkin, Shrader and Hills, 1998; Shane and Venkataraman ,2000). The targets of the entrepreneur in seeking external finance differs from objects of the VC investors.

The entrepreneur can be seen as a strategist (Minzberg 1996) and can also be a collection of people. Entrepreneurship takes the legal form of a limited company in the context of venture capital investments. The entrepreneur owns a majority of the shares of this limited company. The entrepreneur has a dominant role in the innovation process of a high technology firm. They are often the innovators who invest their whole personality and personal assets to support the development of the business.

Schumpeter (1934) introduced the concepts of the innovative entrepreneur and creative destruction, which are the dynamic factors of competitive efficiency. Schumpeter suggests (Lintunen 2000) that:

Entrepreneur wants to control the company and this power component exceeds in many cases the interest of pure financial targets. *To be independent* is

important basis for entrepreneurs strategy. This is one of the reasons, why numerous entrepreneurs don't accept "external participants" to involve into their company decision making. The conflicting interest of entrepreneur and the venture capital investor lies in the use of power in the firm. This power element is anchored in the *ownership of the shares* of the company.

3.8 Private investors

The private persons in general are conservatively oriented and they invest on secure objects and are satisfied with low risk linked with low revenue. This attitude explains the popularity of saving on bank account especially in Finland. The active group of private investors, which is prepared to take a risk by investing on a new limited company, is called *business angels*. Business angels have reached important role in private equity investments in USA and in England. In Finland their importance is small, but it is growing. *The business angels are excluded from the scope of present dissertation.*

3.9 Venture Capital investors

Venture capital investors are *risk oriented*, which are targeting *high revenues* by placing on the shares of *companies with high growth potential*. (EVCA.com)

The venture capital investors invest on small and medium size companies, *which are not listed on official stock exchanges.*

The invested capital is placed on an *equity* or *mezzanine form (convertible loan)*. The venture capital investor does not require collaborations for the finance.

The venture capital investor accepts the investment on minority shares, but wants *more active role* than an average share holder. (Koski 2005). The venture capital investors are a part of risk finance and they *participate in value added activities* (Amit et al,1991, Barry, 1990, Cumming, 2005).

Venture capital investors *can share the risk by syndicated finance*. (Manigart, 2006). Entrepreneurs found that raising additional fund was the most important value adding factor arranged by VC investors (Virtanen ,1996). Venture capital *investors can utilize diversification* (Knill, 2009).“The venture capitalists operate in environment, where their relative efficiency in selecting and monitoring investments gives them a *comparative advantage* over other investors.”(Amit, 1998).

4 Venture capital finance process

Venture capital finance is a process, which have different stages, which can be defined in advance. (Gompers, 1995, Ruhnka, 1987). The *venture capital investors* are seeking object companies, which represent substantial market and profit potential. The *entrepreneurs and their companies* are seeking finance for their business operations.

4.1 Venture Capital finance by development phases

The venture capital finance can be categorized in following phases (EVCA, 2009):

- 1) *Seed finance,*
- 2) *Start up,*
- 3) *Growth ,*
- 3) *Expansion finance*
- 4) *MBO, MBI finance*

The present dissertation covers all these phases and it is important to describe, they form relevant criteria for venture capital investor in selecting investment object.

4.1.1 Seed finance

Seed phase dealing with the ideas, estimation and development of a new business. This phase includes *high technical risk, operative risk* and *market*

risk. All risk fields are difficult to estimate, because lack of reliable information. (Copeland et al,1992).

At this phase the majority of risk is based on the *unknown area*. This finance stage is considered the most risky one and requires a lot of know-how efforts from venture capital investor. Because of high risk and probable *longer investment process* numerous private venture capital investors exclude finance at this development stage. This is reason why *participation of public sector in early stage finance is important*.

4.1.2 Start phase

The next phase, when a *company starts its operations*. A company has a product, a production or service process, which is at the start phase. The finance focus on product development (prototype) and starting of commercial production and sales. A company at this stage does not yet usually generate revenue (Ruhnka, 1987) .

4.1.3 Growth finance

Growth finance consists of finance where a company generally *has already established business operations*. The company seeks risk finance in order to speed up its growth e.g. by launching a new product in the same market it already operates. The expansion finance focus on company, that already operates in a certain market, but it has a target to *expand into new markets*.

4.1.4 Management buyout MBO/MBI finance

Management buy in/out is the finance form, where the management of the company buys with the venture capital financier the ownership of the company. The MBO/MBI finance can focus on the whole company or its certain part or an operation of the company. In general the operating management continues the management of the company and gets know-how support from venture capital partner. The management buyout (MBO), management buying (MBI), institutional buyout (IBO), leveraged buyout (LBO) use different methods in MBO finance. (www.evca.com)

4.2 Development stages of a company

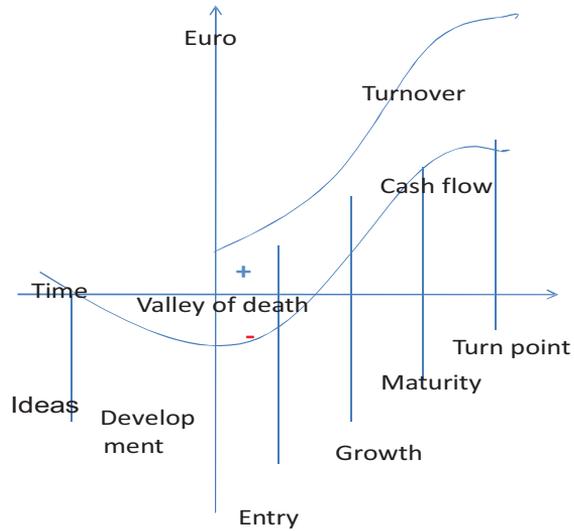
The development of a company can be described as stages through which economic development of a company proceeds. The first stage consists of ideas and it is followed by development process. This first time period, when the company's cash flow is negative is called "*the valley of death*". This stage is the most critical time of a new company with negative cash flow, which must be covered by external finance. If the company cannot meet requirements of negative cash flow it will collapse.

The *development stages* of the company are expressed in following figure 5.

The development phase is critical to find external finance, because positive cash flow in the form of turnover fails. This phase includes most risk factors and most private venture capital investors are not interested in financing company at this phase.

When the company enters the market and it has received positive cash flow and turnover the chances to find external finance from venture capital investors are in general better at this stage. The growth phase is the important in seeking external finance.

Figure 5. The development stages of company and cash flow
(Pääomarahoitus 1997)



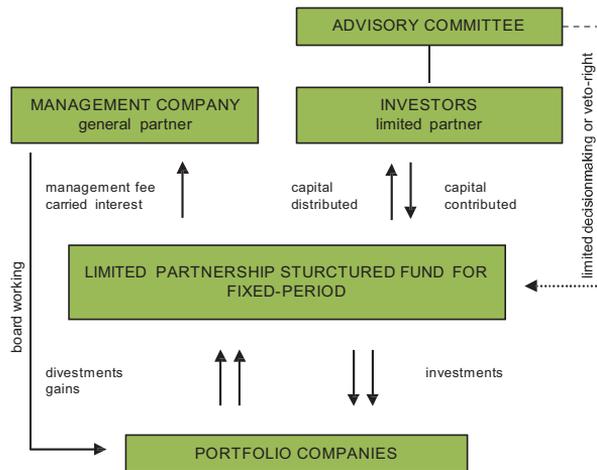
The positive cash flow is the milestone, where chances to find venture capital investor usually increases. The venture capital investor places capital on a company for limited time, usually from 3 to 5 years. The targeted investment period allocates investments on companies, which have expected shortest time

schedule to exit. The forming the fund and collecting required capital takes also some time, which increases the time pressure towards exit.

4.3 Venture capital fund and management company

The venture capital investment process is beginning from collecting the fund. The investors of the fund are mainly institutional investors, which are looking for high revenue on capital. The fund has a limited time and in most cases the defined scope that it invests, like ICT. The fund uses a management company in choosing the investment objects and in managing the fund.

Figure 5. Limited partnership fund structure (FCA 2009)



5 Methodology

The present dissertation is established both on theoretical evidence and results of empirical case study. The theoretical evidence is built on results and findings of extant literature. The theory development is the key methodology in first and last essay. The research challenge is to combine strategy performance approach with the venture capital finance process. These both elements consist of wide literature data, which is relevant for constructing the theory process. The research methodology aims at synthesis between theory building approach in modelling and the results of case study.

The research utilises theoretical model of ASP, which forms a solid base for structuring the methodology. The study employs both theoretical and case study methodology in order to develop new theoretical model, SPI-model.

The qualitative method in second essay was selected (Yin 2009, Amir 2003). It makes possible to cover deeper analysis of selected cases for research purposes. On the other hand the use of quantitative analysis is limited, because of relative small number of venture capital finance cases in Finland. The use of qualitative research was supported also the availability and accessibility of the research data.

The case study is useful in research, which targets to extend and elaborate existing theories. (Yin 2009). On the other hand combining two theoretical approaches, strategy-performance and venture capital finance case study method is appropriate in understanding and analysing the present research context.

The research uses mainly theoretical approach in developing the SPI- model. The research reports, literature and articles in journals form the core of data source and evidence of theoretical base in this dissertation. The discussions and meetings with venture capital investors and entrepreneurs construct relevant data source for understanding of research domain. The sources of data from theory basis and negotiations with VC investors are listed in references.

5.1 Design and data collection in case study

5.1.1 Case study design

The case study design is built on the theoretical structure of the research context. The developed theory is used as a template and the case study results give evidence how theory matches empirical evidence. Analytic generalisation is the approach to analyse results (Yin 2009).

The target of research design was to meet construct validity, internal validity, external validity and reliability (Yin 2009).

5.1.2 Selection criteria for case study

The selection of data in case study was based on several criteria. The selection of sample was constructed so that selected cases must meet following criteria:

- Case focus on *new innovation*
- Case focus on substance, which represents *high technology*
- The case must be *new company or project*

- The case has *potential for venture capital investment*

The selected criteria were met by 20 potential cases. From this population five cases were selected. Later one case was dropped off, because of difficulties in data access, and four cases represent final data source of case study. The sample unit was the company. The selected four cases are presented in appendix 1.

The number of cases were limited, because of better quality of collected data. Four cases give sufficient evidence of the research context.

This on the other hand may limit generalisation of research results.

The researcher had access to the data, which also deals with the business secrets.

The relation with the case companies and the researcher was confidential and information flow made possible two way process. This helped in understanding and in interpretation of the selected research data.

5.1.3 Data collection methods and data sources

The target of data collection was to use multiple sources of evidence (yin 2009) The data was collected from several sources from case companies. The data from cases was partly *oral and written data*. The oral data was collected from discussions with entrepreneurs and venture capital companies. The data was collected during 2002-2009.

The data source consist of following data:

Official company register documents, Annual reports, Balance sheets, Company reports, Business Plans, Executive summaries, Presentations to venture capital companies, Board meetings, Management interviews, Negotiations with Venture capital companies, Documents to Technology Agency in Finland (TEKES), Documents to Finance partners.

5.1.4 Data analysis

The present doctoral dissertation uses several research approaches and primarily methodology is qualitative, which uses descriptive research strategy.

The first essay is based on analysis of theoretical strategy-performance *model*. The outcome of new model is based on the use of selected sources of literature, articles and empirical studies of the venture capital finance. The essay tests theoretically the research hypotheses: *Is possible to use ASP-model as frame in the analysis of venture capital finance?*

The second essay focus on a *management team*, where four case studies has been the data source. The case study follows the general research strategy along Yin (2009). The case study results are presented mainly using descriptive case illustration.

The *third essay* forms a logical continuity to the first essay. The essay analyses and tests the new SP-innovation model introduced in essay nr 1. The case study data was used in the test.

The literature, articles in journals and numerous discussions with SME entrepreneurs, VC investors and researches has formed also relevant data source. During the research process the researcher has gone through venture capital investment negotiations with 18 investment directors/ managing directors in Finnish venture capital companies. These venture capital companies, which were as a part of research, represent majority of venture capital investors in Finland and give relevant data for the research purposes.

The theoretical frame of strategy performance model was the basement in interpretation of research data. The case study data was grouped along theoretical frame. The understanding of the content of data was relevant in the interpretation. The interpretation of data required the use of SPI-model and venture capital investment process.

5.2 The validity of the research

The validity of the research along Yin (2003) is classified *construct validity*, *internal validity*, *external validity*. They are based on a realist ontology and are partly complementary and partly overlapping. To meet construct validity requirements the research uses multiple sources of evidence. Internal validity is addressed by pattern-matching and model building. External validity is processed by using comparative studies.

The present dissertation focuses on the *venture capital finance of a high technology firm*. The research deals with the focused subject and the analysis of data is limited to the area, which is relevant for the research context. The

present dissertation meets the general requirements of the validity considering content and construct defined by Yin (2009) for case studies.

5.3 The reliability of the research

The *reliability* of the research was addressed by documenting sources of data on which research findings are based on. Reliability focus on the transparency of the research process, which means that later researcher by following the same procedures come to the same conclusions as reported by the initial researcher (Yin, 2009).

This dissertation is focusing on the subject by using the data, which meets the requirements of qualitative research. The literature sources and articles were selected with criteria, which are relevant for the reliability of the dissertation.

The challenge of qualitative research is to be linked on occasion of social construction, which is dependent on the experiences, characters and interaction between research participants.

The long experience of the researcher from finance of SMEs may have had some impact on research. This has been considered and the writer argues that the dissertation meets the general requirements of the reliability of the scientific research.

6 Outline of dissertation

This research consists of three essays, which focus on a venture capital process from different point of view by using strategy-performance approach.

6.1 Essay 1: Venture capital finance of a high technology firm in the frame of advanced strategy-performance model

The first essay is theoretical analysis of strategy-performance model, which offers one theoretical option to analyse venture capital finance with the theoretical model. The essay opens the theoretical discussion of possibilities to combine strategy approach and venture capital finance domain.

The *first essay* deals with strategy-performance approach venture capital finance process of a high technology firm. The essay tests theoretically the Advanced Strategy-Performance Model (ASP-model) in venture capital finance context. The objective of essay is to find out how ASP-model can be used in analysis of venture capital finance and to create better understanding of strategic approach in research domain.

The essay links the model with empirical data with Finland and Sweden. On the base of results new SPI-model was developed and it is presented in essay 3. The essay 1. is the first step in this dissertation to create foundation to analyse venture capital finance in the frame of strategic-performance approach.

The first essay constructs the logical bridge to following essays.

6.2 Essay 2: Management team in venture capital finance process of a high technology firm in the strategy- performance innovation model context

The second essay is the combination of theoretical evidence and empirical case study results. The essay focus on management team, which is the core unit in developing new innovation and business in high technology firm.

The *second essay* focus on *the management team* of high technology firm in venture capital finance process. Several researches argue that the management team has a central impact on the success of venture capital finance. The essay utilises four case studies, which support analysis with empirical data.

The management team is important criteria of VC in selection of investment objects (Boocock ,1996, Koski ,2005, EVCA). The essay analyses evolution of the management team as a central part in development of the business process of high technology firm in research domain.

The analysis has its foundation in the theoretical frame of strategy-performance innovation model in venture capital finance process.

6.3 Essay 3: Venture capital finance of high technology firm in the context of the strategy- performance innovation model

The *third essay* is introducing new strategy performance innovation (SPI) - model of high technology firm in the context of venture capital finance. The new model deals with the internal and external innovation mechanism, which form the core of modern business development process. SPI -model is also new theoretical innovation, which can be employed in the analysis of complex research domain.

7 Discussion

The present dissertation focus on venture capital finance. Because the venture capital finance has several links to risk finance in general the target of this discussion is to handle domain with broader view based on the findings during research process especially focusing Finland.

The development in Venture capital finance

The venture capital finance is important in financing and developing companies. Privately owned venture capital investors have been more active in past in financing seed and start up companies, but during this decennium their role has become passive in this finance segment. The main segment has been MBO/MBI, where privately owned venture capital investors have made investments in Finland. The venture capital investors, which still invest on seed and start up segment are public owned investors.

The role of private venture capital investors is diminishing especially in Finland. This may partly due to moving stock exchange operations to Stockholm, some enactments factors and perhaps failing local know-how in issuing shares into stock exchanges. The concrete evidences are the movement of key venture capital investors their main operations in Scandinavia to Stockholm from Helsinki .

The average size of venture capital investors is very small in Finland measured with the financial resources and with the staff (FVCA 2010). It seems evident that the local scope is not relevant anymore in venture capital investments. The global business environment requires larger units and more knowledge pattern

within the venture capital company. The recent development has proved that VC companies have difficulties to collect new funds in Finland.

The development in high technology risk finance

On the other hand the *need of risk finance in equity form is growing*. This is due the asset development of new high technology companies. The primarily assets are intangible assets, which usually are not considered as securities in bank finance. The valuation of these companies becomes more challenging (TEKES 2010).

The new innovations in high technology companies often are invented in research units, universities or *technology clusters* (Virtanen 2004). The building of specific knowledge clusters is a strategy in several states and they are supported by financial assets and some taxation benefits. The competition is increasingly global and it becomes more challenging for a high technology company to realise market entry. The co-operation between public sector, knowledge units, universities and private sector is becoming more important. This requires investments on new scientific equipments and know-how transfer. The key issue is to *select the success scopes* for this development process.

The development of finance market

The risk finance market in Finland requires development, because at present moment it does not work effectively. The stock exchange has moved to Stockholm and this probably has caused the move of know-how and resources to Sweden. During recent years the lack of new listings from Finland is one concrete evidence of this.

The development of finance markets require new legal and new solutions for taxation. These new solutions have to create motivation elements for investor sector and for share holders of the company.

8 Conclusions

The present dissertation focus on thesis by using three different approaches. The first is *strategic approach* to venture capital finance by using strategy-performance model.

On the basis of the research it seems evident that the strategy approach to the venture capital finance is essential. The key elements scope, synergy, competitive advantage and economic performance are most relevant issues in this approach.

In the venture capital finance it is important to recognise strategic elements, which lay the basis for the success of the selected company. The decision of the scope of the VC fund is also relevant, because it guidelines the allocation of selection. It seems evident that the link to the research is important in creating new high technology companies.

The *second approach* is to venture capital finance is analysis of management team of the high technology firm. The finding of this approach is the importance of the substance knowledge. The development of high technology firm is at the beginning technology oriented, where high expertise is relevant. After start phase organising skills and business management skills become more important. On the findings of the research it is important to have ability to combine relevant know-how to the evolution process of the company.

The most relevant contribution of this dissertation is in *introducing new theoretical model*, which combines the elements of strategy-performance approach with venture capital finance. Venture capital investment decision requires firstly the strategic approach. The understanding of the strategy of potential portfolio company is the core part of decision making. The SP-model

opens the tool pattern, which helps to understand how most relevant elements of synergy, competitive advantage and performance.

The dissertation introduces a new *strategy performance-innovation model*. The model combines a strategy development into business processes in the context of venture capital finance and *fills the research gap* in this respect.

The *management team* and the knowledge and skills of the management team are relevant factors for the success of portfolio company. The development phase of the management team correlates with the stage of venture capital investment process.

The development and building of the management team and organisation requires resources, which venture capital investor supplies. The time to exit seems to take more time than planned. The economic fluctuations effect strongly to the level of revenues in exit. The listing on stock exchange in exit phase has been minimal in recent years. It seems evident that in Finland VC-investors have realised best revenues in MBO/MBI exits. The more detailed conclusions and discussion are presented in each essay.

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Vienna Stock Exchange

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European Venture Capital association, (EVCA)

www.evca.com

EASDAQ

www.easdaq.be

Federation Internationale de Beourses de Valeurs

www.fibv.com

Finnish Venture Capital Association, (FVCA)

www.fvca.fi

Deutsche Börse

www.exchange.de

Stockholm

www.exchange.se

**Negotiations of Venture Capital finance cases with representatives of
Venture Capital investors in Finland 2001- 2009**

Arto Naukkarinen, Managing Director , Helmet Venture Managers Oy. (2002, 2004)

Jarkko Penttilä, Investment director , Eqvitec Partners Oy (2003, 2005)

Jukka Jokinen, Investment director, Eqvitec Partners Oy (2007,2009)

Jouko Posti, Eqvitec Partners Oy (2001)

Heikki Miettinen, Investment director, Innofinance Oy (2006)

Turkka Oksanen, Investment director, Innofinance Oy (2005)

Antti Hovi, vice president, OKO Venture Capital Ltd (2004)

Ville Jumppainen, president, OKO Venture Capital Ltd (2001,2002)

Jouko Helomaa, Merita Capital Oy (2001)

Juha Jouhki, Thomproperties Oy (2001)

Matti Copeland, johtaja, Auratum Oy (2001)

Maarit Säynevirta, SITRA (2003)

Henri Grundstén, director , Suomen Teollisuussijoitus Oy (2006)

Vesa Sadeharju, Partner, Venture Capital 3i Nordic Plc (2007)

Pekka Soikkeli, managing director , Solaris Asset Management Oy (2001,2002)

Pekka Ahlström, pääomarahoitus/ SITRA (2001,2002)

Sami Lampinen, Gapman Oyj (2001)

	Case company 1	Case company 2	Case company 3	Case company 4
Appendix 1				
Case Companies Description				
Year of foundation	2003	2001	2004	1995
Type of company	limited company	limited company	limited company	limited company
Domicile	Helsinki	Helsinki	Helsinki	Vantaa
Employees	25	15	under 10	under 10
Scope of the company	3D digital technology	Environment technology	Sensor technology	Logistics
Products	movies, 3d advertisements, 3d software	Food waste processing machine	Bonding process	Transport unit for specific industry with high technology equipments
IPR-Product protection	3D software optional	Process technology	Patent portfolio in use	Patented product
Market segments	no patent pending movie industry advertisement segment corporate imaging, communication post production services	Process patent	B2B market Research laboratories	B2B market Global transport market
Market potential	B2B segment Digital market sector is strongly growing business area Market global, highest potential in USA, EU, Asia	Large food shops S-group, Kesko, Tradeka and other chains Domestic market priority first	Global market potential	Transport volume is growing and high security requirements offer market potential
Technology base	Top 3D computer hardware Top 3D software in disposal Top specialists in 3D technology	Processing machine with steering software, utilise special bacterial processes	Bonding machines, specific material	Mechanical high technology engineering with high technology security equipments
Earningsmodel	Own distribution, partnerships with agencies	own distribution, selling processes and machinery	Specific bonding service to the customer	Sale of products or leasing products
Organisation	The base structure of the	Development project within	Owner 8 scientists form	The core of organisation is formed

<p>Competition</p>	<p>company is formed by three teams</p> <p>Global market, some big players (Disney) Average size in EU relatively small</p>	<p>the company, external expertise use also</p> <p>Environment technology companies, L&T</p>	<p>the core of organisation</p> <p>Global competition, large laboratories</p>	<p>by three engineers</p> <p>Global, large transport companies</p>
<p>Finance</p>	<p>Start finance near 1 mill €</p> <p>Finance need over 3 mill,€</p>	<p>Agency funding 2,500000€</p> <p>Finance need 5000000€</p>	<p>share capital</p> <p>Finance need 5000000 €</p>	<p>Project financed by engineers</p> <p>Seeking prototype finance 1mille</p>

	Case company Alfa	Case company Beta	Case company Gamma	Case company Delta
Appendix 2				
Research sample, data, methods				
Year of foundation	2003	2001	2004	1995
Type of company	limited company	limited company	limited company	limited company
Domicile	Helsinki	Helsinki	Helsinki	Vantaa
Employees	25	15	under 10	under 10
Sample criterias:				
1. High technology	3D digital technology, 3D hardware, software	Environment technology, microbiological battery process	Sensor technology, nanotechnology, bonding technology	High technology equipment, software
2. SME-company	SME	SME	SME	SME
3. Potential VC-company	Applying VC capital	Applying VC capital	Applying VC capital	Applying VC capital
4. Data available	All required data	All required data	All required data	All required data
Data sources	Official company register (PRH) Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data 3D digital technol. Research data digital business	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data environment techn. Legal regulation documents	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data nanotechnology, sensor technology	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Management interviews Discussions with management Negotiations with VC-companies Research data logistics on specifisf area

	process				
Data collection methods	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.
Data collection period	2003-2007	2002-2007	2004-2006	2003-2006	

PART II ESSAYS 1. – 3.

Venture capital finance of a high technology firm in the frame of advanced strategy-performance model

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Abstract

This paper addresses the venture capital investments in high technology firm in the frame of advanced strategy-performance model. Venture capital investors are setting several criteria for investment, which target company must meet. The present study uses ASP-model in analysis of venture capital investment criteria from *the viewpoint of venture capital investor*.

The study utilises the relevant elements of ASP-model in combining strategy approach in analysis of the venture capital finance process. On the base of the research findings a new model, the Strategy-Performance Innovation (SPI) -model is presented. It is *important to address research efforts on venture capital investments*, because venture capital industry employs substantial finance resources. Financing *new high technology companies is vital*, because they form one key source for new innovations.

The present research focus on relevant factors, which have impact on venture capital investment decisions. The new SPI-model fills the gap by offering a new systematic approach in analysing the complex venture capital finance of a high technology firm.

Keywords: Venture capital finance, High technology firm, Strategy-performance approach, ASP-model

Introduction

The venture capital finance is a challenging area for research. It is a phenomenon, which is linked in many ways to our ability to forecast future and make an estimate how a firm will operate successfully under changing circumstances. *A venture capital investor* goes through the selection and investment process, which is targeting high revenue on invested capital. The Investor is prepared to take *calculated risk*, which placement on shares includes.

High technology firms demand risk capital on developing new innovations. These companies try to find investors and financiers for business operations. *The venture capital finance is a process*, where risk capital seeking companies and venture capital investors are trying to find a common solution to risk finance and co-operation. (Maula 2001).

Venture capital investors are setting several criteria for investment, which target company must meet. The present study *uses ASP-model in analysis* of venture capital investment criteria from *the viewpoint of venture capital investor*. The venture capital finance plays central role in financing new high technology companies in global economy. The venture capital investments are continuing growing and their importance is recognized by governments in numerous countries. In Finland the public sector has activated venture capital investments by forming a new venture capital investment company.

It is *important to address research efforts on venture capital investments*, because venture capital industry employs substantial finance resources. Financing *new high technology companies is vital*, because they form one key source for new innovations.

The present research focus on relevant factors, which have impact on venture capital investment decisions. The study uses *new approach by combining strategy-performance-model* to the research context, which gives scientific community new relevant know-how of venture capital finance. On the base of findings the present study fills the research gap by introducing the new ***strategy-performance innovation- model***.

The objectives

The *objective of the study* is to analyse venture capital finance by using Advanced Strategy-Performance-Model. On the base of this analysis the present study aims at finding relevant arguments for the development of Advanced Strategy-Performance Model (ASP-model) in the context of venture capital finance.

The final objective is to create *a new theoretical model* for the analysis of innovative high technology firm in venture capital finance.

Theoretical frame

The theoretical frame of present study focus on *modelling* of strategy and business processes. The Strategy-Performance model is based on *traditional industrial organisation theory* (Caves & Porter 1977, Scherer, 1980 and Barney, 2007), the *business policy tradition* (Chandler 1962, Ansoff 1965) and *the resource based view* (Barney,1991, Porter ,1991, Noda and Collins ,2001, Makhija, 2003). The theoretical establishment is solid for this research context.

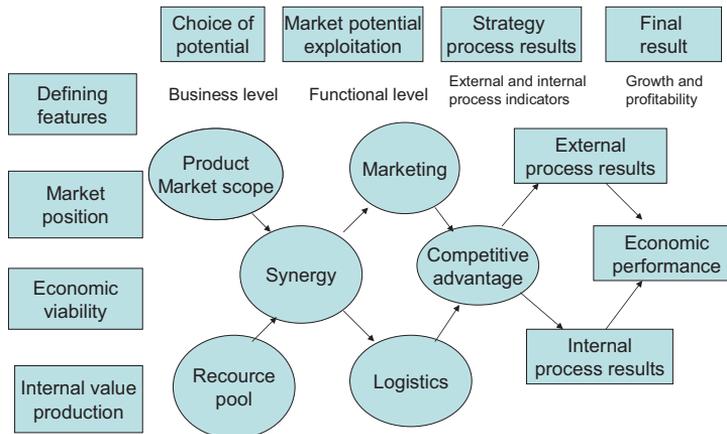
Advanced Strategy-Performance model

The theoretical frame of present study is based on Advanced Strategy-Performance model (ASP-model). The model was originally developed by Lahti (1983) and developed further by Killström (2005).

The model represents the *strategy-performance approach*, which deals with most relevant strategic elements of business development. The model combines the strengths of several theoretical schools and this foundation of theoretical frame is reliable in analysis of venture capital finance process.

ASP-model is a result of long development process, where the elements were adopted from *Business Policy Tradition (BP)*; Barney, 1991, Chandler, 1962, Ansoff, 1965, 1975, Rumelt 1974, 1994, Porter 1980, Lahti ,1983, Minzberg and Qinn, 1996), *Industrial Organisation Economics tradition (IO)*; Ruefli and Wiggins, 2003, Caves and Porter, 1978, Porter 1978, Hamel,1996), and *Resource-based View (RBV)*; Wernefelt, 1984, Barney, 2007, Killström ,2005).

Figure 1. Advanced Strategy –Performance-model (Killström, 2005)



1

Advanced strategy-performance model deals with excellent way the complex phenomena of strategy. The model gives a solid base for analysis of the individual firm or group. The model is relevant theoretical frame for this research purpose and it was selected on the base of its advantage of holistic approach. Alternative models options were also analysed, like value adding mechanism, resource and knowledge acquisition model and endorsement model (Maula, 2001, Virtanen ,1996). These models are relevant options for this research context, but because ASP-model represents strategy-performance approach it is more holistic and meets better the requirements of present study.

Research methodology

The present study follows configuration approach (Harms et.al., 2007; 2009). The study is focusing on theoretical model and theory building follows the deductive research logic based on referred literature, articles and recent studies. The research focuses theoretical *model building* and combines the elements of *advanced strategy-performance model* and *venture capital finance process*.

Venture capital finance process

Venture capital finance is a process, which have different stages, which can be defined in advance. (Gompers, 1995, Ruhnka ,1987). The *venture capital investors* are seeking object companies, which represent substantial market and profit potential. On the demand side *entrepreneurs and their companies* are seeking finance and value addition for their business operations (Virtanen, 1996).The present study focuses on venture capital process mainly from the viewpoint of venture capital investor. The interests of entrepreneurs and finance seeking company are also relevant in this case.

Entrepreneur

Entrepreneur is the key person, who creates innovation and he/she is a *founder* of a limited company in present study. An entrepreneur is covering the main financial risk at a start phase of a company. The entrepreneurs are often *risk oriented persons* in the case of their own company. The entrepreneurship has a central role in creation new products and in exploiting new opportunities in market. (Lumpkin et al., 1998; Shane and Venkataraman, 2000).

The targets of the entrepreneur in seeking external finance differ from objects of the VC investors. Entrepreneur wants to control the company and this power component exceeds in many cases the interest of pure financial targets. *To be independent* is important basis for entrepreneur's strategy. This is one of the reasons, why numerous entrepreneurs don't accept "external participants" to involve into their company decision making. The conflicting interest of entrepreneur and the venture capital investor lies in the use of power in the firm. This power element is anchored in the *ownership of the shares* of the company (Brunninge et al,2007).

Venture Capital investors

Venture capital investors are *risk oriented*, which are targeting *high revenues* by placing on the shares of *companies with high growth potential* (EVCA.com). The venture capital investors invest on small and medium size companies, *which are not listed on official stock exchanges*.

The invested capital is placed on an *equity* or *mezzanine form (convertible loan)*. The venture capital investor does not require collaborations for the finance. The venture capital investor accepts the investment on minority shares, but wants *more active role* than an average share holder. (Koski, 2005). The venture capital investors are a part of risk finance and they *participate in value added activities* (Amit et al, 1990, Barry ,1990, Cumming ,2005). Venture capital investors *can share the risk by syndicated finance*. (Manigart, 2006). Entrepreneurs found that raising additional fund was the most important value adding factor arranged by VC investors. (Virtanen , 1996). Venture capital *investors can utilize diversification*(Knill, 2009)

“The venture capitalists operate in environment, where their relative efficiency in selecting and monitoring investments gives them a *comparative advantage* over other investors.”(Amit, 1998).

Advanced Strategy Performance –model in venture capital finance

ASP-model , figure 1, proceeds logically from scope selection to economic performance. The first phase is selection of the *scope* (market/product scope), where to invest. The second phase is to define investment volume (resource pool). These steps are targeting to *synergy* by combining resources and scope. The *competitive advantage* is reached by creating business solutions that combine marketing and logistics effectively.

Economic performance is the key to the successful exit, which is a final phase of venture capital finance process.

The following chapters are describing the model more in detail.

Market scope

The market potential is an important selection criterion in venture capital finance process.(Koski 2000). ASP-model in *figure 1*. Starts with *selection of a product-market scope*.

A venture capital investor focus on a certain product/market scope, which is

defining its investment segment. This can be based on branch view and grouping has its theory base in Industrial Organisation Economics (IOE).

The product market scope defines the business area of a company, which is looking for venture capital finance. The relevant branch scope of venture capital investors is classified by EVCA (www.evca.com). The scope of venture capital investors in Finland 2010 are presented in appendix. The scope of Finnish VC investors focus mainly on domestic market complemented with Nordic market, Baltic, Russia, USA and EU (appendix).

If the company's *product market scope matches the investment scope of the venture capital investor* the co-operation process is possible. If the scope is beyond the investor's scope a company is excluded from investment portfolio.

The analysis of external factors like *market position* is important for decision making. If the venture capital investor is targeting a leading position in the market, it selects companies with highest growth potential on its investment portfolio. On the other hand it is important to diversify investment portfolio (Knill, 2009). The selection of optimal size of the VC portfolio is also relevant (Cumming,2006).

The final target of venture capital investor is to create high revenue on the investment during limited time period. The *expectations of the investor* of a certain market segment are relevant for financing a firm. The venture capital investor by selecting a potential market scope with high revenues is the base for successful exit stage.

The ASP-model offers a good theoretical base for developing this investment process.

The product-market selection process is becoming increasingly complex phenomena, because *traditional classification of businesses* does not offer *adequately data basis* for reliable analysis.

The possibilities and challenges of new investment objects are located between different business area borders. These *niche segments* offer increasing opportunities for high technology companies. The innovation of new products and their finding requires more sophisticated tools and also more scientific substance know-how. In many cases the market is arising and there is not any reliable statistics yet, which cover these emerging business opportunities.

The market scope estimation is often based on *strategic vision* of future development. This requires understanding both horizontal and vertical elements, which define and limit the market scope.

Product scope

The venture capital investor deals with product/market scope parallel. The product scope defines on which segment of target market company is located. The product scope defines also the frames of *the earnings model* of firm.

The product scope has a strategic dimension to *the timing of targeted market launch*. In high technology this is vital important. The market demand is relevant with the production costs affecting on price level.

The venture capital investors are seeking *new innovations*, which will generate a new profitable business. (Lumpkin et al, 1998). These new innovations can consist of new products, new services, new production or service processes, new materials etc.

The relevant factor is *IPR and the protection of new innovation*. If a company has no patent or protection for its innovation it is probable that it will be excluded from investment portfolio. The importance of IPR is growing.

The selection process of product-market scope is based also on internal factor of venture capital investor. The VC investors have limited human resources and substance know-how, which impacts on selection of alternatives in product-market scope. Venture capital investor can limit product-market scope by focusing only e.g. ICT-companies.

In product-market scope the relevant element is also chance to combine investment objects (companies) by *forming out of them strategic groups*. This can create synergy effects through both on product-market scope and resources. The product-market scope is a strategic decision for venture capital investor in selecting investment portfolio.

The business plan of a firm is relevant document in estimating market potential and product scope (Kraus, 2007, 2008). The scope of the VC investor and VC finance seeking firm must match with each other. The preliminary scope selection is done by *the executive summary*, which is 2-3 pages summary of business plan.

Resource pool

The venture capital investor has financial resources, which make possible to reach targeted business results of a firm. Along with the financial resources VC investor bring in their portfolio companies their network relations and increase credibility of a company. (Virtanen, 1996, Maula, 2001).The resource pool covers the necessary financial, fixed, human and other assets that are required for realisation of business strategy (Furrer et al, 2008)

The basic role of the venture capital investor is to bring *financial and know - how resources* for development of the business of its partner. The venture capital investors are defining the certain limits for their investment on a firm. This scale per investment in Finland 2010 varies between 50 000 € - 100 mill.€.

In Finland operates 40 VC investors, which are members of Finnish Venture Capital Association. These VC companies have staff from 1 person to 110 and total number of staff in these companies is in Finland 490 persons. The companies had administered capita in disposal 37 bill. €. (Appendix, www.FVCA.fi, 2008)

The finance of a firm is proceeding usually through *development phases* and mile stones, which are defined in shareholders agreement or in business plan. The key target in combining resource pool and product-market scope is to create *synergy into business strategy*.The volume of risk finance is a relevant factor for the position of a venture capital investor as a shareholder in the company after investment phase. The venture capital investor holds a minority of shares.

The know-how and a management experience are important factors, which venture capital investor brings to a company. The management systems and the corporate governance become more relevant after VC investment. (Audretsch et al, 2009)

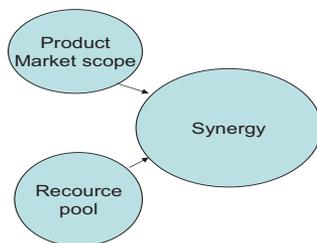
The management of IPR rights is increasingly important know- how, which venture capital investor can supply. Also the work of *board of directors* gets more credibility, when investor has its professional staff or representatives as members of the board (Audretsch, 2006, Brunninge, 2007, Fried et al, 1998).

The investment of a venture capital investor has a *positive effect on the capital structure* of the company. The selection of different resource factors is worked out in budgets, which form a financial tool for conducting and controlling the development of the business.

Synergy

The selection of *product and market scope* and defining the *resource pool* are aiming at a *synergy effect*.

Figure 4. Synergy



The product-market scope is primarily the result of selecting process of an entrepreneur, which meets the scope of the VC investor. The resource pool is primarily supplied by the VC investor. The both elements should be in balance considering the role of investor and entrepreneur. The finance is often the most relevant factor in synergy, because without financial resources a firm is not able to enter targeted market.

On the other hand resources must be allocated in development of business in the best way. This requires often specific know-how and the adequate management resources.

The venture capital investor is offering also required know-how. This may be scarce resource in specific business segments, which require high level substance and technology know-how. (Parhakangas & Landström, 2006) The human resources in venture capital management organisations are small representing only staff from 10- 30 persons in Finland (FVCA.fi).

The use of external specialist by forming a *scientific advisory board*, which support the management with specific technology know-how. The synergy effect is reached through combination of company know-how and venture capital financial and other resources.

It is evident that the risk capital which investor brings to the company is relevant factor for synergy. Without risk capital the development process in product-market scope cannot be realised.

Strategic marketing

Strategic marketing is dealing with interacting process between a company and market, customers, final users. The strategic marketing includes traditional parameters of marketing like, targeted market segments, advertising, distribution channel, pricing.

Strategic marketing is very important element when a company creates new technology, new products or services, which are not yet available in the market. In high technology segment it takes longer time to develop the product, because it requires often a prototype. The entry to the market takes even longer time before market penetration is reached. The understanding of final users needs is relevant part of strategic marketing Both in consumer based business as B to B business. Customer relations management (CRM) is one useful tool for this purpose (Gröönroos, 1990).

The *construction of the brand* is relevant component in a long range strategic Marketing. The brand creation strategy can be based on the image of a company or a product/service. The relevant element of strategic marketing is to create *investor relations strategy*, which *focuses potential shareholders*. The final target is to create image of a firm as excellent investment object.

VC investor looks for the exit stage as a final solution and therefore it is relevant to create working corporate governance and investor relation components as a part of Brand building process. The strategic marketing aims at *competitive advantage* of the company in the market (Barney, 1991, Porter, 1985, 1980, Furrer et al., 2008).

The strategic marketing requires resources, which VC investor brings to the company.

The analyse of competitors and their strategy is relevant part of the strategic marketing.

The strategic marketing and resource use are defined in *marketing plan*, which covers central marketing parameters and the use of financial and other resources of marketing operations. This is a *part of business plan* of the company, which is accepted by the board of the company.

Logistics and R&D

In high technology firm the innovativeness and R& D function are relevant basements for targeting a competitive advantage. Lahti and Killström (Killström, 2005) deal with logistics as an *assisting function of marketing strategy*. It is necessary to co-ordinate the development both these both elements simultaneously. The logistics in high technology segment is becoming more relevant factor, because innovations are combinations of various components, services and ICT systems.

The globalisation and information technology make possible to use international resources and know-how on such way, which bring optimal solution for targeted Competitive advantage .The concept of distance is changing and therefore *outsourcing* is becoming more relevant factor for competitive advantage targets. New innovations and business solutions operate in digital form, in internet. This business process operates in net and does not require such elements in logistic like traditional physical products. The role of *intern and extern nets* has increasing importance in R& D processes.The role of research and development can be based on open source or closed process.

Competitive advantage

The creation of strategic synergy based on decisions of the scope and resource pool constitute the road to competitive advantage, which is worked out through strategic marketing and logistics. Venture capital investor consider competitive advantage important factor on targeted sales and revenue.

Figure 5 Competitive advantage



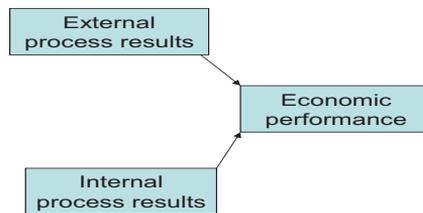
Marketing and logistics are here the key factors in creating solutions, which produce *competitive advantage* to the firm. The firm, which is seeking VC finance must prove that it has a competitive advantage, which gives it chance to win market share.

The strategic decisions are issued so that management process reaches targeted economic results. The competitive advantage is continuing process, which is constructed further on the base of changes that occur in the external and internal mechanism (nets).

External Process results

The *external and internal process results* are important milestones on the way to *economic performance*.

Figure 5. Economic performance



The external process results deals with the achieved results in external market.

The changes in environment are usual and this requires that a firm defines the *milestones*, which it targets in relation to external factors. The achievements in external process are often temporary and therefore this process between company and external market is continuing.

Internal process results

Internal process results focus on *internal factors*. Measuring internal process in a high technology firm is often challenging, because internal development is dealing with *intangible resources and capabilities*. Defining internal process milestones the venture

capital investor can estimate the progress of the firm on the way to final economic performance. Internal process *targets to effectiveness of business process*.

The results are measured by resource use in relation to settled targets or economic outputs. Internal process results are tools for economic performance.

Economic performance

The final phase in Advanced strategy-performance model is *economic performance*. The economic performance of the firm along Lahti has four performance categories in the strategy-performance model: *market power, profitability, economic flexibility* and *internal efficiency* (Lahti, 1983). The *market power* describes market share of a company.

The economic performance is the key element for increasing the shareholder value.

Economic performance of a high technology firm depends on its capability to generate revenues in future (Zahra, 2008, Furrer, 2008). On the other hand it must prove positive business results, which are relevant in valuation of the company. The venture capital investor targets relevant increase in the shareholder value. Several factors influence on the value of the company, but market potential and ability to generate profits are relevant. The targets of economic timing of exit stage are usually defined in shareholder agreement. This agreement may include one or two milestones, where investment process consists of two investment phases. The economic performance is the most relevant base for successful exit.

Exit stage

The ASP-model has final stage economic performance. The venture capital finance has after economic performance *exit stage*, which is a final phase of venture capital finance process. The *economic performance is the base for successful exit*. If a high technology firm has substantial profit expectations it has a good chance to find new investors as shareholders. The challenge of exit for a high technology company is *to create credibility of the company as an excellent investment object*.

Exit may be realised in principle several ways, but main solutions are:

- 1) *Listing company to a stock exchange*

- 2) *Industrial exit, selling shares to a company*
- 3) *Entrepreneur buys shares*

The most common exit during recent years has been industrial exit. The listing has been difficult in first 21. century due the circumstances in stock exchanges and the use of this alternative has been minimal (statistics, EVCA.com, FCA.fi) .

Discussion and Conclusions

The target of this study was to answer question: *Is it possible to use ASP-model as a theoretical frame for analyse of venture capital finance process? What advantages and disadvantages it has? What changes the ASP-model requires for venture capital investment purposes?*

Advanced Strategy-performance model forms a solid theoretical base for the analysis of a venture capital investment. The model deals with the most relevant factors, which are regarded important in venture capital investment. The model considers the most relevant factors, which numerous researches and analysis consider important. The essential investment criteria for venture capital investment were in Finland: 1) Management, 2) Market & Strategy, 3) Product & Technology, 4) Financial characteristics and 5) Exit & harvest potential (Koski, 2005). There are many researches, which support selection of these five criteria's. The model offers a *systematic approach* to strategy process of a firm. It makes possible to locate different strategy levels inside model. The model forms a holistic and strategic approach to the understanding and analysing VC finance.

The alternative option of models to analyse VC finance is *resource and knowledge acquisition model*, *model of the value-added mechanism* and *endorsement model* (Maula, 2001). The strategic approach of these models construct on resource based view and they were used in corporate venturing, which is beyond the scope of this paper.

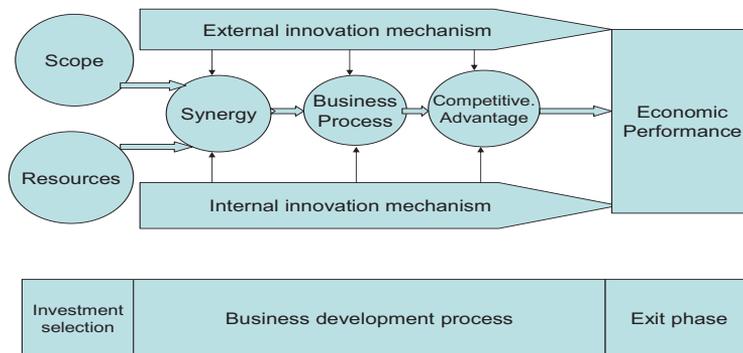
From *the critical point of view* ASP-model does not make possible to analyse enough deeply three important elements in venture capital finance: 1) *management team*, 2) *exit options*, 3) *new innovations*. A *management team* in numerous VC researches is recognised one of the most important factors in new ventures and in venture capital investments (Vyakarnam & Handelberg, 2005, Harper, 2008). New innovations, which are linked to development of the know-how in management team need deeper analysis.

The *exit options* are relevant phase for VC investor. The revenue target of VC investor will be realised only with successful exit. The portfolio company must find new shareholders, who finance targeted profits of VC investor. The exit phase needs deeper analysis, which complete information of the model. The use of ASP-model in venture capital finance has not yet been focus of other researchers and there are no critical arguments to be cited concerning the model. On the base of present study the *finding was the need to adopt ASP- model better to meet the needs of new innovations focused research context.*

Innovation Strategy-performance model

On the base of research findings the following proposals are made to *develop the model for the context of this research purpose.* The venture capital finance is a process, which deals with a complex data of a firm. The development of the business is becoming more abstract and the parameters are often linked together on way, which requires *more systematic approach on external and internal innovation mechanism.* The estimation of the market in a new product segment is often difficult, because there is no reliable data available. The development of the business is a continuing process, where synergy, business process, competitive advantage is created based on the development in *external and internal innovation mechanism.* The following chart *Strategy-performance innovation model* of a high technology firm combines a strategy development into *business processes in the context of venture capital finance.*

Figure 6. : Strategy- Performance Innovation Model of a High Technology Firm



The model is constructed to fit *in analysis of a high technology firm, which is creating new innovation and seeks external risk finance*. The innovation is a process that proceeds from an idea to the performance of business with profits. The first step is to locate the *scope of the business idea*.

The second step is to combine the scope with resources targeting *synergy*. The synergy is created by processing business idea and utilising both *internal and external innovation mechanism*.

The synergy based solution is entered to *business process*, which targets to create *competitive advantage*. The development of the business process is utilising also both *internal and external innovation mechanism*.

The *economic performance* is the result of operative business, which can be measured in numerous financial figures. The general measure of economic performance is turnover, profit, and return on investment (ROI).

The execution of business process aims at *economic performance*. The economic performance is relevant for the existence of the company in a long run. The economic performance is important in seeking *external finance*. The target of economic performance can be divided into *milestones*, which covers the development of innovation during several years period.

The lower part of model describes the *investment process of the venture capital investor*. The VC investor selects the scope and resources for a investment portfolio. If a high technology company meets the scope and resource decision criteria of VC investor mutual synergy is created. The investment decision of the venture capital investor is

followed by business process development, which has strategic elements of synergy, comparative advantage and economic performance.

The core of the business development process of a high technology firm is to adopt elements from both external and internal mechanism (nets).

The *venture capital investment process* is described at lower part of the model. The first step of venture capital investor is to make *investment selection and resource allocation*. After selection of an object company the *business development process* is launched. This development targets to utilising synergy (scope & resources) and developing comparative advantage. The final objective is exit phase.

The innovation process of a high technology firm targets to the successful business. The picture describes the process, which is proceeding from scope to economic performance.

The innovation can be based on technology or market based opportunities. This requires processing, which primarily can be internal process. The intermediation between different organisations, elements and innovators is a common phenomenon in external and internal *networking of technology firms*.

Innovation processes in research context are usually *knowledge based*. It leads to development and investments, which focus on *intangible resources*. The estimation of investments and the resource need is challenging, because the development process requires specific management and substance know-how combinations.

The theoretical discussion and *modelling of venture capital finance* deals with several options. The venture capital finance is described as a process, which has different phases. In a model of venture capital investment decision making Fried & Hisrich distinguish six phases: 1) origination, 2) venture capital firm-specific screen, 3) generic screen, 4) first-phase evaluation, 5) second-phase evaluation, 6) closing (Fried & Hisrich 1994). The model focus on logical procedure of context of different phases.

The venture capital finance forms a negotiating process between investor and potential portfolio company. Several researches deal with agency theory how the interest of venture capital investor or the founders of the company are considered in *IPO and exit*.

(Bruton, 2009, Daily, 2003, Cumming, 2008, Arthurs, 2009).

The discussion of importance of *strategy selection of SME companies* is becoming more important. (Kraus, 2009). The strategy selection process of SME companies is a challenging domain, which requires more research. The presented SPI-model offers a

new systematic approach to analysis of strategy in venture capital finance process of a high technology firm.

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Appendix

The present study deals with three relevant concepts, *strategy*, *innovation* and a *high technology firm*.

Strategy

The strategy deals with the direction of the firm considering the challenges of competition and the changes in environment (Porter 1985, Lahti 1983, Andrews 1987).

The core of the strategy is the allocation of resources between products, markets and the organisational processes, which conduct targeted goals with the best economic results. (Wernerfelt, 1984, Ireland et al 2006)

The concept of strategy has several definitions.

H.Igor Ansoff (Ansoff 1975) defined strategy with five component choices:

1. product-market scope, 2.growth vector (the direction in which scope was changing)
3. competitive advantage, 4.synergy of the firm and 5.procurement.

Quinn (Minzberg & Quinn 1996) defines” A strategy is the pattern or plan that integrates major goals of organisation , policies, and action sequences into a cohesive whole”.

Minzberg (Minzberg & Quinn 1996) mentions five ways to define strategy:

- 1) *strategy as plan* 2) *strategy as ploy* 3) *strategy as pattern* 4) *strategy as position* 5) *strategy as perspective*

Strategic concept deals with several levels and along Lahti it has three main levels

(Lahti 1985, 2009): 1) Company portfolio, which defines resource allocation segments
2) Branch level 3) Business operation level, where targets and limits are defined for business.

The strategy deals with the long range goals and objectives and allocation of resources.

(Chandler 1962). The strategy can be a process.(Hatten and Schendel 1976). Porter emphasises *comparative advantage* in strategy selection. (Porter 1985). Porter's niche strategy as part of positioning is useful for small and medium size companies.

There are several approaches to the strategy and the definition of the strategy in general level is difficult. The managements role in strategy implementation has effect on flexibility of strategy. The formal elements of strategy are relevant, but experimentation, intuition and learning effect also on strategy. (Hamel, 1996, Hayashi, 2001)

The rapid changes in technology challenge strategy selection process of firms.

The strategy is becoming more important part of entrepreneurship of SMEs. (Kraus et al 2009).

Several high technology firms are developing separate *technology strategy* as a part of strategy of the firm. The company strategy is usually built on scope selection, resource allocation, business process solutions, synergy and competitive advantage as base elements (Andrews 1987).

The selected strategy of a company can be analysed and more systematically positioned and defined by using the ASP- model.

Innovation

The *innovation* is relevant factor in the success of a high technology firm.

The technological innovations cause changes on product/market scope and create new business opportunities. The importance of innovations as a key factor to changes in economy has been pointed out by Schumacher. (Schumpeter 1934).

The innovations create new business opportunities, which are exploited by entrepreneurs. (Hitt et al 2002). The innovation or an innovative business process is important factor for the Venture capital investment. New innovations can be protected by patents and other immaterial rights.

High Technology firm

A high technology firm in this research is a new company, which primarily develops new products, services or processes by using innovative technology. The company uses immaterial property rights (IPR) and other methods to protect company's rights to its products. A high technology firm utilises new innovative technology, raw materials and

processes in business operations. The competitive advantage is based on innovative products, services and their combinations.

A high tech firm invests relevant part of its turnover for R&D processes in order to reach or preserve its competitive advantage in market.

The strategy of a high tech firm in general is to base success on know-how and specialisation, instead of mass production with large production volume.

Management team in venture capital finance process of a high technology firm in the strategy- performance innovation model context

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Abstract

This paper addresses the know-how and knowledge development of a management team in a firm undertaking venture capital financing. Venture capital financing is a process that focuses on the development of the business that follows the selection of the scope of business. In high technology firms, this development process requires specific substance knowledge upon which a core competence can be built. The firm's management team plays a central role in the development of these business processes. This paper addresses a gap in the literature and seeks to answer how the management team develops over the phases of the firm's venture capital finance process. Thus, this study focuses on the evolution process of a management team in the context of the strategy-performance innovation model.

Keywords: management team, venture capital finance, substance know-how, SPI-model

Introduction

The development of a business from the initial idea into a fully operative business is a complex process. In high technology companies, this process typically takes several years and requires various skills from the *management team*. The role played by the management team has been shown to have a significant effect on the profitability of the company. Thus, the management team is central to the venture capital finance process. The securing of venture capital finance by a firm is accomplished through a process that consists of, amongst other phases, different estimations of the firm's capability to create expected profits. The key factors that have an effect on the firm's capability to generate revenues through business operations are connected to both entrepreneurship and management teams.

The literature has shown the management team to be an important factor in the evaluation process by a venture capital (VC) investor (Boocock, 1996; Koski, 2005). This paper analyses the role of the management team in the venture capital finance process of a high technology firm. The aim of this paper is to identify the factors that are the most relevant to this process and to make conclusions regarding their importance in terms of the VC's evaluation process of a firm as a potential investment target. While this research area is broad, the analysis in this essay is limited to select perspectives regarding the management team in the specific context of the venture capital investment process.

Theoretical framework

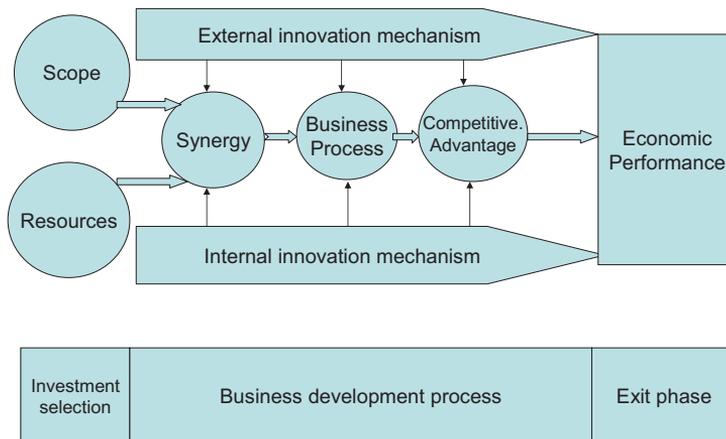
The innovation model and venture capital finance

The theoretical frame in this essay is based on the advanced strategy-performance model. The model was originally developed by Arto Lahti (Lahti,1983) and further developed by Pekka Killström (Killström,2005) who introduced new elements to the model.

The venture capital finance is a process, which deals with a complex data of a firm. The development of the business is becoming more abstract and the parameters are often linked together on way, which requires *more systematic approach*. The estimation of the market in a new product segment is often difficult, because there is no reliable data available. The model is important in analysing the most relevant elements in venture capital finance.

The model *was* modified and adapted to fit the present research context, namely the strategy-performance innovation model and the high technology firm in the venture capital finance process (Nikk 2009)

Figure1: Strategy-Performance Innovation Model and the Venture Capital Finance Process



The model was constructed for the analysis of high technology firms that create new innovations and seek external risk financing. Innovation is defined as a process that develops an initial idea into a performing business that generates (Nikk, 2009) profits.

The first step in this process is to identify the scope of the business idea. The second step in the model matches the determined scope with the required resources with the aim of creating a synergy. This synergy is a central element that leads to competitive advantage.

The business process relies on both internal and external innovation mechanisms. The external and internal innovation mechanisms form the dynamic elements of the development process and are a source of information and knowledge and new innovations (Carayannopoulos and Auster, 2003). The important parts of the external innovation mechanism are different technology and knowledge based clusters (Eisingerich et al 2010). These clusters in turn attract important information and human resources around specific technologies.

Internal innovation mechanisms form the dynamic system by which a high technology company conducts and defines its business operations. This mechanism includes all the relevant factors that have an impact on the development of new innovations within a firm. Internal innovation mechanisms are linked to external innovation mechanisms and they form a network for innovations (Blankenburg Holm et al,1999 ,Dushinsky and Shaver, 2009).

The firm's economic performance results from its business operations. This performance can be evaluated through the use of numerous financial measures. The general measures of economic performance are turnover, profit and return on investment (ROI). The execution of the business process aims to achieve economic performance. Economic performance is both relevant and necessary to secure the existence of the company in the long run. The firm's economic performance is also important when seeking external financing (Audretsch, 2008). Economic performance targets can be divided into different milestones each covering separate stages in the development of the firm's innovations over a period of several years.

The lower part of model describes the investment process of the venture capital investor. The VC investor selects the scope and the resources to be committed to an investment portfolio. If a particular high technology company meets the scope and resource decision criteria of the VC investor a mutual synergy is created (Boocock and Woods, 1996, Ruhnka and Young, 1987). The investment decision of the venture capital investor is followed by the development of the business process, which combines strategic elements of synergy, comparative advantage and economic performance.

Organisation theory

The research methodology of this essay draws on organisation theories. The focus of the research is the organisation and the development of its know-how. The relevant know-how of the organisation is based on individual and team level know-how. Thus, the management team has a central position in creating new innovations of the firm. (Harper, 2005; Audretsch et al, 2008; Audretsch and Lehman, 2006, Clarysse, 2004).

The theoretical basis for this study also draws on organisation theories that are relevant for the analysis of the motivation and commitment of members of the management team (Vyakarnam and Handelberg, 2005).

Furthermore, agency theory is another relevant perspective for the analysis of the relationship between venture capital investors and the management team (Reid,1996, Rosenstein,1993). The members of a management team are often also shareholders in their firm. Thus, this ownership role is linked to the commitment of team members.

The internal and the external innovation process include the process owners that are formed by the company's management team. Process ownership (Galbraith 1995) is strongly linked to the know-how management within the organisation.

This study focuses on the management team of a high-technology firm in the venture capital finance context. The management team forms the top management (Eisenhardt and Shoonhoven 1990) of a high technology firm thus it selects the strategy and runs, or manages, the company's operative functions. The management team selects the firm's scope and resources, creates the synergies and competitive advantage, operates the business processes and is responsible for the firm's economic performance.

The management team consists of the high technology firm's key persons and, in many cases, the entrepreneur or entrepreneurs. The management team ideally can be formed so that the most relevant skills for the conducting the strategic business elements are represented in the team. The management team may also be called the new venture team (NVT) (Lehtonen 2000, Sapienza et al 1996).In the start phase the team's specific substance know-how (e.g. ICT technology, nanotechnology) is its important. Later the know-how in a team expands to skills required for the implementation of a business strategy.

The knowledge diffusion and entrepreneurship was analysed by Audretsch et al. in a model in which they link 1) technical knowledge, 2) innovation effort, 3) entrepreneurship and 4) economic performance. (Audretsch et al 2008).

The management team represents the know-how of the firm and the credibility of the firm. The credibility of the company at the start phase is based mainly on the know-how of its top management team members and their experience. The competence in strategic management seems to have a positive correlation to the future success of the

company (Kraus and Kauranen 2009). The distinction of what constitutes strategic management in small organisation is difficult because there is often direct link between strategy and operations. Typically, in these companies the same persons create strategy and execute the operative actions. Thus, the management team usually runs the strategic and operative business and therefore it is important to make the correct strategy decisions, which in turn commit the company's resources.

Methodology

The study combines theory and empirical analysis. The empirical part consist of the case study focusing four high technology companies. The data was collected from several sources and research uses a qualitative research methodology. The data from cases was partly oral and written documents. The oral data was collected from discussions with entrepreneurs and between venture capital companies. The data was collected during 2002-2009. The data was documented in following documents:

Official company register documents, Annual reports, Balance sheets, Company reports, Business Plans, Executive summaries, Presentations to venture capital companies, Board meetings, Management interviews, Negotiations with Venture capital companies, Documents to Technology Agency in Finland (TEKES), Documents to Finance partners.

The data is primarily qualitative and the analysis of the data and the findings are based on a constructive approach drawing on a qualitative methodology (Silverman ,2000).

The theoretical research is based on an analysis of the literature, including journals focusing on venture capital finance, strategy and management.

This paper addresses the development process of the management team in four different high technology firms. This longitudinal research process is thus able to provide the researcher a deeper knowledge of the case companies.

The aim of the study

The primary objective of this paper is to analyse the management teams of high technology firms in the context of the venture capital finance process. The aim is to identify the relevant factors that are important in the composition of the management team. Estimating the significance of the management team in the venture capital finance process is one aim. The essay will also contribute to the strategy-performance model by analysing the management team by using new model in this research context.

Management team and entrepreneurship

The management team consists of persons who bring together key entrepreneurial elements to form the management team. An entrepreneur is the key person, who creates and develops new innovations. Usually, the entrepreneur is the main source of resources and he or she primarily covers the financial and operative risk in the process of creating a business out of a new initial idea.(Amit et al ,1990) An entrepreneur's role can be filled by one person or several individuals. Some research argues that entrepreneurship is more likely a plural rather than singular concept (Harper 2008).

The entrepreneur can be seen as a strategist (Minzberg 1996) and can also be a collection of people. Entrepreneurship takes the legal form of a limited company in the context of venture capital investments. The entrepreneur owns a majority of the shares of this limited company. The entrepreneur has a dominant role in the innovation process of a high technology firm. They are often the innovators who invest their whole personality and personal assets to support the development of the business.

The management team's know-how in a high technology firm

The knowledge of the management team may evolve in terms of growth and performance according to 1) the team's industry experience; 2) the team's work experience; 3) the complementarity of the member's functional backgrounds (technology/marketing) 4) team size 5) the team's joint experience/team tenure; and 6) the team's networks and contacts (Vyakarnam and Handelberg 2005).

The composition of team know-how is divided into four categories *for the purpose of this analysis*. The know-how ranges from substance know-how to external process know-how. The progress of know-how can proceed on all of these facets at same time.

1. substance know-how, 2. innovation process know-how, 3. internal process know-how, 4. external process know-how

The grouping is theoretical and it supports the analysis of the development of know-how processes in a high technology firm. The know-how develops through the learning of its team and through its members (Peltonen 2008). The development of know-how is a dynamic phenomenon (Nonaka et al 2003) and the know-how of a management team can be increased by recruiting new team members or by outsourcing functions.

Substance know-how

Substance know-how is an important innovation factor in a high technology firm. Substance know-how within a selected expertise domain is necessary. The base for this substance know-how can be created in a university, laboratory, in large corporation or amongst a group of academic scientists (Clarysse and Moray, 2004). The substance know-how is part of the construction that can be linked to the knowledge based view, resource based view and social capital theory (Maula 2001).

Substance know-how is developed by individuals or by a research team without a specific team structure. The competence of the substance know-how is based on the high level expertise in such areas as nanotechnology materials (Granqvist 2007), 3D animation technology, biotechnology, etc.

The selection of the scope and strategy of a firm is based on this substance know-how. The formation of a team is thus the first step in the creation of a high technology firm as a team creates a better basis for the success of the venture (Kamm et. al 1990).

The credibility of the firm is based on the expertise and experience of the team's substance know-how. A high level of expertise leads to a cohesive team and is also a relevant factor in enabling communication between team members. Substance know-how has also been linked to the experience of a function, which is also important for the success of a company(Cooper and al 2008).

In general, substance knowledge is not a sufficient form of know-how to meet the criteria of venture capital investors. The estimation of the level of substance know-how within a firm is challenging as VC investors do not have enough experts and skills to understand the most sophisticated technologies. This seems to be one factor that contributes to the high risk and the absence of private VC investors at the early stages of the VC finance process.

The innovation process know-how

The substance know-how builds a base from which to develop an innovation. The innovation process know-how also introduces dynamic capabilities to the knowledge evolution process (Nonaka, 2003, 1994).

An innovation can focus on: 1) developing new products or services 2) developing new methods of production 3) identifying new markets 4) discovering new sources of supply 5) developing new forms of organisations (Schumpeter, 1934).

The innovation process is a development process that usually results in the creation of products, services, production processes or new innovations within the business management process. The innovation process in a high technology firm is usually based on substance know-how and it focuses on the product-market selection. The technology can be based in research oriented or technology-adopting companies (Clarysse and Moray, 2004)

The positioning of innovation in the market-product sector affects the selected business strategy. The innovation process is a necessary stage for the creation of a business process. This can be compared to a bridge that is built to connect the firm's substance know-how and the development of the business process.

The firm proves through its innovation processes that it can create solutions that have a chance to proceed to the market. The innovation process includes the basic work of the team, which aims to develop a prototype of the product or service. The building of a prototype is a significant milestone. It proves that the know-how of a company can produce a product and it demonstrates the firm's core competence.

The protection of an innovation by a patent or other IPR right supports the firm's chance to find a VC investor. The filing of a patent application requires resources and the specific know-how, which is generally supplied by an external service company.

The ability to make a prototype is a significant step towards venture capital financing. A prototype can also provide the basis for an estimate of what resources are needed to take the innovation into production.

The innovation process is followed by business development process. The internal and external mechanisms (networks) represent the sources of innovations, which may arise outside or inside of the company.

The internal process know-how

The internal process know-how is relevant for the management of business operations. The internal process deals with the factors that are controllable by the management of the firm. The internal process includes traditional business management skills. These include the selection of strategy, product management, production processes, budgeting, customer management, organisation, personal management, marketing etc.

The management team may already have the relevant know-how of internal processes or it can decide to buy the expertise by recruiting new staff. The potential increase in the know-how base of a firm is limited by cost. This is a concern for the limit for the growth of a company. Thus, VC- financing is important in speeding up the process of business development.

The main objective of the internal know-how process is the firm's ability to create an operative and profitable business.

The experience of members in a management team has a positive impact on the success of the venture (Stuart and Abetti 1986).

External process know-how

The external process know-how is important for the firm in marketing and communicating with the market. The factors in the external process are not controllable

by the management of the firm. The company can influence the market with parameters in marketing, communication, PR and participating in external networks.

In many countries, the development of technology has led to the formation of knowledge based technology and research centres. These centres, such as CERN or Silicon Valley in USA, are sources of new innovations. Typically, the public sector supports this kind of development by forming technology programs and forming clusters around selected expertise (Virtanen, 2005, Eisingerich, 2010, www.tekes.fi, 2010).

The external process know-how is especially relevant for the firm's external networking and its participation in innovation processes that are based on both external expertise and internal expertise. The main element in external process know-how is the ability to understand and foresee market changes. Business operations are then created so that they match with the development of the market. The business plan is an important tool by which to combine the external and internal processes into a co-ordinated business strategy and operation.

The evolution of the entrepreneurship and management team

The development of a high technology firm is a process of evolution that often includes learning from mistakes. The basis of the firm may be in scientific innovation, which may stem from research at a university or laboratory. Thus, the basis of the firm is the high expertise and strong knowledge of technology (Orlikowski 2000).

This team is formed on basis of its future evolution. The evolution from expertise team towards business operation team is often the first critical stage of a firm. The members of the initial team in many cases do not have the necessary knowledge how to change the innovation into an operative business. This evolution process is thus linked to the power element, which is relevant for in terms of the decisions regarding control of the firm. Initially, the power of the management team is based on its substance know-how. If the team has the appropriate IPR rights these may give them significant control. However, the construction of a team is a process that must be worked out with respect to the relevant power elements and different interests of shareholders and stakeholders.

The co-evolution of new organizational forms is an example of organisational evolution that is linked to the evolution of technology (Djelic and Ainamo, 1999, Rosenkopf et al.,1994). “The innovative organization is dealing with complex technologies or systems under conditions of dynamic change” (Mintzberg, 1996).

When the company grows it emphasises the requirement for management skills. This raises the question of top management solutions. If the founder does not meet the requirements an external CEO may well be the relevant solution. This discussion is dealt with in greater detail in the article by Bharat and Tabak (2008).

Knowledge is a key resource of competitive advantage. (Agrawal et al. 2005; Alvarez and Barney 2004). The members of board are one relevant resource that can both access and absorb knowledge spillovers (Audretsch and Lehmann 2006).

The commitment and motivation of management team members

The motivation of the management team is an important factor in determining the business success of a high technology firm. The team in high technology firms is usually highly motivated and committed to the project or the firm. The motivation is often linked to broader goals and targets such as increasing scientific competence. The original target is not to create a firm but to create a new innovation. The basis for the initial commitment and motivation is usually very strong.

However, the innovation process may lead to a situation where pure substance know-how and expertise targets conflict with the commercial targets of the firm. This situation may cause a break within the basic team.

The objective of the firm is to create economic results in the form of profits. The members of the team may have different approaches to the firm’s financial aspirations. This is often due to the fact that team members often have different economic and financial backgrounds.

It is usual that highly motivated researchers and team members in a high technology firm are willing to work considerably without being paid a salary. This is further evidence of these individuals’ commitment to the innovation work. However, the target

of the venture capitalist is to create a management team, which is highly motivated and willing to create a profitable business process in co-operation with its investors.

Thus, the analysis and understanding of the financial motivation and firm targets is relevant for the understanding of the evolution of a high technology firm.

The role of investor and the expectations for the management team

The venture capital investor expects that the management team is able to achieve the economic targets of the business.(Parhakangas and Landström, 2006) The management team has a very important role in the venture capital investment process. If the management team does not meet the requirements of the investor, it is not possible to arrive at a positive investment decision.

The venture capital investor operating at the seed finance stage may be satisfied with the substance know-how of the team and may be ready to support the creation of the business process. However, many financiers at the growth stage expect that an operative organisation is already running and that the business generates cash flow.

The investor usually expects that the relevant expertise on substance matters and the ability to run operative business profitably exists. The investor also expects results within a time frame of 3 to 5 years. During this time the management team is expected to add to the expected value to the business.

The management team is the majority owner of the company. The roles and distinctions between the investor and the entrepreneurs are defined in the shareholder agreement. The shareholder agreement is the most important document that defines and guides both the investor and the entrepreneurs towards the exit phase.

The shareholder agreement and entrepreneurial freedom

The formal ownership structure is based on the minority ownership of the venture capitalist. However, the investor wants to limit the decision making of the entrepreneur on many relevant areas of the business. Thus, the shareholder agreement is an important contract, which regulates the rules between the shareholders (Kaplan 2003).

The venture capital investor participates in the board of the company by naming his representative to the board of the company. The objective is to support the management of the company by providing the relevant know-how that new members of the board bring to the company (Audretsch et al 2009). Entrepreneurial freedom may thus be limited due to conflicting objectives at the board level.

The shareholder agreement also deals with the exit stage, which in advance bind the entrepreneur. The shareholder agreement discounts the future, which may be realised in a different way than initially expected (Casamatta, 2003). This may also limit entrepreneurial freedom, which is linked to the issue of agency (Audretsch et. al, 2006).

The venture capital investor's interests may conflict with the interests of the management team (Bhatrat and Tabak, 2008, Fried et al, 1998)). This is common particularly when it comes to the valuation of the firm and the definition of the ownership structure. The valuation of IPR rights and new innovations using different valuation techniques is a challenging task. It is vitally important that a mutually acceptable position is achieved in terms of the valuation of the firm and in the case of entrepreneurial freedom. These elements are the basis for a successful business.

Venture capital investor

The venture capital investors invest in limited companies that are not listed on stock exchanges. The capital is mostly invested as equity or in a mezzanine form.

The venture capital investor may accept an investment with a minority share position but wants a more active role than the average shareholder. The venture capital investor also typically places his or her own representative on the board of the company (Fried et al 1998). He or she also has an interest to commit his or her own know-how along with the capital investment to the company. The venture capital investor has different expectations for the management team depending of the development stage of the company. The development process of venture capital finance is an evolutionary process that proceeds from the early stage through the growth period to the exit stage. The venture capital investor does not participate in the daily operations of the firm, but guides the strategy of the firm and supplies it with contacts and the necessary financing (Fried and Hisrich 1994).

The role of the board

The role of the board is not usually very important in SME companies (Brunninge 2007). Therefore, the conflict of interest between the owners and the management team is not significant because in many cases the team owns shares of the company. This situation changes when the company gains new shareholders who are mainly driven by investor interests. The venture capital investor expects to have a representative on the board of the company. These new members bring know-how, which the investor consider relevant for the development of the company. The role of the board is to look after the shareholder's interests (Fama and Jensen 1983, Arthurs et al, 2009). The board also has an important role in solving the agency problem that may rise between the management and shareholders (Audretsch and Lehman, 2006).

The separation of ownership and control is a central feature of modern economics (Aggarwal, 1999). This becomes important when the board selects a new CEO outside of the founding team who is not an owner of the company's shares.

VC-backed companies' boards are more active than traditional boards (Fried et al., 1998). The board usually steers and controls the operations of the company including the business plan and the annual budget. The board does not interfere with the operative side of the company. The role of the board is significant in providing strategic resources that support the company in reaching its financial targets.

Internal effectiveness of the management team

The internal effectiveness of the management team is measured through business performance measures such as turnover, profits, ROI and market share. Thus, the internal effectiveness is related to the competence of the management team in running business operations. The internal effectiveness of the management team is guided by learning by doing. It behaves like experience curve, which indicates learning process (Boston Consulting Group, 1970). High tech companies go through several changes. The resources and the organisation must be surpassed with its possibilities in market circumstances. Thus, the size of the management team and staff are relevant cost

components. The management team must generate profits in order to reach the agreed targets. If the team does not meet these targets then changes are necessary in the firm's business operation. There is a correlation between successful ventures and ventures established by teams (Kamm et. al.1990). Conceptually, the internal effectiveness is linked to the resource based strategic view. The internal analysis that focuses on the strengths and weaknesses shows the present situation of the firm (Barney 1991). The internal effectiveness of the management team is evaluated on an on-going basis in which the board and the management team are expected to work to reach agreed goals.

External effectiveness of Management team

The external effectiveness of the management team is related to the market development, which is usually beyond the control of the management team. External effectiveness deals with the capability of the management team to utilise external networking and market information. As the market is changing, the company must adapt to these changes by making the necessary corrections to its operations.

The aim of external effectiveness is to create competitive advantage. The analysis of external factors in terms of grouping opportunities and threats can indicate the current strategic situation of the firm (Porter 1991). Forecasting the markets future development, including demand and supply, is part of the relevant know-how base. The external effectiveness also concerns co-operation with partners and external networks.

External effectiveness can be estimated or measured in different ways. The timing of the analysis is also relevant. This process can be divided into three stages:

- 1) *estimation before the investment*, 2) *estimation during the development process*,
- 3) *estimation before the exit*

The estimation before an investment is usually made based on the track record of the management team. This estimation is mainly based on the know-how and the personal history of members of the management team. The information is gathered from CVs and other external data sources. This estimation cannot be based on operative results but only expectations for the future.

The estimation of the development phase is based on the business operation data. The market share, customer satisfaction, and the brand image are important. The firm's external effectiveness, like market share has an impact on the profits of the company. This has been proved by the analysis of the PIMS database (Buzzel and Bradley, 1987).

The estimation of the external effectiveness of the management team before the exit stage will be defined by the interest of the potential shareholder. The result after the exit phase is the final measurement of the external efficiency of the management team by the VC investors.

The external and internal processes are usually linked together through the business operations of the firm. For example, the customer management process is an example of a situation in which the external and internal processes must be performed together in a co-ordinated manner. The interaction between the market orientation (external) and the entrepreneurial (internal) orientation is significant among high technology industries.

Conclusions and discussion

On basis of researched cases the following conclusions and findings can be made.

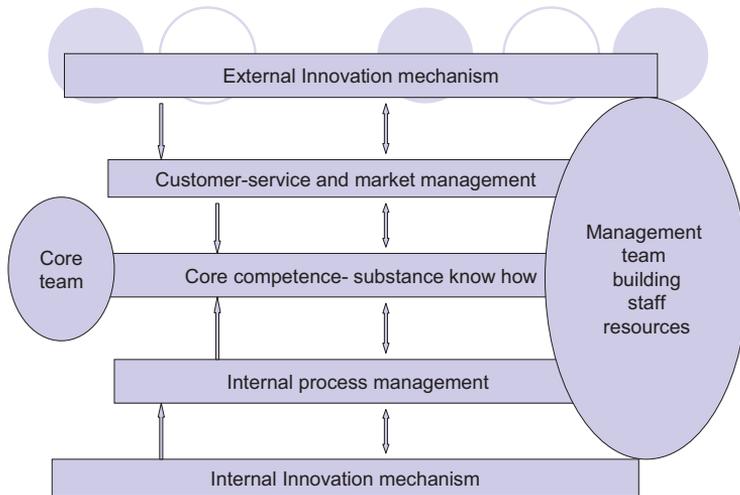
If the firm does not form a management team that is able to perform the necessary business operations it is difficult to succeed in the venture capital investment process.

The companies at the seed phase usually have no formal organisation in management team.

The existence of a management team with wide skills is relevant to the VC investment.

The building of the operative management team takes time over planned investment horizon.

The management team consists of a group of persons that need continuing coaching and learning. Its core competence is under continuous development and it adopts new elements from both the internal and external innovation mechanisms (network).

Figure 3: Evolution of core team to management team

The development phase of the management team can be conceptually linked with the stages of the venture capital investment process.

The building of the management team and organisation requires resources that are supplied by the venture capital investor.

The construction of management team know-how is a continuous and dynamic process.

The motivation of the entrepreneur or entrepreneurs and the management team is relevant factor in the exit stage.

The shareholders agreement affects the motivation of the management team and it may limits the decision space of the management team.

Venture capital investments at the seed phase are rare because the know-how of the potential target firm's management team is usually limited to substance know-how.

The development phase of the management team is an important factor for the venture capital investment.

The management team is the key factor for a successful venture capital investment. It is necessary to study this area more, particularly at the growth stage.

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Venture Capital Finance of High Technology Firm in the Context of the Strategy-Performance Innovation Model

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Abstract

Venture capital investors are setting several criteria for investment that a target company must meet. This study uses the Strategy-Performance Innovation model for the analysis of venture capital investment criteria mainly from the viewpoint of venture capital investor. The purpose of this paper is to present new model that focuses on venture capital finance of high technology firms. The paper is based on surveys in the literature, journals in entrepreneurship and empirical case studies. The result of the paper is a new theoretical model. The testing and simulation of the new model is challenging due to the classification of the scope of a high technology firm. The model requires more theoretical research for implementation. The model is a new and useful tool with practical implications for venture capital finance in the context of high technology firms. The model can also be used as theoretical strategy-performance framework in future research and business applications.

Keywords: Venture capital finance, high technology firm, Strategy-Performance Innovation model

Venture Capital Finance of High Technology Firm in the Context of the Strategy-Performance Innovation Model

Introduction

Venture capital plays an important role in the financing of new innovations. However, several studies have shown that venture capital investors do not allocate enough resources to early stage companies. The vast majority of private venture capital (VC) investments focus on companies that have already progressed to later stages of development. Therefore, it is important to introduce new tools and approaches that can help VC companies analyze the financing of innovations.

High technology firms seek investors and financiers for their innovations and business operations. Venture capital financing is a process where risk capital seeking companies and venture capital investors try to find common solutions to risk finance and co-operation. It seems evident that understanding both sides of the venture capital finance process can contribute to success. Venture capital investors have several different criteria by which they evaluate companies they may potentially target for investment. This study uses the Strategy-Performance Innovation model for the analysis of venture capital investment criteria from the viewpoint, primarily, of the venture capital investor. It is important to study the research process undertaken by venture capital investors as the venture capital industry makes up important part of finance industry. Financing new high technology companies is vital from a societal standpoint, because they are a key source for new innovations.

This paper contributes to the analysis and discussion of the venture capital finance domain. In previous research Virtanen (1996) focused on 'venture capital advantage' and found that raising additional finance was the most important value added offering made by venture capital investors. Sapienza et al (1996) analyses value added and VC governance in four countries. Lehtonen (2000), presents a new approach by which to evaluate the value creation of venture capital financing that also focuses on corporate governance and exits. Koski (2005) developed a model which simulates the estimated success potential in venture capital investment and identifies six main dimensions: 1) management, 2) market & strategy, 3) product & technology, 4) financial characteristics and 5) exit 6) harvest potential. There are several researches, which find previous factors important in venture capital investment decisions (Muzyka et al. 1996).

The decision process of venture capital finance Tyebee and Bruno (1984) analysed by using Decision Process Model of Venture capitalist investment activity. Zacharakis and Meyer (1998) analysed venture capital decision making by using social judgement theory. Maula (2001), on the other hand, focuses on corporate venture capital and the value-added specifically for technology-based new firms. The research raises several relevant success factors in corporate venturing. Lehtonen and Lahti (2009) deal with the role of advisors, which they prove to play important role in venture capital finance.

The discussion around the importance of the strategy selection of SME companies is becoming more important (Kraus, 2009). The strategy selection process of SME companies is a challenging domain requiring more research. These new approaches to modeling strategic entrepreneurship are important in increasing our understanding of SME finance. It is important to open new approaches to this research context. The present study focuses on key factors that have an impact on venture capital investment

decisions. The study exploits the Strategy-Performance Innovation model, which links *in new way the strategic elements and innovation to venture capital finance*. The model focuses also on internal and external innovation mechanisms, which are the source of new innovations. The study also tests the use of the model in four case companies. On the basis of the findings the present study contributes to the research gap by introducing the new SPI- model in venture capital finance of innovations.

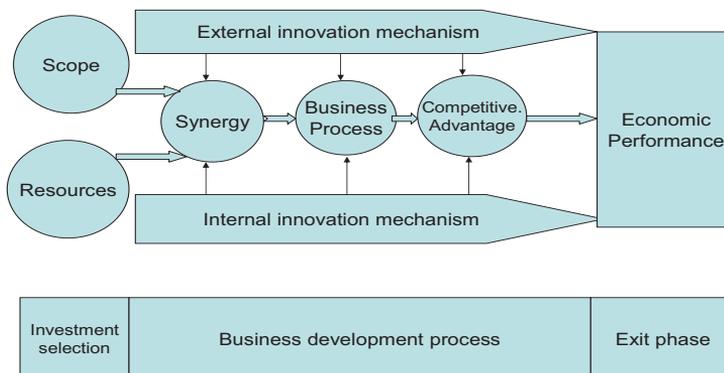
The paper combines strategy-performance approach to venture capital finance process. The *strategic approach is new*, because it helps to recognize the key elements on which to estimate the success of the firm. The SPI-model integrates these elements and helps to build the strategic view how to build business process for exit phase. The SPI-model helps to locate the strategic challenges of the firm.

Strategy-Performance Innovation model

The theoretical framework of this study is referring to the modeling of strategy and business processes. The Strategy-Performance Innovation model developed by the writer of this paper is based on traditional industrial organization theory (Caves and Porter, 1977; Scherer, 1980; Barney, 2007), the business policy tradition (Chandler, 1962; Ansoff, 1965) and the resource-based view (Barney, 1991; Porter, 1991; Noda and Collins, 2001; Makhija, 2003; Furrer et al., 2008). The Strategy-Performance Innovation model has its roots in the theoretical studies of Lahti (1983, 1987), in which he developed the Strategy-Performance model. Killström (2005) introduced new elements to the model, which he called ASP-model. The model was developed and modified for this research context from the ASP-model.

The SPI-model is the result of a long theoretical development process in which elements were adopted from the Business Policy tradition (BP), Industrial Organization (IO) economics tradition, Strategic Groups tradition (SG) and Resource-based View (RBV). The present Strategy-Performance *Innovation* model focuses on the venture capital financing of *high technology firms*.

Figure 1. : Strategy-Performance Innovation Model (SPI-model) of a High Technology Firm



The SPI-model was constructed for the analysis of high technology firms that are creating new innovations and that are seeking external risk financing. The model integrates the strategy-performance approach and the venture capital finance process at different phases of the decision making process. The venture capital investment process consists of three main decision phases: 1) investment selection, 2) business development process, and 3) exit. The strategy-performance approach provides strategic tools that assist these decision phases.

Innovation is a process that starts with an idea that develops into a profitable business operation. The first step in the model is to identify the scope of the business idea. The second step is to combine the selected scope with resources with the aim of creating synergies. The synergy is created by scope and resources processing the business idea and utilizing both the internal and external innovation mechanisms.

The synergy is linked to the firm's business process, which aims to create a source of competitive advantage. Business process is described in more detail later. The development of the business process utilizes both the internal and external innovation mechanisms. The end result of the business operations is economic performance that can be measured through financial figures. The general measures of economic performance are turnover, profit and return on investment (ROI).

The execution of business processes aims at economic performance, which is necessary for the success of the company in the long run. A firm's economic performance is also important when seeking external finance. Economic performance can be divided into milestones that cover the development of innovation during several years.

The lower part of model, starting from investment selection links the model to the venture capital investment process. The VC investor selects the scope and resources of its investment portfolio. If a high technology company meets the scope and resource decision criteria of a VC investor there is the potential for mutual synergies. The investment decision of the venture capital investor is followed by the development of the business process, which includes strategic elements of synergy,

competitive advantage and economic performance. This business process can be also called value-added process (Lehtonen 2000, Virtanen 1996). The above diagram describes the process that proceeds from the initial scope to economic performance. The innovation can be based on technology or market based opportunities. This requires creative work processing, which can primarily be an internal process. The interaction between different organizations, elements and innovators is a common phenomenon during the external and internal networking of technology firms.

Estimating the amount of investments and resources required by the firm is a challenge in and of itself. This development process requires combinations of specific management and knowhow. The theoretical discussion and modeling of venture capital finance offer several options. Venture capital finance is described as a process that has different phases. In a model of venture capital investment decision making Fried and Hisrich (1994) distinguish between six phases: 1) origination, 2) venture capital firm-specific screen, 3) generic screen, 4) first-phase evaluation, 5) second-phase evaluation, 6) closing. The SPI-model deals with the logical progression of these six phases.

The discussion regarding the importance of strategy selection in SME companies is becoming increasingly important (Kraus 2009). The strategy selection process of SME companies is a challenging area that requires more research. New approaches by which to model strategic entrepreneurship (Kraus 2009) are important in order to increase our understanding of SME finance. The presented SPI model offers new tools for the analysis of strategy in the venture capital finance process of high technology firms.

Market scope

The market potential is an important criteria in the venture capital finance, because it is the base for growth. The market and strategy is among five main dimensions based on estimate of seven venture capital investors in Finland. (Koski 2000). The SPI-model in Figure 1 starts with the selection of the product-market scope. Venture capital investors focus on a market/product scope that is defined by their particular investment segment. These can be based on line of business and grouping which have their theoretical base in Industrial Organization (IO) economics (Lahti, 2009). The business area or sector is one option by which to define the market potential in a specific segment. Another option by which to classify the market potential is statistical market segmentation. The relevant measures of line of business of venture capital investors are classified by European Private Equity and Venture Capital Association EVCA (www.evca.com).

If the company's product market scope matches the investment scope of the venture capital investor then co-operation is possible. If the scope is beyond the investor's scope a company is excluded from the investment portfolio. The venture capital investors that are members of the EVCA present the scope of their investments and their general investment focus area on their web pages in order to assist companies in finding a potential VC investor.

The analysis of external factors like market position is also important for decision-making. If the venture capital investor is targeting a leading position in the market it selects companies with the highest growth potential for its investment portfolio. Potential investors in IPOs always focus on companies with the highest market growth potential. These investments support the company from the entry to the exit

phase. The market potential is also relevant during the company's possible industry exit as this forms the foundation upon which acquisitions are based.

The successful selection of a market portfolio is the main argument for VC investors to issue new funds for institutional investors. Institutional investors seek new objects and they select them based on portfolio theory. It is important to diversify an investment portfolio (Knill, 2009) and thus, optimizing the diversity of the VC portfolio's investments is also relevant (Cumming, 2006).

In Finland, the VC companies approach to investment is still mainly local and not enough global. Strategically VC companies that are members in EVCA focus geographically on specific countries. There are some global players that are present in all markets that can utilize the different profiles of economic cycles on different continents.

Product scope

Venture capital investors deal with product and market scope in parallel. The product scope defines which segments of the market the company is targeting. The product scope also defines the earnings model of firm. The earnings model is then more precisely developed into the business operation. The product scope has a strategic dimension in terms of the timing of targeted market launch. In high technology this is particularly important. The market demand is as relevant as production costs in terms of its effect on the product's price level.

Venture capital investors seek new innovations that will generate a new profitable business (Lumpkin and Shrader, 1998). These new innovations can consist of new products, new services, new production or service processes, new materials etc. The relevant factor is IPR and the protection of new innovations. If a company has no patents or protection for its innovations it is probable that it will be excluded from the VC's investment portfolio. The importance of IPR is important and growing.

The selection process of the product-market scope is also based on internal factors of the particular venture capital investor. VC investors have limited human resources and specialized knowhow, which in turn impacts the selection of alternatives in the product-market scope. Venture capital investors can limit their product-market scope by focusing only specific sectors or industries, for example ICT companies.

In determining the product-market scope it is possible and important to combine investment objects, or companies, into strategic groups. This can create synergies for the VC both in terms of product-market scope and resources.

The business plan of a firm is the key document that estimates the market potential and product scope (Kraus, 2007). The scope of the VC investor and that of VC finance seeking firm must match. The VC's preliminary scope selection is done by evaluating the executive summary of the business plan.

Resource pool

The venture capital investor possesses financial resources that can enable companies to reach their business targets. Along with the financial resources that VC investors make available to companies they also bring the networks of relationships to the companies in their portfolio and also increase the credibility of the company (Virtanen, 1996; Maula, 2001).

The resource pool covers the necessary financial, fixed, human and other assets that are required for the realization of the business strategy (Furrer et al., 2008). Thus,

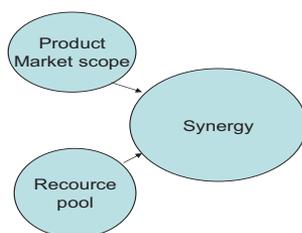
venture capital investors define the maximum limit of their investment in each firm. The amount per investment in Finland varies between €100 000 and 10 000 000. The progress of a firm is usually through the development phases and milestones that are defined in shareholders' agreements or in the business plan. The aim of combining resource pools and the product-market scope is to create synergies that support the business strategy.

The share of risk finance in a company is a factor that determines the position of a venture capital investor as a shareholder after the investment phase. Typically, the venture capital investor holds a minority of shares. In addition to the capital the VC's knowhow and management experience are important resources that a venture capital investor brings to a company. A company's management systems and corporate governance also become more developed after a VC investment (Audretsch et al., 2009). The management of IPR rights is increasingly important knowhow, which can be supplied by venture capital investors. Also the board of directors often gains credibility when an investor has its professional staff or representatives as members of the board (Audretsch, 2006; Brunninge, 2007; Fried et al., 1998).

Synergy

The selection of the product / market scope and the definition of the resource pool aim at creating synergies.

Figure 2. Synergy



The product-market scope is primarily the result of the entrepreneur's selection process. This is then matched by the scope of the VC investor. The VC investor is the primary source of resources. Both the role of investor and entrepreneur should be in balance with each other. However, financing is often the most important factor

necessary for any potential synergies as without financial resources a company is not even able to enter the selected market.

The venture capital investors also offer companies important knowhow. This may be a scarce resource in a specific business segment that requires high levels of technological knowhow. (Parhakangas and Landström, 2006). In Finland, the human resources in venture capital management organizations are small with staffs of only 10 to 30 persons (FVCA.fi). Also, external specialists may be used to form scientific advisory boards that can support the management with specific technology knowhow. The synergy effect is reached through combination of company knowhow and venture capital financial and other resources. It is evident that the risk capital which investors bring to the company is a relevant factor for synergy. Without risk capital the development work defined within the product-market scope cannot be realized.

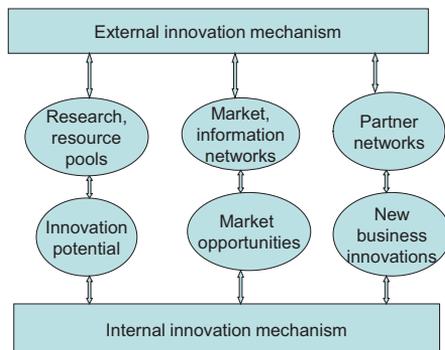
External Innovation mechanism

The external and internal innovation mechanisms form the dynamic elements of the development process and are a source of information and knowledge and new innovations (Carayannopoulos and Auster, 2003). The most important parts of the external innovation mechanism are different technology and knowledge based clusters (Eisner et al 2010). These clusters in turn attract important information and human resources around specific technologies.

The public sector, the EU and numerous states seek new innovations especially in high technology sectors. They allocate substantial amounts of financial and human resources in order to develop specific clusters and innovation and research and development programs. Some good examples of research clusters are CERN, EU-programs, ITER, Silicon Valley, TEKES programs etc. New technology demands co-operation between multiple actors and the combination of both financial and knowledge resources into clusters that then are able to supply the required resources. It seems evident that when linking knowledge to clusters, SMEs can also participate in the research programs and become sources of new innovations.

Technically the use of external innovation mechanisms has become easier because of the internet. High technology firms can utilize external innovation mechanisms over the internet by linking the firm specific clusters or co-operating members of these clusters. These networks increasingly form the forum for co-operation between high technology firms. (Elfring, 2003). External innovation mechanisms can also offer resources that can be utilized over the internet. External innovation mechanisms are global and offer huge possibilities for high technology companies. Forming social networks between high technology companies can enable information flows and knowledge transfers.

Figure 3. External and Internal Innovation Mechanisms



The external innovation mechanism is a macro element, which collects research resources, forms market information networks and partner networks. The internal mechanism is a micro element that filters potential innovations from the external mechanism and turns it into new business innovations.

The interaction between the external and the internal innovation mechanism is important. The external innovation mechanism forms an information window to market opportunities and risks. The internal innovation mechanism, on the other hand, focuses on constructing the core competences of a firm and diminishes the company's weaknesses.

Social media creates new opportunities as well as brings about new challenges in terms of connecting both the external and the internal innovation processes. The more the innovation process is linked to new social media the more the likely that the innovation is realized through a global network. The participants of innovation process may represent different areas of specialization and may have their residence in Asia, America or in Europe. Due to the geographic spread of the innovation activities the process is ongoing, 24 hours a day.

Internal innovation mechanisms

Internal innovation mechanisms form the dynamic system by which a high technology company conducts and defines its business operations. Internal innovation mechanisms include all the relevant factors that have an impact on the development of new innovations within a firm. Internal innovation mechanisms are linked to external innovation mechanisms. The strategy of high technology companies is to consider existing and potential changes in the technological environment. The internal and external innovation mechanisms are the frames of reference that are used by high technology firm to categorize information.

Business process

The business process includes all the relevant elements that form the core of the business in a high technology company. The present study includes the following parts of the business processes:

- innovation process

- marketing processes
- customer management processes (CRM)
- management of resources process

Innovation process

The innovation process is especially relevant when developing a new product or service. A high technology company's aim is to find and produce solutions that support its core competence. The innovation process is key to selecting strategic products or services that can generate the competitive advantage of a company. The innovation process consists of three key factors: 1) Innovation, 2) Entrepreneurship, and 3) Technology transfer (Stuart and Abetti, 1990). The innovation process is research and development intensive phase, which is anchored both within the external and internal innovation mechanisms. As a company's research and development can be based on open source or closed process the role of internal and external networks has increasing importance in R&D processes. Clusters based on co-operation and specific knowhow are part of the external innovation mechanism and are relevant to the innovation process.

The Marketing Process

The marketing process deals with the interaction between the company, market and customers. Marketing includes the traditional methods and elements of marketing such as targeted market segments, advertising, distribution channels, pricing and brand building.

Strategic marketing is very important for a company when it creates new technology or new products or services that are not yet available in the market. The construction of the brand is a relevant component of the long-range strategic marketing plan. The brand creation strategy aims to develop the image of a company or a product or service in the market. It is also important to create an investor relations strategy, which focuses on attracting potential shareholders. The ultimate aim of strategic marketing is to create an image of a firm as excellent investment object. VC investors consider the stage at which they exit and therefore it is relevant to integrate a well functioning system of corporate governance and investor relations as a part of the brand building process.

Strategic marketing aims at improving the competitive advantage of the company in the market (Barney 1991, Porter 1985, Furrer et al. 2008) Strategic marketing requires resources that the VC investor brings to the company. An analysis of competitors and their strategies is also a relevant part of the strategic marketing process. The allocation of resources for the strategic marketing plan are also defined in the marketing plan, which covers the central marketing parameters and the use of financial and other resources of marketing operations.

Customer management processes

The understanding of customers is a relevant part of strategic marketing both in consumer based and B-to-B businesses. Customer relationship management (CRM) is one useful tool for this purpose (Grönroos 1990). The customer management process is also linked to the innovation process.

Management and resource processes

Human resources are important for a high technology firm in creating competitive advantage. High technology based industries are knowledge intensive and thus managing the core competence is crucial. Naturally, a company's management and leadership have an impact on the motivation of the staff. Human resources are usually scarce and, thus, it is vital to use resources effectively. The role played by the entrepreneur and the company founders is a particularly important factor. Also, the management team plays a key role in conducting business operations. A company's business operations are limited by financial resources. The management of financial resources is necessary to allocate resources in an optimal way. The board of directors plays a part in the management of the company, which can further increase the credibility of the firm among external financiers and stakeholders.

Competitive advantage

The creation of strategic synergy is the key to competitive advantage. Competitive advantage is based on the company's scope and resource pool that are implemented through the business processes including the core processes of high technology firms. Innovation, constructing the core competence, marketing, CRM and the management of resources are the key factors in creating solutions that lead to competitive advantage in high technology companies. A firm, which is seeking VC finance, must prove that it has chance to win market share.

The company's strategic decisions are made so that management can reach their targeted economic results. The renewal of competitive advantage is a continuing development that must be based on changes that occur in the external and internal mechanism.

Economic performance

The final phase in the Strategy-Performance Innovation model is economic performance. The economic performance of the firm, according to Lahti (1983), has four performance categories in the strategy-performance model: market power, profitability, economic flexibility and internal efficiency.

Market power describes market share of a company. The economic performance is the key element for increasing the shareholder value. The economic performance of a high technology firm depends on its capability to generate revenues in future (Zahra, 2008; Furrer, 2008). On the other hand, the company must prove that it can also achieve positive business results in the short term, as these are important for the valuation of the company.

The venture capital investor seeks to benefit from a significant increase in the shareholder value. The company's value is influenced by several factors including the market potential and the company's ability to generate profits. The economic targets set for the exit stage are usually defined in the shareholder agreement. This agreement may include one or two milestones when the investment process consists of two investment phases. The economic performance is the most relevant factor for a successful exit.

The Exit Stage

The exit stage is the final phase in the SPI-model. The venture capital investor collects here profits and can draw conclusions of the success of the investment. The successful exits are relevant for venture capital companies in seeking new capital.

If a high technology firm has substantial profit expectations it has a good chance of finding new investors as shareholders. The challenge of the post-exit stage for a high technology company is to create the credibility of the company as an excellent investment object in the eyes of potential investors. An exit may be realized in principle several ways, but main options are: 1) listing the company on a stock exchange, 2) industrial exit consisting of selling shares to another company and 3) the entrepreneur buying shares of the company. The most common exit during recent years has been the industrial exit. Taking the company public, or listing it on a stock exchange, has been difficult in the 21st century due to circumstances.

Strategy-Performance Innovation model (SPI-model), case study results

The Strategy-Performance Innovation model is a theoretical framework by which to analyze high technology firms. This study's aim is to test how well the SPI-model is able to meet the requirements of venture capital investors. The model is tested by using four case companies that were selected and analyzed in line with the methods outlined in the research plan (Appendix 1). The following cases were analyzed with the Strategy-Performance Innovation (SPI)-model. The paper presents a more detailed test of case company 1 and while a summary of the other cases is provided in the appendix.

Case 1: 3D- ICT Animation Company

The company is focusing on the three dimensional (3D) creation of visual fiction by using high technology ICT. The company produces visual static and moving pictures in a digital form in computer space with several applications. The traditional name of the product may be 3D animation film though this does not give a correct explanation of the product. The word animation describes the old hand drawn technology used to create moving pictures. However, the case company's 3D animation product is a visual creation of a wanted expression of the storyboard or fiction of the real visual world.

The market/product scope of the company

The market scope of the company is consists of three segments focusing on 3D digital processing: 1) the 3D entertainment industry (movies, games), 2) 3D advertising and, 3) 3D business communications. All of the three segments represent a growing market with excellent earnings possibilities. The company is currently producing a 3D-ICT film, which is targeting global markets and is expected to generate revenues of US\$ 70-100 millions.

The business scope of the company is 3D-ICT animation of visual creations based on the needs of the customer. The product scope is based on high technology and the knowledge intensive use of 3D software. Ensuring a high level of quality is an important factor in the company's product scope. The production uses computer technology that enables the best possible 3D visual end product.

Resources

The resources of the company consist of computer hardware, software and intangible resources. The core competence of the company is its knowhow of 3D technology and software. The company's human resources consist of a staff of 15 persons. The sum of the balance sheet is around € 2 million. The company is aiming at further external financial resources of around € 3-6 million.

Synergy

The combination of market scope and resources creates synergies for the company. The additional financial resources sought out by the company would make market entry and growth possible. The new financial resources are an important part of the synergy effect.

Business process

The business process consists of the:

- innovation process
- marketing processes
- customer management processes (CRM)
- management of resources processes

The core of the innovation process occurs both in the external and internal networks. The company utilizes leading international specialists in 3D technology to new 3D solutions. The marketing process is linked to the use of new tools and technologies such as social networks. Furthermore, customer management processes are built on partnership networks. The management of resources aims at a cost effective production process of 3D solutions.

Competitive advantage

The competitive advantage is based on use of top-level knowhow, applied skill sets and leading technologies in the creation of 3D visual solutions. The core of competitive advantage is based on the cost effectiveness in production process of 3D solutions. The ability to utilize international top specialists through online work processes is also an important part of the competitive advantage.

Economic performance

The aim of the company is to generate profitable business operations and to increase the value of the company and to make it an attractive target for investors.

External innovation mechanism

The company uses both the internal and external innovation mechanisms. The company's network consists of partners, working groups and individual specialists that have top-level skills in the creation of 3D visual solutions. The network has global reach and it is linked through a sophisticated computer system. The external innovation mechanism supplies the best qualitative 3D visual solutions. This is made possible by the presence of the most skilled resources and special options in the external network. Thus, the company utilizes the best 3D visual skills in the external innovation mechanism and combines this with the best 3D software solutions. The external innovation mechanism is an important way by which to use resources effectively.

The company is linked to the external innovation mechanism, which is supported by the publicly funded innovation system. The company participates in innovation programs organized by TEKES and builds global co-operation and production networks with external clusters that have knowhow and expertise in 3D digital technology. The external network is geographically located in the EU area, Eastern Europe, Russia and India.

Internal innovation mechanism

The company is developing its internal innovation mechanism by increasing its 3D digital ICT knowhow and knowledge base. The internal innovation mechanism has a direct interface with the external innovation mechanism. Both elements support the development of new 3D solutions. The company is also planning to use social media as market communication channel between its staff, external stakeholders and partners. The internal innovation mechanism supports the maintenance and protection of the company's IPR.

Venture capital finance process

The company builds 3D technology and business processes and it is currently seeking additional financial resources from venture capital investors. The company has already received start funding from venture capital investor.

Discussion and Conclusions

The objective of this research was to test the strategy- performance innovation model in the venture capital context. First, the study asked if it is possible to use SPI model as a theoretical framework for analysis of a venture capital finance process and what advantages and disadvantages does it has? How does the SPI-model need to be adapted in order for it to be used in for venture capital investment purposes?

The empirical test of the Strategy-Performance Innovation model resulted in a new theoretical approach for the analysis of venture capital investments. The model takes into account the most relevant factors that are considered important for venture capital investments. The model considers those factors that numerous researchers and previous analyses have regarded as significant for venture capital investments. The essential criteria for venture capital investment are: 1) Management, 2) Market and Strategy, 3) Product and Technology, 4) Financial characteristics and 5) Exit and harvest potential (Koski, 2005). There are many studies that support the selection of these five criteria. The model offers a systematic approach to the strategy process of a firm. It makes it possible to locate the different strategy levels within the company.

The model forms a holistic and strategic approach to understanding and analyzing VC finance.

The model focuses on innovation mechanism, which is formed of internal and external innovation mechanism. These mechanisms are central elements of network, which is playing increasing role in creating new innovations. Numerous governments are developing different clusters, which are focusing on specific knowledge or technology. These new external innovation clusters are in future one source for innovations and new business models. The interplay with public and private sector is essential element of innovation mechanism.

The model is a strategic tool in understanding emerging new innovations. On the other hand the model is usable in estimating the relevance of new innovations. The raising new technologies e.g. from nanotechnology has already invented new materials, which are superior compared to exiting materials. These materials will proceed into production phase after economic business process is invented, which may take some 10-15 years.

The model is presenting a *long range strategic approach* to equity finance of new innovations. The venture capital finance is a short term solution for financing new companies. The critical point of the venture capital finance is the exit phase, where venture capital industry has lost credibility in bringing long range solutions for the shareholders.

On the other hand, the SPI-model does not separately deal with three important elements in venture capital finance: 1) the management team, 2) exit options, 3) and new innovations. In numerous VC studies a management team is recognized as one of the most important factors in new ventures and in venture capital investments (Vyakarnam and Handelberg, 2005; Harper, 2008). New innovations that are linked to development of the knowhow of the management team require closer analysis. Also, the exit options are important for the VC investors. Thus, the exit phase needs deeper analysis in order to further develop the model.

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Appendix 1 Case_Companies Description	Case company 1	Case company 2	Case company 3	Case company 4
Year of foundation	2003	2001	2004	1995
Type of company	limited company	limited company	limited company	limited company
Domicile	Helsinki	Helsinki	Helsinki	Vantaa
Employees	25	15	under 10	under 10
Scope of the company	3D digital technology movies, 3d advertisements, 3d software	Environment technology Food waste processing machine Process technology	Sensor technology Bonding process	Logistics Transport unit for specific industries with high technology equipments
Products	3D software optional no patent pending movie industry advertisement segment corporate imaging, communication post production services	Process patent	Bonding process	Patented product
IPR-Product protection	3D software optional no patent pending movie industry advertisement segment corporate imaging, communication post production services	Process patent	Bonding process	Patented product
Market segments	3D software optional no patent pending movie industry advertisement segment corporate imaging, communication post production services	Process patent	Bonding process	Patented product
Market potential	B2B segment Digital market sector is strongly growing business area Market global, highest potential in USA, EU, Asia Top 3D computer hardware Top 3D software in disposal Top 3D specialists in 3D technology Own distribution, partnerships with agencies	B2B market Large food shops S-group, Kesko, Tradeka and other chains Domestic market priority first	B2B market Research laboratories Global market potential	B2B market Global transport market Transport volume is growing and high security requirements offer market potential
Technology base	Top 3D computer hardware Top 3D software in disposal Top 3D specialists in 3D technology Own distribution, partnerships with agencies	Processing machine with steering software, utilise special bacterial processes	Bonding machines, specific material	Mechanical high technology engineering with high technology security equipments
Earningsmodel	Own distribution, partnerships with agencies	own distribution, selling processes and machinery	Specific bonding service to the customer	Sale of products or leasing products
Organisation	The base structure of the company is formed by three teams	Development project within the company, external expertise use also	Owner 8 scientists form the core of organisation	The core of organisation is formed by three engineers
Competition	Global market, some big players (Disney) Average size in EU relatively small	Environment technology companies, L&T	Global competition, large laboratories	Global, large transport companies

Appendix 2	Case company Alfa	Case company Beta	Case company Gamma	Case company Delta
Research sample, data, methods				
Year of foundation	2003	2001	2004	1995
Type of company	limited company	limited company	limited company	limited company
Domicile	Helsinki	Helsinki	Helsinki	Vantaa
Employees	25	15	under 10	under 10
Sample criterias:				
1. High technology	3D digital technology, 3D hardware, software	Environment technology, microbiological battery process	Sensor technology, nanotechnology, bonding technology	High technology equipment, software
2. SME-company	SME	SME	SME	SME
3. Potential VC-company	Applying VC capital	Applying VC capital	Applying VC capital	Applying VC capital
4. Data available	All required data	All required data	All required data	All required data
Data sources	Official company register (PRH) Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data 3D digital technol. Research data digital business process	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data environment techn. Legal regulation documents	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Board meetings Management interviews Discussions with management Negotiations with VC-companies Documents to TEKES Research data nanotechnology, sensor technology	Official company register Annual reports Balance sheets Company reports Business Plan Executive summary Presentations to VC-companies Management interviews Discussions with management Negotiations with VC-companies Research data logistics on specisif area

Data collection methods				
Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.	Analysing documents Interpretation of data Presenting data in research context case analysis, descriptive meth.
Data collection period	2003-2007	2002- 2007	2004-2006	2003-2006



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