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PhD Thesis

Doctoral School on Knowledge and Management

Department of Management, Politics and Philosophy

Copenhagen Business School

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Early Phases of Corporate Venturing – PhD Thesis • CHRISTIAN VINTERGAARD

Early Phases of Corporate Venturing



CHRISTIAN VINTERGAARD



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Early Phases of Corporate Venturing

Christian Vintergaard

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II. ABSTRACT

This work is submitted to the Doctoral School on Knowledge and Management at the Department of Management, Politics and Philosophy of the Copenhagen Business School in partial fulfilment of the requirements for the degree of PhD. The aim of this thesis is to present a combination of new theoretical perspectives and management guidelines that will enable better insight into the dynamics of the early phase of corporate venturing. This will include new perspectives on corporate venturing as it contributes to academia and practical tools for decision-making.

The thesis provides two overall contributions to current corporate venture literature. First, it sheds light on the critical but overlooked dimensions of the early phases of the venture process. This includes prerequisites for the development of new innovative venture opportunities (i.e. venture base), discovery of investment opportunities, and finally preparation for the evaluation of investment opportunities. The venture bases are those characteristics and prerequisites of a firm and its environment that can serve as resources for starting new ventures. Due to the innovative nature of the ventures, discovering the entrepreneurial opportunities becomes a key challenge involving a diversified set of actors. The early phases also include specific knowledge-creating actions to prepare for evaluation of the many different investment opportunities. Secondly, the thesis contributes new perspectives on how the early phase activities are interlinked in the value chain. Contrary to previous literature, which sees the venture process as linear and foreseeable, this work illustrates that a more dynamic approach is called for, one that pays particular attention to how knowledge and learning guides activities in the venture process from developing new innovative ideas to evaluation of their significance.

The contributions draw on theoretical perspectives from present corporate venture literature (e.g. Block and MacMillan, 1993; Burgelman, 1984, 1996; Chesbrough, 2000; Zahra, 1991) and complementary literature, representing a knowledge and network perspective (e.g. Gibbons et al. 1994; Kline and Rosenberg, 1986; Powell et al., 1996). These perspectives are especially powerful in delivering arguments about innovation process and evolutionary development. They also bring new insight into the type of learning process that corporate ventures are a part of when they develop and evaluate new venture opportunities.

Contrary to the traditional monographic PhD thesis, this one presents its results in five (5) independent but connected studies, published in international, peer-reviewed journals and book chapters. In addition to these studies, the thesis includes a theoretical introduction, a literature review, and a conclusion.

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Copenhagen, January (2006)

Christian Vintergaard

1. INTRODUCTION

In response to competitive pressures from new innovations, many major firms use corporate venturing as their preferred business development strategy (Sharma and Chrisman, 1999). The strategy provides them with a window to novel technologies (Winters and Murfin, 1988; Hardyman, DeNino and Salter, 1983). Corporate venturing is conventionally defined as a business operation that involves more uncertain income streams in the development of new projects than the firm's base business (e.g. Burgelman, 1983, 1984; Chesbrough, 2000, 2002; Zahra, 1991). These revenues derive from established firms' active investments and equity stakes in small and medium sized start-ups (Gompers and Lerner, 1998). There is also usually an entrepreneurial element in the corporate venturing strategy, which is especially apparent in processes for managing and capitalising on knowledge that resides on the boundary between the parent company and its environment (Keil, 2002; Sharma and Chrisman, 1999). This knowledge can in turn lead to high strategic and financial rewards for the corporate venture.

This thesis is concerned primarily with the innovation dynamics in the early phase of the corporate venture process. Beginning with a detailed understanding of the problem addressed and the methodology used for facilitating the answers, the thesis proceeds to elaborate a theoretical and empirical account of the corporate venture strategy - including how the strategy is usually analyzed in the literature. This provides evidence for developing a new scientific understanding and a foundation for the studies that it presents.

1.1 Problem assessment

The corporate venture process includes everything from developing novel business ideas, making investments, to harvesting the results of a venture as it develops (Bygrave and Timmons, 1992; Gorman and Sahlman, 1989; Timmons and Bygrave, 1986; Tyebjee and Bruno, 1984). The managing of innovation processes like these spans several linkages in the value chain, which means that there are numerous stages of the corporate venturing process that could conceivably qualify as an object of investigation (e.g. idea development, evaluation process, venture development, exit strategies etc). Some authors even claim that the entire corporate venture process needs to be analysed in order to bring down the failure rate of investments (Block, 1982; Burgelman, 1983). This thesis will focus on the early phases where corporate venture develop new venture ideas, discover them and prepare for their selection. Complementary literature indicates that the process through which innovations and new venture firms develop is linear and

progressive, and that the corporate venture process should be analysed accordingly (Timmons and Bygrave, 1986; Tyebjee and Bruno, 1984). The linear innovation models begin with scientific discoveries, passing through industrial R&D, engineering, financing and manufacturing activities in order to end up with a product or service that is ready to meet markets.

A growing body of literature however argues that new dynamic innovation models are called for (e.g. Kline, 1985; Kline and Rosenberg, 1986; Stokes 1997). These models focus on feedback loops and learning rather than linear progression. Complementing previous corporate venture literature, I propose an alternative perspective on the corporate venture process: a perspective that is more dynamic and interactive. It is often argued that the analysis of dynamics and interactivity in the innovation process is best approached from perspectives of knowledge creation and learning (Zahra, Nielsen, Borgner, 1999), networking (Bygrave, 1987; Powell et al., 2002, 1996; Seufert et al., 1999) and entrepreneurship (Hornsby, Kuratko and Zahra, 2001). Such analyses explore and explain the management resources that can help the organization to shape new promising venture opportunities and evaluate their significance. Hence, this thesis strives to find answers to: from a knowledge, network and entrepreneurship perspectives how can corporate venture firms manage the early phases of the venture process?

The early phase of the corporate venture process, which is the focus of the studies collected here, includes three interconnected activities: the development of innovative ventures, the discovery of venture opportunities and the preparation of a basis for the evaluation of these opportunities. What is particular about the early phases of the corporate venture process (besides its early location in the valuechain of innovation) is among others the locus risk and change, the role of individuals, information and competences, and value creation. Development of innovative ventures includes characteristics and prerequisites of a corporate venture firm and its environment that can serve as resources for starting new ventures. This thesis argues further that the discovery of new entrepreneurial investment opportunities is a key challenge for corporate venture firms involving a diversified set of actors in a network environment. In this environment, actors mix and match technologies and market capabilities in a continuing development process. This thesis also includes perspectives on how to improve a corporate venture's selection capacity. Selection capacity is needed in order to prepare an evaluation process of the investment opportunities. This capacity is a function of the committed participation of the corporate venture firm in knowledge-creating networks.

1.1.1 Thesis structure

The chapters in this thesis are structured according to the model below.

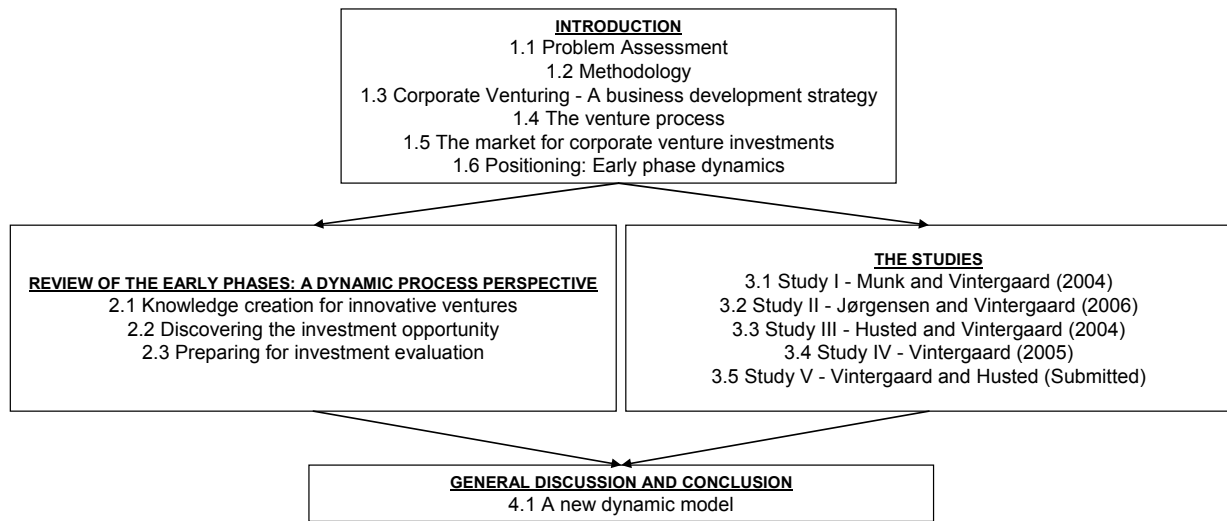


Figure 1. Thesis flow

In the introduction, the methodological reflections of how to analyse the problems are defined. This chapter is followed by an analysis of the corporate venture strategy and a further understanding of the focus and positioning of this thesis. The first chapter is followed by two core chapters: a literature review and copies of the five (5) studies included in this thesis (please see the list of complementary studies in the exhibits). The literature review in chapter 2 provides a broader and more elaborate understanding of the academic foundation of this research than were published in the studies themselves. The review does not intent to analyses the subject, but provided a foundation for the studies. Together, the review and the studies in chapter 3 facilitate a general discussion in chapter 4 that summarizes the work that has been done, draws some further conclusions on the early stage of the venture process and provides new dynamic dimensions to the corporate venture model. These overall contributions are presented in a comprehensive and conceptual framework.

1.2 Methodology

This section provides an overall analysis of the methodology used for answering the questions stated in this thesis. Special attention is given to perspectives from grounded theory (e.g., Glasser and Strauss, 1967) and to the research process, which builds on Mode 2 knowledge production processes (Gibbons et al., 1994). Both of these perspectives are valuable for analyzing a new and developing area as the one addressed in this thesis. This thesis consists of individual studies which also include separate methodology sections (see chapter 3 for their detailed methodologies).

1.2.1 Grounded theory

Innovation theory indicates that new dynamic models are called for (Kline and Rosenberg, 1986). There is however limited academic attention yet as to what the models would look like in the early phases of corporate venturing, as such an open-ended problem area. This process calls for an interpretative and explorative methodology which is receptive to various outcomes. A further complicating methodological matter is the multiple complexions of actors and sources which are involved in the innovative process (Powell et al., 1996). Seufert et al. (1999) argues that innovation processes needs competencies from many different stakeholders. These actors and sources need to be included in a collective and coherent methodological framework, which can absorb a large diversity in the substantive data. Furthermore, the academic field of corporate venturing spans several more established traditions such as entrepreneurship, innovation, risk-management, and corporate finance.

The open-endedness and diversification of actors and academic traditions in analyzing the dynamics in the early corporate venture phases, limited the methodological choice away from testing predefined hypotheses or measuring the scope of their significance. This is particularly due to the emergent nature of this study. A more appropriate methodology should, on the one hand, be open to emergent patterns from the widely dispersed sources, and on the other hand, systematically derive at specific sets of concepts, hypotheses and elements of theory. The final product should consist of new provisional theoretical perspectives and hypotheses about the dynamics in the early phases of the corporate venture process.

In the late sixties Glasser and Strauss developed a general methodology framework which could include the above conditions - the grounded theory approach (e.g., Glasser and Strauss, 1967; Glasser, 1978; Martin and Turner, 1986; Strauss and Corbin, 1998). It is often argued that the ethnographic approach of grounded theory is ideal, when the theory of the subject remains weakly developed (Glasser and Strauss, 1967). The methodology has later found its broad use in studies of e.g. cancer care (Mason and Strauss, 2004), recovery during transition to motherhood (Brudenell, 1997), development of strategic ideas (Schwarz and Nandhakumar, 2002) etc.

Common to the grounded theory approach is that it stresses theoretical discovery rather than theoretical testing. This guides the collection and analysis of generated audience accounts (DeLorme and Reid, 1999). Grounded theory studies are based on the perception that the processes and products of research are shaped from the data rather than from preconceived theoretical frameworks (Glasser, 1992). With only limited coverage in current corporate venturing literature on the dynamic activities in the early phases, data needed to be generated from the ground up (Clardy, 1997; Perlow, 1998). A methodology such as grounded theory

functions particularly well for including the open-endedness of the research problem and the diversification in the data.

1.2.2 Implementation of grounded theory

The methodology of this thesis is built on the below grounded theory model (Fernández, 2004; Glasser, 1998).

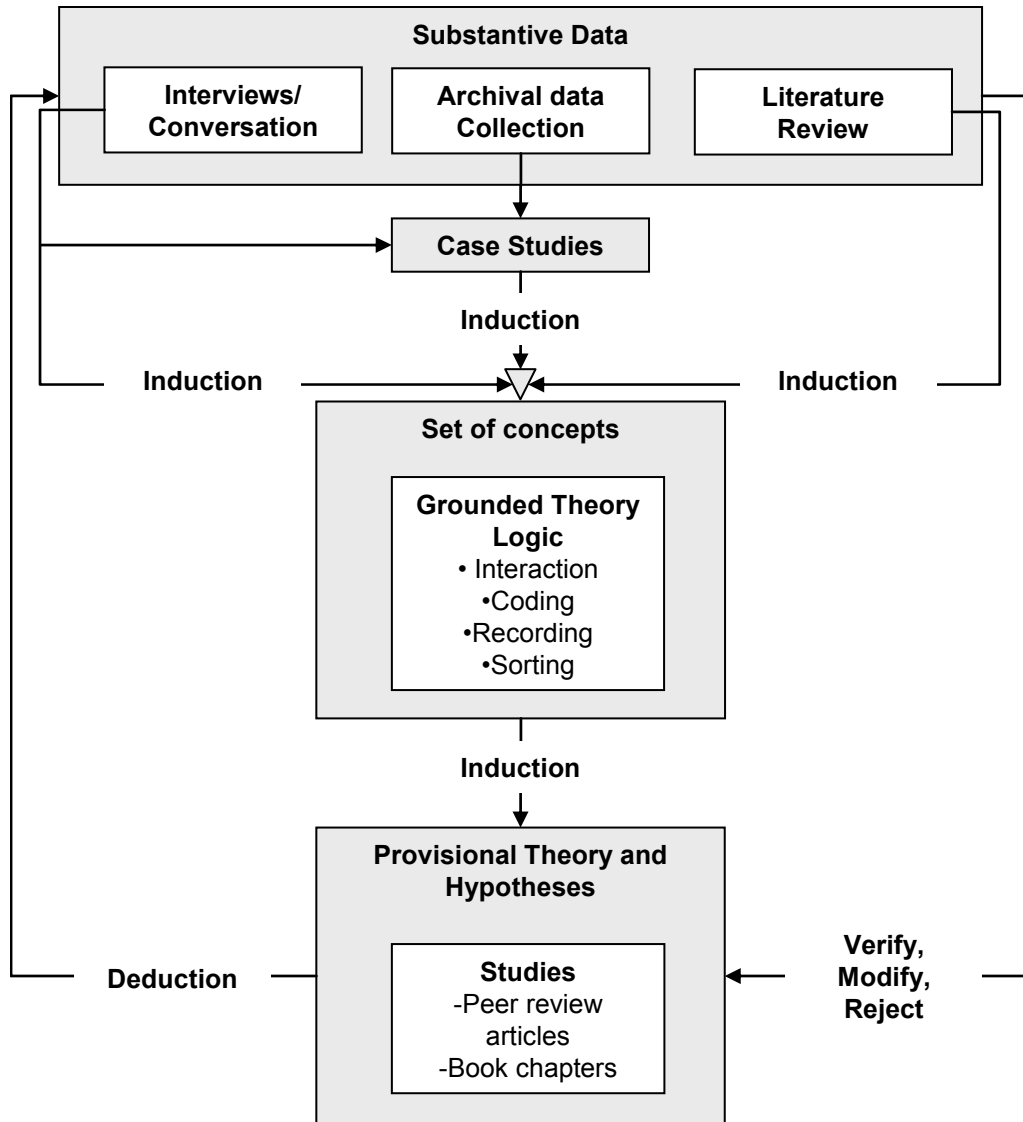


Figure 2. Grounded theory model

As illustrated in the above model, the grounded theory process in this thesis includes: 1) a phase of initial open-ended substantive data gathering, 2) a period for developing a set of concepts using the grounded theory logic and 3) a time for the revision of provisional theory and hypotheses as the data is interpreted. This process has been used for both the individual studies and for the overall arguments in the thesis. The grounded theory procedure is designed to generate conceptual frameworks directly from the emerging data (from e.g. interviews, archival

data and literature review). Instead of using the data to test a theoretical point it is used to build it.

For this procedure, the researcher uses sources that seek out maximum differences among the subjects being studied. Numerous in depth interviews with venture managers are used to extract raw accounts of the subjects' experiences. These experiences have been supplemented with archival data from yearly reports, public media etc. Extending the substantive data, a literature review (see chapter 2) provides the common conceptualization from earlier academic perceptions. This thesis use grounded theory in a less pure form than how it is sometimes applied. Such previous interpretations believe that no prior knowledge should be included in the analysis. The method used here is consistent with Glasser and Strauss' (1967) approach; however, it deploys comparative analysis to generate theory and therefore:

"... puts a high emphasis on theory as process; that is, theory as an ever-developing entity, not as a perfect product" (p. 32)

Consistent with this view, data collection, coding and analysis are overlapping operations that:

"...should blur and intertwine continually, from the beginning of an investigation to its end" (p. 43)

Through a grounded theory process that involved mainly qualitative interviews, consideration of newness led to the exploration of alternative conceptions and construction of corporate venturing and especially the early phases of the process.

Data collection and analysis was carried out simultaneously throughout the process as prescribed by grounded theory (Glasser, 1992; Strauss and Corbin, 1990). The substantive data accounts were written, analyzed and coded – and later condensed into the individual studies of this thesis and empirical case studies. The process of analysis included taking interview notes, transcribing, coding while asking questions and making constant comparisons between instances in the data across different players in the market and between methods (Glasser 1978). When working inductively from substantive accounts, certain sets of concepts begins to form. Following a carefully controlled process of analyzing the emerging categories and comparisons between the case accounts, the categories are defined using logic from grounded theory. This process draws on returning patterns found in similar cases and tested through contrasts with cases in other categories (Clardy, 1997).

The iterative comparison process between different interview statements and diverging academic reasoning developed into new provisional theory and hypotheses. Consistent with the conditions

in the grounded theory, writing this thesis developed through virtuous induction and deduction circles (Fernández, 2004) where:

“...[d]eductions for theoretical sampling fosters better sources of data, therefore better grounded inductions” (Glasser, 1998: 43)

More precisely, the traditional linear process for corporate venture strategies was questioned and new perspectives were developed, which again lead to need for new data. Working with a grounded method approach, often fall short in delivering finished theories for testing. Therefore, this thesis also focuses on deriving at provisional theories and hypotheses as they are presented in the studies and the concluding chapter. An additional complicating matter of the grounded theory approach is the time limitation to derive and deliver robust results (like within the period of a PhD program).

Summing up, the illustration in the table below demonstrates a research process involving a broad review of the literature (both within and outside the concept of corporate venturing) and multiple qualitative data collections to develop a grounded theory (Strauss and Corbin, 1990). A better understanding of the research questions is presented tested and exemplified in qualitative studies and is given a theoretical foundation. The table illustrates the empirical and theoretical foundation for developing new provisional theory and hypotheses for each of the studies of this thesis.

Studies	Research question	Substantive data – interviews and archival data	Literature review	Provisional theory and hypotheses
Study I Munk and Vintergaard, (2004)	What is the unique role of venture capitalists in facilitating innovation?	25 in-depth semi-structured interviews conducted in fifteen (15) venture capital organizations. The organizations were selected according to their industry focus with the intention to cover as many different sectors as possible.	<ul style="list-style-type: none"> • National System of innovation • Venture capital management • Science and technology studies • Network literature 	Two-dimensional conceptual framework which locates and analyze the role of venture capitalists in the national innovation system.
Study II Jørgensen and Vintergaard (2006)	What are the relations between a company's network strategy and its corporate strategy?	Three (3) case studies from the Danish biotech industry exemplify and illustrate how a company's corporate strategy is directly correlated to how it manages its strategic network identity.	<ul style="list-style-type: none"> • Network literature • Strategic management 	A framework illustrating the relation between strategies and network structures.
Study III Husted and Vintergaard (2004)	How can corporate venture firms secure the development of innovative ideas by systematically working with the organization's venture base?	The article is mainly conceptual in nature but draws on twenty-two (22) semi-structured interviews conducted between 2000 and 2002 with managers of corporate venturing departments at six (6) multinational Danish firms in knowledge-intensive industries. The interviews are used to illustrate the main arguments of the paper.	<ul style="list-style-type: none"> • Corporate venturing • Science and technology studies • Network literature 	The results are presented in propositions for venture managers. The propositions provide a framework for development of more venture ideas.
Study IV Vintergaard (2005)	How do corporate ventures recognize and discover new investment opportunities?	This paper reports on the development path of several entrepreneurial opportunities of the Danish corporate venture capitalist, Danfoss A/S. The lead case has been followed over a five-year period providing the case with longitudinal characteristics. More than 100 hours of in-depth interviews with top-level venture management provide the basis for the analysis.	<ul style="list-style-type: none"> • Corporate venturing • Entrepreneurship • Network literature 	A conceptual (two-dimensional) framework which maps the development paths of entrepreneurial opportunities.
Study V Vintergaard and Husted (Submitted)	How can corporate venture firms prepare for evaluating science based ventures?	The present study was conducted as a focus group exercise with twenty-nine (29) senior venture capitalists. The group was meeting for a one-day discussion on evaluation issues, to which the participants had been invited or volunteered.	<ul style="list-style-type: none"> • Corporate venturing • Science and technology studies • Network literature 	Management guidelines and conceptual frameworks for evaluation of science based ventures.

Table 1. Theoretical and empirical overview for the thesis.

Grounded theory continues through various modifications and re-formulations as new data and concepts are integrated (Charmaz, 1983; Glasser, 1992; Strauss and Corbin, 1990). The inductive and deductive process from the grounded theory logic has coursed one study to be lead to the

next. As my understanding of one part of the early corporate venture phases started to take form, it simultaneously stimulated new ideas and raised new unsolved academic and managerial problems. As an example, the results in Study III (Husted and Vintergaard, 2004) about the *venture base* also lead to the arguments in Study V (Vintergaard and Husted, Submitted) about *venture evaluation*. It was acknowledged that the knowledge needed for developing new innovations was in many respects similar to that needed for evaluation of science based venture opportunities.

While the grounded theory approach functioned particularly well for deriving at provisional theories and hypotheses when faced with open-ended problems in widely dispersed data samples it also suffers from several shortcomings. It has been argued that different from many quantitative methods grounded theory does not intent to prove and measure the significance of relations. Hence, the methodological approach does not provide information on how general the findings are either. On the other hand grounded theory processes led to provisional theory and hypotheses which indicates connections and relations between categories.

The deductive processes results in a need for new or complementary substantive data for each of the studies. Such an approach is very resource demanding, and requires a receptive methodological approach. Working with a grounded theory approach necessitates that the researcher repeatedly is on a lookout for new empirical data and has the energy and resources to include them in the analysis. As an example, different from the other studies in this thesis, Study IV (Vintergaard, 2005) required an in-depth case study to discover how entrepreneurial opportunities develop over time. Other studies of this thesis required a broader empirical base to build an argument e.g. Study I (Munk and Vintergaard, 2004) interviewed more than twenty five (25) venture investors to illustrate their role in the innovation system.

While grounded theory requires a very receptive approach to data collection and analysis, it also calls for an outreaching researcher. In a similar vain it is argued that one of the largest challenges for developing robust theoretical and academic arguments depends on the researcher's capacity to engage in knowledge-creating networks. In order to capture the necessary breath in the data, such network needs to include many different environments. The use of networks is further necessitated to complement the grounded theory framework.

1.2.3 Working as a Mode 2 researcher

Working with a grounded theory approach cannot happen from within an academic "ivory tower". The researcher needs a framework that allows for an outgoing methodology where data is collected from many different sources. To accommodate for such research approaches, Nowotny et al. (2001) pointed to the relation between knowledge production and applied context

in their book, *Re-thinking science - Knowledge and the public in an age of uncertainty*. They argue that applying scientific knowledge in non-scientific contexts can be solved by an institutional shift of knowledge production into applied contexts. Up until now, scientific knowledge has been expected to produce “reliable knowledge”, which was to be communicated to society in a de-contextualized form. The work of Nowotny et al., (2001) however, indicated that successful transfer of knowledge is tied to the transfer of the context of knowledge production as well.

During his work, Gibbons et al. (1994) developed a new model for knowledge production in science, which they called *Mode 2* (as opposed to *Mode 1*). This model sees changes in the practice of the natural sciences, the social sciences and the humanities. In Mode 2, knowledge is carried out in a context of application: it is characterized by transdisciplinary and heterogeneity and is more plentiful and temporary:

”Mode 2 is more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context” (Gibbons et al., 1994: 3)

By contrast, Mode 1 is organized homogeneously and tends to preserve its messages. Mode 1 is most frequently identical with what is commonly meant by science. Differently, Mode 2 knowledge production process has the following three characteristics:

- The first is the crucial importance of context. “Context” does only not confirm that more consideration must be paid to the end-uses of scientific results, nor even in the sense that “context” helps to identify scientific problems and to select suitable methodologies. What is at stake here is rather the more underlying sense that, as a result of its *contextualization*, reliable knowledge is being progressively redefined – or superseded by – knowledge that is *socially robust*. (Nowotny et. al. 2001)
- The second characteristic is the creation of research communities. Not only have information technologies advanced time and place for communication to take place and enabled research collaboration to flourish on a global scale, but these new communities have become able to include socially distributed “researchers”.
- The third element is that conventional collegial accepted terms of discipline, research community and peer groups are being exchanged by the outline of an *agora* in which new knowledge is created as a result of the negotiation and of scientific, market, political and cultural perspectives.

In short, we are seeing a shift from Mode 1 science, which is bound to expertise, discipline and its own self-preferentiality, towards Mode 2 knowledge production which is to a greater extent based on social acceptance of many different sources (Nowotny et al., 2001; Gibbons et al. 1994).

This approach is consistent with the grounded theory approach and has been an important guideline for my research process. Emphasis is on collecting diverse data samples which can assist in creating a new understanding of the early stages of venture process. Like much late modern problem-solving, my knowledge production is characterized by inter-disciplinary collaboration in contexts of application resulting in a knowledge production hybrid (see Gibbons et al., 1994). Cooperative procedures involving other scientists, stakeholders and other users of knowledge were included to transform knowledge claims into trustworthy, *socially-robust* and applicable knowledge, suited to the realities of social and environmental change and in the transition to sustainable venture networks (Nowotny et al., 2001).

Following the guidance of Gibbons, Nowotny and their co-authors; I designed my research strategy with a similar research goal in mind: to create knowledge and research results that were socially robust. By following an open-ended (grounded), but still planned methodological approach, assisted my knowledge production. I kept to the directions of a Mode 2 researcher as such an approach together with grounded theory would assist the development of new provisional theory and hypothesis which are more widely accepted. I engaged in several activities to contextualize my knowledge and meet the criteria of a Mode 2 researcher. It is necessary to be included in both scientific and nonscientific communities to make this happen. As illustrations of the communities (i.e. agoras) for non-academic contextualization, please consider the following non-scientific contexts in which I collected data and tested my tentative theoretical constructs:

- I have been appointed chairman of the educational committee of the Danish Venture Capital and Private Equity Association. In this forum I have tested my ideas of how venture capitalists can engage with the scientific community to develop and test new innovative ideas.
- My opinions of the early phases of the venture process and entrepreneurship issues, in general, have been cited in more than forty (40) newspaper articles and other public media, from which mutual discussions with different actors in the public have sprung.
- I have been appointed chairman of the board and judge for the Danish Venture Cup and member of the board of EVU (Centre for Business Start-Up, Growth and Development). These partnerships has increased my knowledge of how science based ventures develop from

ideas to business concepts. The position has also resulted in a general extension of my network in the venture community.

- I hold memberships in committees hosted by organizations such as: Connect Denmark (e.g. tech-trans committee) and DVCA (analytical committee). These memberships and networks have given various new perspectives on what venture capitalists look for in science based ventures. The networks have also provided insight to the daily work processes of venture investors.
- I have given speeches at numerous non-academic conferences including a wide range of stakeholders such as e.g. daily newspapers, incubators, entrepreneurship interest groups etc. These connections have provided a broader basis for testing and developing my provisional ideas and theories.
- Several businesses have requested speeches about my tentative results. These occasions have provided a possibility of getting a first hand impression on the robustness of my finding as I engaged through discussions of the findings.

While non-scientific communities are fruitful for analyzing managerial implications and applicability, they often fall short in developing specific arguments into theoretical constructs. Working as a Mode 2 researcher also demands that I learn from interaction with my academic peers. I therefore also involve myself with several scientific communities that have added to my understanding of the field and provided a different setting for testing and developing my knowledge:

- Visiting Scholar at: Babson College - Arthur M. Blank Center for Entrepreneurship (USA, MA). As one of the leading universities in entrepreneurship Babson's research capacities were a great resource for discussion of my arguments.
- Reviewer for the: e.g. European Academy of Management (EURAM), Eastern Academy of Management, The Decision Sciences Institute's 2004 Annual Meeting, Academy of Management Conference. By reviewing my peer's work it also helped my own understanding of how to create sound scientific arguments. This skill later helped me in crafting my own peer review articles.
- Feedback from conference presentations at e.g. Academy of Management Conference (2004, 2005), RENT conference (2004, 2005), Triple Helix conference (2003, 2005), EAM-I Conference (2005).
- Acceptance of peer review work: See the individual studies of this thesis in chapter 3 and the list of complementary studies in the exhibits.

- In the management team of the following international research projects: DOMINO (Dynamic Organizational Management for Inter-firm Network Orchestrations), The SNS Economic Policy Group (SNS Konjunkturråd/ SNS Ekonomiråd), CEMS faculty group: ICE (Innovation, Creativity and Entrepreneurship). These engagements have introduced me to a broad range of international researchers, with multiple perspectives on my research.
- Co-organizer of numerous national and international conferences; including member of the Scientific Committee for the 5th Triple Helix Conference. These relations have provided a forum for intensive academic discussion and networking.
- Development of and teaching for the MSc's: 1) E67 Corporate Venturing and Venture Capital Management. 2) E31 Intrapreneurship and Innovation - A Practical Approach.
- Guest lecturer for several BSc, MSc and MBA courses about corporate venturing.

From my academic collaboration I gained awareness of how to construct theoretical arguments and present my work in a conceptual way. Interaction with my peers also lead to a better understanding of my contribution to the field and how I am positioned in relation to the work of other fellow academics. As a result several of my studies have already been accepted and published in peer-review publications.

As a Mode 2 researcher, it has not been the aim to discover the universal “truth” but to develop a provisional understanding of the early phases of a corporate venture strategy. While, this thesis, on one hand, provides work accepted by my academic peers (e.g. international journal publications) it also strives to add value to the business community. In combining the inputs from the above communities I have a better chance of providing work which meets the quality criteria of the scientific community but also has managerial relevance.

This thesis strives to develop a starting point for understanding the non-linear process in the early phases of corporate venturing. However further research in this area is highly called for and must also include perspectives beyond those presented in this thesis.

1.3 Corporate Venturing - A business development strategy

In the following section, the reader will be introduced to the concept of corporate venturing including some of the primary drivers behind its use as a business development strategy.

Increasing demand for continuous development of new innovative products and services, has caused many firms to use corporate venturing as their business development strategy (e.g. Block and MacMillan, 1993; Burgelman, 1983, 1984, 1986; Chesbrough, 2000, 2002; Zahra, 1991). The concept of corporate venturing was introduced as a business development strategy in the

1960s (Hannan, 1976). Since then, many firms have followed. The strategy is especially powerful when large firms have to react quickly to rapid technological development where the ability to explore and exploit new knowledge is the key (Grant, 2000). To be successful in capturing and appreciating the value of new knowledge calls for highly receptive organisations – a capacity the corporate venture strategy includes. Much of the knowledge needed for new innovations is difficult to discover and assess as its value will first be proven when it materialises as new products and services. The time-lag before this happens can be lengthy and even then the outcome is rarely certain. Combined with the dispersed nature of the knowledge needed this makes it difficult to explicate (Grant, 2000).

Managing such knowledge flows is often difficult for established firms due to cultural inertia, organisational resistance and risk averseness (Ansoff, 1965; Markides, 1998). It is often so, that the more established an organisation gets, the more its employees and management tend to develop a paradigm of the way work should be done. This resistance can build on the daily operations of the firm, which focus on incremental innovation and optimized processes. When an environment shifts in a discontinuous way, the response of highly inertial systems is often increased conformity, commitment to the status quo, and decreased vigilance in problem-solving (Burgelman et al., 1996; Tushman, 1997). Due to a more established perception of what knowledge is of value for future R&D development, it is often argued that cumbersome firms have problems innovating (Block and McMillan, 1993). The same resistance can potentially also blind them from the knowledge which could make them appreciate and evaluate new products and services (Burgelman, 1996). Likewise, the path dependency of the established corporation means that existing capabilities and resources can become liabilities rather than capabilities, especially when a firm faces new markets or disruptive technologies (Chesbrough, 2002; Cohen and Levinthal, 1990).

Differently, while new venture firms lack a variety of resources they can in principle more easily adapt to environmental changes and can therefore better manage dispersed knowledge (Mønsted, 2003). It is argued that small firms, which operate near the core of their own strategic development, are better at exploring and exploiting new knowledge (Block and MacMillan, 1993). Because new ventures do not have cumbersome bureaucracies or large product-markets to protect, they often react faster than large incumbents (Burgelman, 1983; Henderson and Clark, 1990; Schumpeter, 1934; Tushman and Anderson, 1986). This speed and flexibility course new venture firms to suffer neither from cumbersome structures, which hamper creativity, nor from narrow perspectives on acceptable research outcomes. These points neutralize some of the competitive advantage that existing companies used to have over start-ups that directly challenged their position – enough resources to simply overpower the small firm.

Flexibility and innovativeness is most often the strength of new venture firms, but they do not have the advantage of large resource pools. To succeed in developing new firms, new and radical innovations are not always enough (Bygrave and Zacharakis, 2004); capital, marketing, management and other resources are also needed for firm development. Corporate venturing is a strategy that encompasses the best of both worlds: the flexibility and innovativeness of small firms and the resource pools of large organisations. The way to accompany these differences is for corporate ventures to invest either in new venture firms from outside the corporation or in units formerly part of the corporation. Dougherty (1995) argues that corporate venturing is a good strategy for new ventures and the corporation to exchange resources and competencies. Thereby, access to knowledge and innovation is acquired by larger firms who can supply the resources of a large firm. This relationship builds on knowledge and resource exchange, but also specific structures which facilitate the process.

The structure in a corporate venture is commonly established between conglomerate corporations and small venture start-ups. It is usually found in closely related industries, and with complementary technologies (Maula and Murray, 2000). The large company may be able to facilitate elements such as management or marketing skills and financial assets, which the small company would not otherwise have access to. The small company may be involved in research and development within a specialized field in which the large company has an interest, but in which it is not ready to participate in directly.

1.3.1 Managing knowledge in corporate venturing

Large firms can use many different strategies for managing new knowledge for novel innovations; however, corporate venturing differs from traditional business strategies by facilitating growth through acquisition (Albrinck et. al., 2000; McGrath and MacMillan, 2000). Specific to this process is that it includes most links in the value chain, from developing knowledge for innovations to harvesting the results of profitable start-ups.

Some literature argues that in search for new venture opportunities, corporate venturing can be valuable in exploring new and unrelated areas of business, experimenting with new capabilities and exploring new markets (Chesbrough, 2002). Adventures into new industries can also provide valuable foresight about market opportunities and act as a window to new technologies and developments. Such foresight can be used to decide on acquisition targets and new areas for development (Powell et al., 1996.). The ventures are often used to scout for potential ideas and projects from the widest possible range of sources (Schuyt et al., 2000). Thus, the new venture opportunities can be used to test new products and markets, which the parent business is considering, thereby providing an early forecast about opportunities that arise along with their

possible difficulties. Another purpose is to develop back-up technologies that differ from a firm's current technological trajectory (Chesbrough, 2002; Ginsberg, 2001).

Corporate venture departments are set up within the framework of an established company, i.e., corporations buy up or take shares in start-ups or initiate an internal development process where projects can be situated. This separation from the parent company provides the autonomy needed to successfully develop ideas that are at the periphery and that are radically different from the dominant logics of the organization. In these structures new knowledge is given the independence and support to blossom into a new innovative venture because it is not limited by or dependent on a history. Internalizing (by means of acquisition) the venture into the existing corporation makes a dedicated part of the organization, which ensures a good balance between autonomy and control. These dedicated structures also provide the necessary flexibility for the ventures to grow (Block and MacMillan, 1993). The research of Siegel, Siegel and MacMillan (1988) also discovered that autonomy (link to the parent organisation) should not only be created between the venture and the corporate venture entity, but also between the parent company and its venture entity. In their study, this type of organizational structure provides a substantial organizational independence in the development of innovations.

1.3.2 Venturing is a risky business

The corporate venture investments are typically more risky and subject to less strict management of internal costs than typical research and development activities (Block and MacMillan, 1993). Different from other development activities, science based ventures carries more risk due to: the novelty of the underlying knowledge and technology is difficult to assess, the development path of venture opportunities are difficult to predict, and it has a longer process of development.

The knowledge needed for evaluating new venture opportunities is often lacking. Since the new ventures are based on novel products and services, venture managers only have a vague reference point for their evaluation. They do not know the market potential or whether the product meets expectations. Corporate venture capitalists typically try to spread their risk on different ventures. A major task of corporate venture capitalists is therefore to ensure a high intensity pipeline of new ventures from which they can make their investment decision. The pipeline describes the flow of new venture firms in different stages of maturity. This pipeline is (as it will show in the later section) often analysed from a process perspective. From this pipeline it is expected that only a very few highly rewarding investments will make up for the many losses.

In the early stages, measures tend to focus on reaching certain milestones. Therefore, funding is often provided based on these well-defined achievements, sometimes through outside investors to provide the new venture objective with external validation. Later in this thesis a more

thorough review will be made of the different management mechanisms for evaluating new ventures.

As a further risk adding factor, new venture opportunities can develop in many different directions (Roberts, 1988). The underlying knowledge often derives from scientific results and their uses are often multiple. Hence venture opportunities often change market focus, customer segments and suppliers many times in the process. Adding to the uncertain development path, the development process is also often longer than for traditional business development (Albrinck et. al., 2000).

1.3.3 Strategic and financial results

Venture capital investors can be organised in many different ways (banks, pension funds, business angels, fund of funds etc.), but they typically all seek high financial gains (Michalski, 2003). Competition is played out as to whom can pick out the few promising venture opportunities and develop them into highly rewarding business. The aim in corporate venturing is different, as the returns from the venture activity are both financial and strategic. The strategic advantages of the relationship are more diverse but equally important (Albrinck et al., 2000; Block and MacMillan, 1993; Schuyt et al., 2000). According to Chesbrough (2002) strategic return in the context of corporate venturing is characterized by having an aim of “*increasing the sales and profits of the corporation’s own business*” - which may or may not be associated with a financial return from the venture itself. The broad scope of this description sheds light on how corporate venturing may supply a wide range of different strategic benefits for the parent corporation. Reviewing the literature on corporate venturing reveals some of these strategic returns:

1. Rethink the corporate strategy: Corporate organizations who decide to engage in corporate venturing are often responding to an urgent pressure from the surrounding market. A market driven by new and innovative start-ups makes venture investments a valuable strategy. This strategy often helps to reconfigure the existing tactics of the corporate organization. Cohen and Levinthal (1990) argue that R&D has two “faces”, where, apart from generating innovations, it also helps to absorb knowledge generated by others (Gambardella, 1995). In many situations the established corporation, with its existing portfolio of capabilities, will be in a better position to enter new areas, relying on their existing knowledge as a platform for adopting new technology and knowledge. As part of this process, corporate management is forced to determine which strategies to follow.
2. Balance exploration and exploitation: While corporate venturing is a way to search for new innovative activities in the market, it can also provide significant value to the current product

portfolio. A corporate venture program also helps to solve the problem of running the existing business while dedicating significant resources to the development of a new business area. This strategic return concerns the ventures' ability to stimulate demand for the parent corporation's products and services through developing complimentary products. Intel, for example, has exercised this type of venturing activity with their investments in advanced software companies. The initiation of this kind of venture should be seen as providing indirect strategic returns whereas there is not necessarily any direct flow of return from the venture to the corporate parent (Chesbrough, 2002; Schuyt et al., 2000).

3. Promote innovative spirits: Over time the innovative spirit that the parent company was once founded on may diminish as organizational structures infiltrate the otherwise innovative entrepreneurial employees. The ambience of a venture department can help reignite this passion that could potentially be lost in the bureaucracy and organizational structure of the parent firm, thus creating an exciting atmosphere of new developments and encouraging diversity of thinking. Entrepreneurial talent is rewarded under a corporate venture structure, and it allows for new knowledge to be developed and appreciated. This also makes it easier to retain and attract highly talented people. This could, for example, be entrepreneurs with valuable knowledge and technologies who wish to commercialise their own idea, but need a solid business partner to make this happen. As an example, Lucent's acquisition of SDX Business Systems into Lucent's venture portfolio provided access to superior telecommunication technology (Schuyt, 2001).
4. Secure flexibility: A key advantage of corporate venturing is its natural ability to provide flexibility in terms of sensing and responding to new knowledge and entrepreneurial opportunities. Corporate venture programs are in a constant stage of alertness as to what potential area, university, and industry should be investigated for investment potentials. Conversely, traditionally established companies often fail to be flexible, as they typically have many other existing focuses, where providing resources into new fields tends to be a managerial hassle (Maletz and Nohria, 2001).

While a corporate venture strategy has many positive outcomes and can function particularly well for exploring and exploiting new knowledge, the literature has also pointed to its different demands, multiple objectives and often conflicting goals (Block, 1982). Finding one strategy that reconciles all of them is difficult. Early on it was argued by Hannan (1976) that only few corporate ventures knew how to make it work. Later (but still early in the history of corporate venturing) Block (1982) made a similar finding. Both Hannan and Block concluded that the problems could be solved if corporate venturing was thought of as a strategic sequence of events.

Later many other authors came to similar conclusions (e.g. Burgelman, 1983, 1984; Block and McMillan, 1993). This approach included analysing what kind of procedures firms need to follow when they pursue a corporate venture strategy. This literature tries to uncover how new ventures are assessed and developed into rent generating new ventures under a corporate venture strategy (Gorman and Sahlman, 1989). Such an analysis takes the value-chain of corporate venturing and breaks it down into its parts; it shows how they develop over time and how they are interrelated within a larger whole – a process comprising many activities. In the subsequent review of what the process looks like, I also want to raise the question of whether this approach should be modified.

1.4 The venture process

In the corporate venture literature, empirical complexity has been accommodated by describing the strategy as a sequential planned *process* with different critical phases and activities (e.g. Block and McMillan, 1993; Burgelman, 1983, 1984; Bygrave and Timmons, 1992; Gorman and Sahlman, 1989; Fried and Hisrich, 1994; Timmons and Bygrave, 1986; Tyebjee and Bruno, 1984). This venture capital process (value-chain) includes everything from raising money for an investment fund, over managing the investment process, to harvesting the results. A process which Bygrave and Timmons (1992) argue takes up to 10 years to complete.

In the following, a review of the literature of the process will be conducted. This will foster awareness of the corporate venture strategy, while at the same time illuminating how academics have tried to make sense of the process. In this section, the venture capital process is described and analyzed in light of current research as research gaps are identified. The chapter presents stages and phases of the venture capital process, but also questions the strict sequential presentation of corporate venture strategies.

As a reference point, Galbraith (1982) discovered that managers of new entrepreneurial firms think in a “stage-wise” process and venture capital managers therefore tend to do the same. In order to follow the rationale of new venture managers, venture capitalists need to strategize accordingly. One of the stage models for new entrepreneurial development, which tried to explain this process and establish consensus about the process, was described by Bhave (1994). He elaborated on the development process of new firms by building on previous literature and twenty-seven-business cases. He developed an 8 step process model for firm development with the following critical steps:

- 1) Opportunity recognition
- 2) Business concept
- 3) Business concept development

- 4) Production technology
- 5) Production technology development
- 6) Organization creation - resource need
- 7) Product
- 8) Product development.

Before Bhave (1994), many others have made similar descriptions of the entrepreneurial process, including many of the same stages and phases (e.g. Roberts, 1988). Ruhnka and Young (1987) connected the relationship between the development paths of new entrepreneurial firms to the type of action that could be expected of venture capitalists according to these and modelled them as a planned process. A starting point for a progressive venture capital model was thereby created with a reference point to the perceived development path of new firm formation. Since then a major task of venture capitalists and corporate venture capitalists has been to develop the technology based start-ups into prosperous firms, following their sequential development seemed logical.

The planning approach to the formulation of corporate venture capital strategy is constructed as a sequential planned process with various critical phases, all with the aim of ensuring progression of the new venture firm (Burgelman, 1983, 1984; Bygrave and Timmons, 1992). Each of these phases is consequently broken down into sub-phases permitting a more elaborative description of the process and a more detailed analysis of its parts (Steiner, 1979) – very much as it was done for the development of new entrepreneurial ventures. Approaching strategy in this way has often been referred to as the *planning school* (e.g., Mintzberg et al., 1998). The planning school derives and formulates strategies based on a series of planned events or processes. In order to meet corporate objectives, this school of thought builds on the motto of “predict to prepare” (Ackoff, 1983). Consequently the overall process often gets broken down into sub strategies to ensure that the objectives are most successfully reached even if the complex relations persist (Steiner, 1979).

In trying to discern the advantages of a corporate venture strategy, the literature has often approached the phenomena from a process perspective. Block (1982) defines corporate venturing as:

“...a process, which finds, examines, initiates and tracks new businesses,
(and perhaps new products)” (p. 22)

This definition captures the flow from idea generation to business/ product launch. Block (1982) presented one of the earliest processes to understand the high failure rates of corporate venture investors. This is done by dividing the process up into four major phases:

- 1) Making the decision to engage in venturing
- 2) Generating and collecting venture ideas, establishing criteria for their selection, and then screening and selecting the ideas to be developed into ventures.
- 3) Organizing and starting individual ventures
- 4) Monitoring the newly established business and applying learning to design modification

This process has since served as a starting point for many other process descriptions. Following authors such as Block (1982), Burgelman (1983, 1984) developed one of the most well known and often cited process models. Burgelman didn't significantly alter the overall structure and phases of the process taken from Block's model, but he added to the understanding of the process by assigning different corporate functions to the individual phases. This interpretation allowed for a better understanding of the combined strategic, organizational and managerial implications in corporate venturing while at the same time keeping to the process perspective. While Burgelman's process model did provide the field with a stronger management orientation, it didn't include as many phases of the process as, e.g., Block's model already had (1982). Needless to say, however, process models are not necessarily assessed according to the number of sub-strategies they provide but, rather, according to their analytical component. In the corporate venture literature, Burgelman's model has been a reference point for much research on the process. As a reference point, however, he also postulated that while chronological models are useful for narrative purposes they do not capture the fact that critical, strategic activities can take place in the organisation simultaneously as well as sequentially (Burgelman, 1983). In this connection, he and others also referred to strategies as being emergent. Particularly the later innovation model of Burgelman et al. (1996: 5) reflects the dynamic interpretation of how technological innovations develop.

Both Block (1982) and Burgelman (1984) interpreted corporate venturing primarily from an internal perspective, where strategic returns and corporate entrepreneurship issues were of the essence. This perspective paid special attention to management of entrepreneurial ideas from within the organisation. The later work on corporate venturing also added an external dimension which called for a more financial perspective (Keil, 2000; Maula, 2001). The financial perspective is traditionally used for analysing the last part of the phases where venture capitalists harvest the results of their investment. This part of the process includes how to exit the venture when it has matured.

In contrast to the process literature on corporate venturing, traditional venture capital literature tends to focus more on the later phases of the venturing process. As traditional venture capitalists have a stronger financial orientation, the focus of the literature is on when and how venture capitalists can harvest from their investments. As an example of such processes, Tyebjee and Bruno (1984) identified five principal activities carried out by venture capitalists:

- 1) Deal origination
- 2) Deal screening
- 3) Deal evaluation
- 4) Deal structuring
- 5) Post-investment activities.

Tyebjee and Bruno (1984) argue that a central part of post-investment activities involves how investor's should cash in on their investments. However Tyebjee and Bruno (1984) focus to an even greater extent on the process including recruiting key executives, strategic planning, locating expansion, financing etc. A similar discovery was made in the work of Gorman and Sahlman (1989) who tries to answer the question: *What do venture capitalists do?* In their analysis, the daily management processes of nurturing the venture constitute the primary focus. In contrast to Tyebjee and Bruno (1984), Gorman and Sahlman (1989) pay only limited attention to the exit phase and pre-investment process. Gorman and Sahlman (1989) analyse the types of management tasks venture capitalists perform for new venture firms (help to raise additional funding, strategic analysis, management recruiting etc.).

While most of the process literature on venture capital management have concluded by describing and analysing different types of exit strategies (IPO, BMO etc.), Wright and Robbie (1998) have provided very elaborate descriptions of the venture process that include also *post-exit* activities and have thereby contributed to our understanding of the cyclical nature of the venture process. These activities include re-contracting issues with previous entrepreneurs who have already been part of an earlier investment. These are activities where investments are relocated to previously successful entrepreneurs that were formerly part of the venture portfolio. Such investment can be very rewarding as the entrepreneur has gained very important insight into what it entails to be an entrepreneur and how to work with venture capitalists. Such experience can be very expensive to gain, and many only gain this by failing with their venture. The learning experience, however, is very valuable for running a new venture.

The above description provides an examination of the different venture capital processes. With this in mind the reader should be aware, that while corporate investors need to conduct very

different tasks for developing a venture, their process does not necessarily follow chronologically one after another. This thesis later argues that this is especially true for the early phases of the venturing process.

Before this critique, the reader will be provided with an empirical glimpse into the corporate venture market. This will allow for an even better understanding of the corporate venture strategy and offers the reader a foundation for the later analysis and critical approach. The empirical section primarily builds on secondary data and quantitative studies of Pedersen and Vintergaard (2001), Jensen and Vintergaard (2002), EVCA (European Private Equity & Venture Capital Association), DVCA (Danish Venture Capital and Private Equity Association) and Vækstfonden (Danish government granted fund).

1.5 The market for corporate venture investments

In the following section, a short empirical overview will be provided of the market that corporate venture firms work in. The quantitative analysis will foster a better understanding of the market and the investment strategies of corporate venture investors.

Corporate investors operate on the same market as many other categories of venture capital investors. This is the investment market for unquoted early stage innovative ventures, with a high risk and reward profile. These ventures are often based on scientific results which may stem from university based research, corporate R&D etc. Besides corporate venture investors, additional players in the market are: bankers, pension fund holders, business angels, government granted fund holders and other investors. However, the risk profile, time horizon and strategic expectations of investors differ. As mentioned earlier, due to the novelty of the ventures the expected returns are very difficult to predict prospectively¹.

Structure

Some corporate ventures have earmarked funds at their disposal; others get permission from the members of the board from case to case. This differentiation tells something about the level of autonomy of the corporate venture department. Yet the organizational structure may also differ: In 2001 a survey undertaken by the European Private Equity & Venture Capital Association (EVCA) on the European corporate venture market, reported that 74% of corporate venture departments were operated from a subsidiary of the parent corporation and 24% from a department within the parent organization (EVCA, 2001). Two years later, 69 % came from a

¹ The following section will not include a separate methodological discussion, the reader however have to be aware that different measures and definitions have been used in the different data sources (venture capital reports). We may therefore also have to consider that not all corporate venture firms have been included in the analysis due to difficulties in discovering them.

subsidiary and thirty-one (31) from a department within the parent organization (EVCA, 2003). This is an indication that more corporate venture departments are gaining in autonomy from the rest of the organisation. It also indicates, however, that many corporate venture departments are still heavily governed by the corporate organisation.

Invested capital

In the diagram below, the funds invested by corporate investors are illustrated. Such data tell how much activity there is in the market. In times of general economic recession, venture capital investments also tend to be lower. This causes less demand for new venture firms, but also creates greater uncertainty about the ventures' level of success. During periods of stagnation, the price paid for the ventures will fall, bringing a situation where venture investors have to pay special attention to their evaluation process. The graph shows that the level of funds invested was at its peak in 2000 and was in 2003 at its lowest since 1996. The significant increase from 1996 to 1997 and decrease from 2000 to 2001 is both caused by the general economical development.

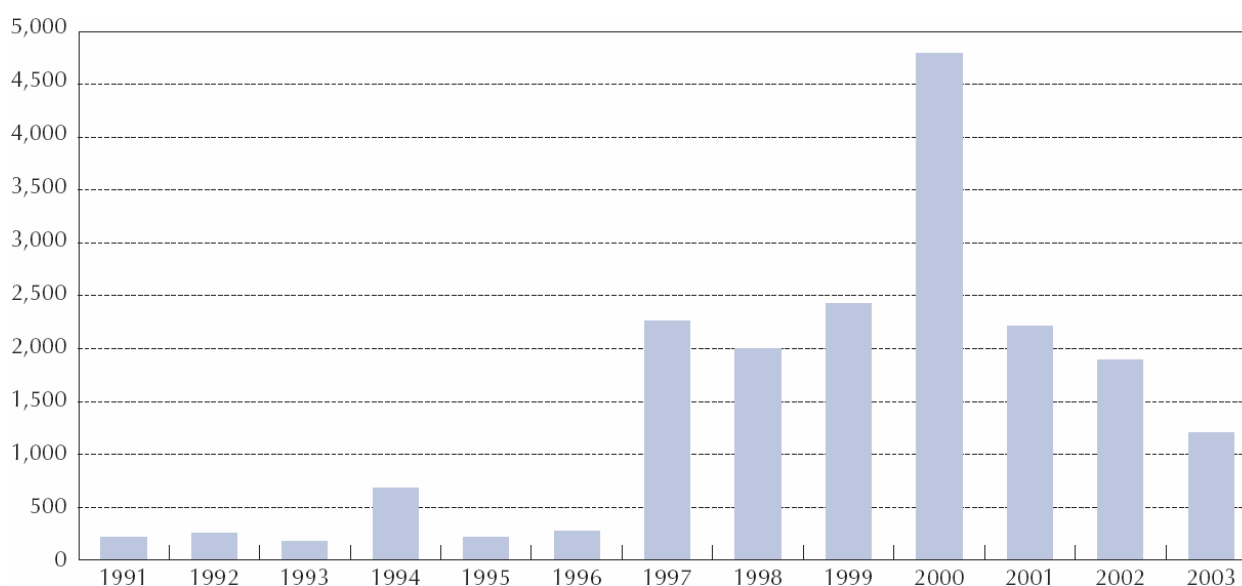


Diagram 1. Funds invested by corporations in the European private equity industry 1991-2003 (in € millions) (EVCA, 2004a)

The diagram of European investment activity tells us that the activities have significantly decreased. It however also shows that many corporate venture firms are still operating and making investments. The same kind of tendency has been apparent in the US market.

Market size

Before analysing corporate venture investors, understanding their relative significance in the market in comparison to other categories of investors is beneficial. In a study of the Danish venture capital market it was concluded that corporate venture investors constituted a significant proportion of the Danish market (Pedersen and Vintergaard, 2001). As corporate venturing is viewed in relation to the overall market for venture capital, it was found that they were an important player in the market. In 2000 it was discovered that corporate venture funds accounted for 10 % of the total capital under management for these types of investments in Denmark (Pedersen and Vintergaard, 2001). In 2004, the relative amount is 15%, which has decreased, however, from 22% in 2001 and 2002 (Vækstfonden, 2004). In comparison, this is still approximately 10% more than the average European market (EVCA, 2004a). The large proportion of corporate venture capital is an indication that corporate venture investors have substantial resources available for future investments. In the most recent Danish GEM report (GEM, 2004) it was concluded that while the overall entrepreneurial activity in Denmark was low, Danish corporate firms were particularly good at managing innovative processes. With many resources available, corporate venture firms can also make a significant impact in the future if these are put to efficient use.

Pipeline and exit

As mentioned earlier, corporate venture firms harvest their results when they sell/exit their investments. Part of what determines such results is the number of incoming investment proposals and the nature of the market for exits. The collective Danish corporate venturing funds received 3,259 investment proposals and invested in 119 - only 3.5% of the incoming proposals in 2000 (Pedersen and Vintergaard, 2001). In the years that followed the percentage was even lower.

There are many different exit strategies, but the most frequently used are the ones illustrated in the table below, which represents the total European market. One could say that an exit is basically a change of ownership structure of the venture. While corporate venture firms only invest in a very limited number of the proposed cases, they also prefer to exit their investments using very few exit options.

	2000				2001				2002				2003			
	Amount € Millions	%	No of div.	%	Amount € Millions	%	No of div.	%	Amount € Millions	%	No of div.	%	Amount € Millions	%	No of div.	%
Divestment by Trade Sale	75.7	40.2	37	22.3	81.9	33.5	39	26.0	75.1	24.8	31	21.1	55.3	42.0	18	24.0
Divestment by Public Offering (*)	35.1	18.6	53	31.9	58.1	23.8	47	31.3	49	16.2	26	17.7	16.5	12.5	10	13.3
Divestment by Write-Off	9.5	5.0	9	5.4	63.6	26.0	37	24.7	150.2	49.6	68	46.3	19.4	14.7	28	37.3
Repayment of Preference Shares/Loans	28.2	15.0	9	5.4	16.7	6.9	11	7.3	17.2	5.7	10	6.8	16.4	12.5	8	10.7
Sale to a private equity house	7.5	4.0	20	12.0	953	0.4	1	0.7	250	0.1	5	3.4	3.5	2.7	1	1.3
Sale to financial institution	17.0	9.0	14	8.4	0	0.0	0	0.0	3.7	1.2	1	0.7	0	0.0	0	0.0
Divestment by other means	15.2	8.1	24	14.5	23.1	9.5	15	10.0	7.3	2.4	6	4.1	20.7	15.7	10	13.3
Total	188.2	100.0	166	100.0	244.4	100.0	150	100.0	302.5	100.0	147	100.0	131.8	100.0	75	100.0

Diagram 2. Divestment at cost 2000-2003 (EVCA, 2004b)

As seen in the diagram the largest proportion of corporate ventures divestments (i.e. exits) are carried out through what is known as “Trade Sales”. A trade sale is when the venture is sold to another party (investor, corporate firm etc.). This category accounts for 42% of the total European divestments for corporate venture capitalists. For the overall venture market only 14,2% of the divestments were trade sales in 2003 (EVCA, 2004b). In contrast to the other types of divestments, one could argue that trade sale is a favourable way to exit if the venture is at a less mature stage (then e.g. IPO’s). Therefore one could also claim that corporate venture firms need to build up competencies which are particularly good for managing less mature ventures. Since exiting ventures through a trade sale happens in a less formalised market (versus an IPO), the corporate venture firm needs to develop skills that can help them find such buyers, negotiate prices etc. Such considerations imply that corporate ventures should include their exit strategy already in the evaluation phase of venture, to ensure that there eventually will be a buyer for the venture. Such considerations will determine the price set during the evaluation of the venture.

Funds

In a recent study of the Danish venture capital market it was indicated that the number of corporate venture funds (investors) only accounts for 8% of the Danish venture capital funds in 2003 as compared to 18% in 2001 (Vækstfonden, 2004). This confirms another characteristic of the corporate venture market: Corporate venture actors are the first to go into venture capital markets when the economy is growing and the first to get out of the market in times of recession. Note that *all* of the corporate venture companies in the Danish market today were founded after 1999 (Vækstfonden, 2004). This gives an indication of the fragile structure of a corporate

venture strategy, but also highlights the importance of creating an alert organisation which can easily react to market changes.

Investments

Statistics further show that Danish corporate venture funds have made 17% of the total number of investments in 2000 which account for 21% of total invested capital (Pedersen and Vintergaard, 2001). In 2003, the amount of capital invested by these funds was down to 16% of the total number of investments (Vækstfonden, 2004). While the amount invested is down, the independent funds raised by corporate investors has in relative terms grown from 45.1% to 60.1% from 2001 to 2003. This shows that corporate ventures should have funds available for new deals. In the overall European market we see that the market has recovered from 2002 to 2003 both in terms of investment and fundraising (EVCA, 2004a). As a consequence of the end of the economic downturn through 2005, it must be expected that many corporate venture firms will be focusing on making new investments and ensuring a prosperous pipeline of opportunities. This places specific emphasis on the area of investigation in this thesis: the early phases of the venturing process.

Investment stages

Due to the strong commercial and technological understanding of corporate investors (in contrast to other venture investors) they can develop a superior competency in the early phases of a venture's development. While traditional venture investors focus more on the development and exiting phases of the investments, corporate venture funds can find a niche in the early phases of the venturing process. In 1999, most of the Danish corporate investments were made in the Start-up stage (55%), but relatively many were also made in the seed and the expansion/growth stages (Pedersen and Vintergaard, 2001). Further, in a European comparison the diagram below illustrates that most corporate investments are placed in the early stages (both number of investments and amount invested) (EVCA, 2004a).

Stage distribution	2000				2001				2002				2003			
	Amount €		No of		Amount €		No of		Amount €		No of		Amount €		No of	
	Millions	%	inv.	%	Millions	%	inv.	%	Millions	%	inv.	%	Millions	%	inv.	%
Seed	40.5	3.9	60	9.5	5.6	1.0	20	4.2	9.6	2.8	11	3.2	17.9	3.8	36	11.4
Start-up	399.2	38.0	295	46.7	306.7	56.4	238	50.2	133.8	39.6	208	53.5	140.8	29.9	145	46.0
Expansion	539.1	52.0	247	39.1	208.1	38.3	210	44.3	192.0	57.2	147	40.6	266.0	56.5	118	37.5
Replacement Capital	60.1	5.7	19	3.1	20.3	3.7	3	0.6	0.2	0.1	3	0.6	8.5	1.8	8	2.5
Buyout	7.8	0.7	11	1.7	3.1	0.6	3	0.6	1.4	0.4	8	1.9	37.2	7.9	8	2.5
Total	1,046.7	100.0	632	100.0	543.8	100.0	474	100.0	337.0	100.0	377	100.0	470.4	100.0	315	100.0

Diagram 3. Stage and distribution by amount and number of deals for 2000-2003 (EVCA, 2004a)

In comparison to the rest of the European venture capitalists (in percentage of amount invested), corporate ventures place 0,6% in seed, 6,8% in start-up, 21,4% in expansion, 7,9% in replacement, and 63,6% in buyout (EVCA, 2004b). This makes corporate venture investors a proportional early investor in relation to their peers. This further accentuates the content of this thesis.

An explorative analysis of the Danish venture capital market made in 2002 was to explicate the growth improving factors in the Danish market (Jensen and Vintergaard, 2002). Thirty-three (33) potentially growth-improving factors were identified to prompt the development of the Danish venture capital market. The analysis concluded that in order to increase the general level of venture capital investments, greater focus needed to be placed on the development of new and innovative ideas. It was concluded, further, that the most important factors to prompt growth for the Danish venture capital market were the development of new valuable business proposals (coming from entrepreneurial culture and qualifications, quality of business plans and government funded research). This study supported the idea that an important analytical focus is to be placed on the early phases of the venturing process and thereby how to access new potential ventures from which knowledge could be exploited.

Corroborating evidence can be found in the fact that while the total amount of funds invested in new ventures has been on a down slope since 2000, corporate investors have fewer investments to spread their risk over. Hence the return has to be high on the few investments that are in fact made. This again emphasises the importance of the quality and uniqueness of new venture ideas and the ability to evaluate the ones which may most likely yield the highest returns. In the light of the very few selected business proposals which receive funding this point is further emphasized (Pedersen and Vintergaard, 2001).

Another empirical observation that highlights the importance of the early phases is the combined investment focus and the patience of the corporate funds. Corporate ventures build pipelines to invest in early stage projects. In these stages the venture is determined mostly by the underlying technology and not so much by the mercantile and market parameters (Block and McMillan, 1993). In this part of the process there is a high degree of uncertainty about the future of the venture and the use of the technology. This calls for additional attention to be paid to the underlying innovativeness of the venture and the capacity to evaluate the most promising business opportunities even at this stage. While corporate ventures can harvest from both strong commercial and technological competencies, it becomes crucial to pay special attention to leveraging these in the early stages of the venturing process.

Like the conceptual description of the corporate venture strategy, the empirical data also indicates that new and important analytical angles are called for in how to work with the early phases of the venturing process. Similar to the theoretical perspectives presented in the earlier chapter, the empirical analyses also focus on the highly needed attention to be paid to the beginning of the venture process.

The following section will further address how the current theoretical and empirical foundation in corporate venturing accentuates a complementary perspective. This perspective relies on an understanding about where the venture opportunities come from and how they develop.

1.6 Positioning: Early phase dynamics

The specific financial, strategic and organizational advantages of corporate venturing all depend on the novel innovations that the corporate ventures access. Empirical observations find that a large proportion of the new venture firms are built on science-based technologies which are developed from academic research (Block and McMillan, 1993; Stokes, 1997; Sung, Gibson and Kang, 2003). Science-based ventures are selected because of their novelty and their uniqueness. This often shows in the technological edge of academic discovery. Research especially from universities, has been the target of new investments (Chrisman, Timothy and Fraser, 1995, Etzkowitz, 2003). Sung, Gibson and Kang (2003) argue that in trying to define new venture firms, much is determined by how much R&D expenditure makes out of total sales and cost of these firms. Research has shown that university based research accounts for a significant amount of new ventures. For example, Powell et al. (2002), find that venture capitalists tend to locate themselves geographically in close proximity to research intensive areas. This happens especially in Boston and the Bay Area where the research intensity is high. Research even shows that R&D projects which are sponsored by venture capital are three times as likely to generate patents as corporate sponsored R&D (Kortum and Lerner, 2000). Etzkowitz (2005) also

describes that the venture capital market began around the academic community of MIT and the technologies developed there.

The altered structures for innovation have also changed the role of universities in society. They now provide the foundation for new ventures in addition to their traditional role as research and teaching institutions (Chrisman, Timothy and Fraser, 1995). New names for this kind of entrepreneurship have even been developed, such as academic entrepreneurship (Powers and McDougall, 2004) and faculty entrepreneurship (Chrisman, Hynes and Fraser, 1995). The challenge has also caused the development of new organisational structures at the universities including technological transfer offices to facilitate smooth interaction with investors (Powers and McDougall, 2004).

The new role of universities in society has lead universities to spin their research off as new firms, many of which are obstacles for venture investment (Charney and Libecap, 2000; Etzkowitz, 1998; Nicolaou and Birley, 2003). Spinning off science in terms of ventures has also added a managerial component to research, and changed the traditional interpretation of output. There is a general tendency here, that the role of the university now includes more commercial goals (Ernø-Kjølhede, Husted, Mønsted and Wenneberg, 2003). Natural science departments in particular have had to acquire capabilities to meet these new demands, but the social sciences are also expected to follow this trend. In the next chapter we will see how the role of science also has changed in relation to development of new innovations. More specifically attention is given to the changed perception of how innovations are developed. Understanding this change becomes key when analysing the early phases of the venturing process, as venture capitalists see themselves as the end-users of scientific research. This will ultimately question the linear pipeline perspective on corporate venture strategies.

1.6.1 The linear model

Analysing the development from science to science-based innovation (ventures) was traditionally seen as a way of exploring the connection between “knowledge search” and “knowledge use”. These categories are themselves often subdivided into a number of distinct stages, linked in a simple linear fashion (Bush, 1945). This connection, generally known as the “linear model”, provides a framework for categorising the processes of knowledge creation and application (e.g. Stokes, 1997). The linear model advanced during the scientific revolution and was initially argued for by authors such as Sir Francis Bacon², but it re-emerged in a broader and more recent debate when presented by Vannevar Bush in a report to President Roosevelt about

² This was done in his book “Advancement of Learning” published in 1605

science in peacetime: “Science, the Endless Frontier” (Bush, 1945). Since then many other researchers have constructed innovation and entrepreneurship models based on this overall interpretation of how innovations develop; among them Edward B. Roberts (1978, 1988) who argues that innovation is the multiplicity of invention and exploitation but who also indicates to be an expounder of the linear interpretation. While Roberts acknowledge that feedback loops are needed in the process, he and others still argue that the overall management of technological innovation thus includes the organization and direction of human and capital resources towards efficiency: (1) reacting to new knowledge; (2) generating technical ideas aimed at new and enhanced products, manufacturing process and services; (3) developing those ideas into working prototypes; and (4) transferring them into manufacturing, distribution and use (Roberts, 1988: 13). Like many others, Roberts believes if enough effort in terms of time, money and freedom is provided for R&D then the project will automatically blossom.

1.6.2 Corporate venturing and the linear approach

From the discussion of characteristics of the linear model it is obvious that there is a high degree of similarity with the process model in corporate venturing (and venture capital management). The process/pipe-line perspective is indirectly a reflection of the linear model; a strong separation from science and research to new firm formation and market needs. As already proposed, Block (1982) and Burgelman (1983, 1984) introduced some of the first official corporate venture models which include different stages in new firm formation. These models also introduced the pipeline perspective on strategy formation. While Burgelman described the emergent phenomena of innovation, the model still had a pipeline perspective. Each of the models presumes that entrepreneurial value is enriched in the transition from producers to users – from the entrepreneurial team to the corporate venture company. While it is known that scientific research results will always be an important input to the development of new venture firms, the involvement of corporate ventures in this process is less highly thought of.

Along similar lines to those proposed by Roberts (1988), it is believed that venture managers need a critical mass of ventures to feed into the corporate ventures pipe-line. The pipe-line perspective has been the dominant in the corporate venture literature until today, focusing on how to attract and screen as many projects as possible. It is an attempt to find “the needle in a haystack”. It has remained a fixed interpretation that new ventures logically flow from basic research to finished ventures that will consequently be up for evaluation and development. The problematic points of the linear model will be clarified in what follows. This critique will help to develop a new and supporting interpretation of the corporate venture strategy.

1.6.3 A scientific critique of the linear model

The linear innovation model has today received broad criticism in the research community. It is argued that effective innovation is more likely to depend upon constructive negotiations between people with different social and cognitive backgrounds: researchers, practitioners, lead users and other stakeholders in the innovation in question (e.g. Clark, 1995; Gibbons et. al, 1994). The dynamics of a complex system of innovations are non-linear (Christensen, 1992; Leydesdorff and Meyer, 2003). For example, the *interaction* between demand pull and technology push may become more important for the systemic development of innovations than supposed by the linear model (Kline and Rosenberg, 1986; Mowery and Rosenberg, 1979, 1989).

Critics of the linear model (Kline and Rosenberg, 1986; Mehta, 2002) have argued that it has the following critical components: 1) it focuses on a predictable process, 2) it makes a distinction between basic and applied research (and users and producers of science), 3) it supposes that scientific research comes only from the universities, and 4) it offers little focus on the market and commercial demands. Some authors have argued that in general the linear model does not really describe science but, rather, design, and the assumption that basic research drives innovation is flawed (Kline and Rosenberg, 1986).

In theory, the linear model consists of successfully interrelated activities. These begin with basic research and progress to more developmental research activities such as the development of new product and process ideas, the evaluation and testing of prototypes, commercial production and finally marketing and diffusion (Massey, Quintas and Wield, 1992; Sung, Gibson and Kang, 2003). Kline and Rosenberg (1986), argue that:

“...models that depict innovation as a smooth, well-behaved linear process badly mis-specify the nature and discretion of the causal factors at work” (p. 275)

Likewise, the linear model presumes that the innovation processes is a one-way flow of scientific or technological knowledge from academic research to industrial development and commercialization. These processes are divided into ‘basic research’, ‘applied research’, ‘development’ and ‘production’ and their analysis depends on an artificial distinction between basic and applied research (Stokes, 1997). Vannevar Bush was the first to explicate this distinction by arguing that basic research is performed without thought of practical ends, and that basic research enriches general knowledge and an understanding of nature and its laws (Stokes, 1997). Making this distinction assumes that universities and industries are the only players in the development of new innovations. Several other actors, however, play important roles in the innovation processes, including both government (Leydesdorff and Etzkowitz, 1996), investors

(Coehoorn, 1995), and end users (Bobrowski, 2000; Bunders, Broerse, and Zweekhorst, 1999; von Hippel, 1988).

In addition, the problems of the linear model have been identified as lacking client focus, making it difficult or impossible to judge the value of the work that is undertaken. By making this distinction, the role of demand in the marketplace is often only given scant attention (Myers and Marquis, 1969). The demand of the market is presumed to be high, making it a supply driven strategy. Because of the novelty of scientific research, the end product does not yet have a market or a defined customer base, which makes it problematic to make this assumption. This market may eventually develop depending on input from many different actors, trends, public debate and organizations. This argument does not remove the two forces of innovation: market forces (income, relative prices etc.) and forces that progress at the technological and scientific frontiers, but bring them closer (Kline and Rosenberg, 1986). To further complicate matters, the development horizon is also substantially longer for science based ventures than for other product developments, which makes the potential outcome even more open ended. As the outcome of this broad critique, a series of new and non-linear models has been developed, of which some are reviewed in the following section. These new models will provide valuable input for a new perspective on the early phases dynamics of the venturing process and they have all to some degree been included in the studies and conclusions of this thesis.

1.6.4 New innovation models

Based on the above critique of the linear model, the scientific research community has developed new and more interactive interpretations of how innovation is developed in society and within firms (Gibbons. et al., 1994; Kline, 1985; Kline and Rosenberg, 1986; Leydesdorff and Etzkowitz, 1996; Stokes 1997). These models and ways of thinking (e.g. Mode 2 knowledge production, Triple Helix, Chain-linked model, National Innovation System) re-thinks the processes and the actors involved into a more interactive interpretation. The models range from micro to macro-economic perspectives. Many of them also gave new meaning to how innovations are created and the knowledge production process which leads to it.

Other innovation models, such as Pasteur's Quadrant (Stokes, 1997), The stage Gate Model (Cooper, 1990, 1993) also makes valuable contributions to the innovation literature. Complementary arguments have also been made in evolutionary economics about Schumpeterian competition in an industry (Nelson and Winter, 1982). However, these models do not add significantly to this thesis as it develops its arguments from new venture firms with limited routines and decision rules.

In the following, a review is made of a sample of such non-linear models - models which have been a key source of inspiration. The content of these models will later be useful for deriving at new perspectives for the early phases of corporate venturing. Common to these models is that they all in different ways provide a counter reaction to the linear approach, by implying dynamics to the knowledge creating process of innovation.

Mode 2 knowledge production

One of these new interactive approaches was introduced by authors such as Gibbons. et. al (1994) and et al. Nowotny (2001). The approach was called Mode 2 science (as opposed to the linear Mode 1). This model has already been introduced in the methodology chapter of this thesis, as it dealt with the role of science in society. In the context of this thesis, the understanding of Mode 2 grasps a broader set of actors and their role in creating knowledge for innovations. This approach argues that no individual or single firm holds all relevant knowledge and expertise needed to facilitate input to significant innovations. Cooperation between a greater number of participants therefore increases the chances of new and innovative developments. The sample of participants has to be trans-organizational, relying on activities in networks between firms, universities, consultants, customers, suppliers, national laboratories, media etc. From a Mode 2 perspective it will have to become common knowledge that complex research results are no longer robust when developed in academic communities of homogeneous character. Nowotny et al. (2001) and Gibbons et al. (1994) argue that the growth of complexity arising from the abandonment of industrial age meta-narratives has developed a distinctive society in which the development of more open systems of knowledge production and the growth of social complexity has increased uncertainty in both knowledge production and society. As a general consequence of this shift, the boundaries between basic research, oriented basic research and applied research have become blurred.

Within the traditional linear model (Mode 1) the process of innovation corresponded to a vertically and serially structured supply chain of basic research, oriented basic research and applied research. By contrast, within the new model (Mode 2), and more especially in the field of innovation, research is based on recursive interaction processes and networks of heterogeneous actors that are provided with heterogeneous knowledge resources. This has developed a position where knowledge is carried out in a context of application. It has made knowledge creation more socially accountable and reflexive. The core processes have involved transforming knowledge claims into trustworthy, socially robust and usable knowledge. This tightly links to what Carlile and Reberich refers to as knowledge “transformation” of knowledge into novel application (Carlile and Reberich, 2003).

Those who were in favour of Mode 1 and Mode 2 claim that this approach provides a more suitable framework for explaining modern societies in which the roles of knowledge, research and education are characterised by increasing distribution, complexity and significance. It is argued by Hellström et al. (2003) that commentators on Mode 2 knowledge production have often focused on the problem of justification. Here it is argued, that it does not seem sufficient to recognize the need for a formalized and internally received phase of justification in academic knowledge creation (Weingart, 1997). Justification of knowledge is connected to disciplinary institutions such as departments and journals. Hence the argument often replicates itself, and it is only through these institutions that knowledge has its validity. Hellström et al. (2003) further argues that the problem with this critique is that it is based on a naive “truth as correspondence with nature” understanding of the product of academically produced knowledge, and, further, on an idealistic conception of the political economy of science. This correspondence and presentious understanding is problematic from a socialized perspective because it presupposes a conception of nature prior to and disconnected with the knowledge that is to be tested about it. To take one well-known example, it takes for granted that knowledge is tested through replication, Collins (1985) however has shown that it is not. This standpoint has been grounded in the tradition of academic society for some time, but the significance has not yet attained meaning in the practice of corporate venturing. This becomes problematic because one of the premises for Mode 2 knowledge production in the formation of new venture firms is that knowledge has been tested and challenged in the context of application. It is presumed that corporate venture firms have participated in the process.

Triple helix

Another approach to the analysis of the innovative process was introduced as the Triple Helix model. The Triple Helix model was developed in 1996 by Leydesdorff and Etzkowitz and describes the process as a transition from the linear model of scientific progress to an interactive structure, which appears as a "triple helix" of science, policy and industry (Leydesdorff and Etzkowitz, 1996, 1998; Etzkowitz and Leydesdorff 1997, 1998; Etzkowitz, 2002, 2005; Ernø-Kjølhede, 2001). Contrary to the Mode 2 model, the triple helix model deals with specific institutions. The model explains the changing relationship between government, university and industry and thereby challenges the assumption that the public and private spheres are separate. According to Etzkowitz and Leydesdorff (1997), the three institutional helixes public, private, and academic, which formerly operated at arm's length, are increasingly working together to create new knowledge and value from the innovation generated within each helix. Leydesdorff and Etzkowitz (1996) take this argument further and state that a triple helix of academia,

industry, and government relations is likely to be a key component of any national or multinational innovation strategy in the late 20th century. In arguing for the changed relationship between these three actors, Etzkowitz and Leydesdorff (1997) emphasize that the boundaries and roles of the helixes are undergoing significant changes and are being replaced by a web of ties. These network ties will later be analysed in more detail.

Etzkowitz and Leydesdorff (1997) further claim that the challenge of creating new knowledge flows has today become an academic challenge in cooperation with government and private firms, which has changed the structure and role of the university from the traditional linear model. Their primary focus is thereby directed towards the changing role of the university in relation to the other helixes (Martin and Etzkowitz, 2000:13). The university is increasingly becoming involved in tasks such as technology transfer, commercialization, and the creation of new ventures, tasks that originally have been held by private firms. This moves university research closer to application and the authors argue that commercialization is supported by, e.g., new hybrid organizations, ventures, incubators, etc. (Martin and Etzkowitz, 2000). This way of analysing knowledge production has challenged established notions of institutional roles and identities more so than the earlier critique of the linear innovation model.

Chain-linked model

An alternative innovation model developed by Kline (1985), and Kline and Rosenberg (1986) propose an interactive process approach to the development of innovations. Their model was also developed as a counter reaction to the linear model. Contrary to the linear model of research, Kline (1985), and Kline and Rosenberg (1986) launched the so-called “chain-linked model” of innovation processes. The model was first introduced by Kline (1985) and a year later further elaborated with Rosenberg. This model explains the relation in most countries between basic research and the innovative firm. It also explains the activities that an innovative firm undertakes. The model of Kline and Rosenberg (1986) carries the logical implication that, in commercially successful radical innovations, the research solutions in one arena are influenced by the ideas and opportunities in other areas. In this connection Kline and Rosenberg (1986) argue that:

“...it is a serious mistake to treat an innovation as if it were a well-defined, homogeneous thing that could be identified as entering the economy at a precise date – or becoming available at a precise point in time...” (p. 283)

In contrast to the linear sequential model, that is, the “scientific push” argument, according to which scientific discoveries naturally drift towards the market and are instinctively adopted.

Kline (1985), and Kline and Rosenberg (1986) emphasize the effects of “loops” and feedback on the flows and transfers of information within the firm. The chain-linked model takes into account the loops and feedback between the roles of different functions within the firm. These includes design, manufacturing, marketing, sales etc. Hage and Hollingsworth (2000), argue that:

“Obviously, a product that does not have desired attributes and a certain level of customer-preferred quality is unlikely to do well, although, products are frequently developed without much research concerning the needs of customers.” (p. 977)

While on this model, as on the linear model, innovation still emerges from a process, it is assumed that scientific research is not only a source of inventive ideas but is used to solve problems along the chain of innovation:

“In this model [the Chain-linked model], the “central chain of innovation” begins with design and moves toward development and production to sales. Each step is linked together via feedback loops and all are side-linked to research” (Mehta, 2002: 270)

Science profits directly and indirectly from the products of innovative activities such as the tools and instruments made available by technology (Kline and Rosenberg, 1986). Moreover, special emphasis is put on the important role of the actors who learn with the context of the innovation process and who cooperate and participate in the process.

National innovation system

There has also been a counteraction to the linear model from a macroeconomic perspective: “The innovation system” approach (Cooke, 1998; Lundvall, 1992; Niosi, 2000). A dominant part of the literature from the systems approach focuses on the national level and the central theoretical and empirical contributions within this approach have been published in recent decades by the work of Freeman (1988), Nelson (1988) and Lundvall (1988), setting forth a framework allowing for a systems approach in understanding the possibilities and opportunities in innovation (Lundvall, 1992, 2000). The analysis of the innovative capacity of nations has become widely diffused and is now an integral part of the analytical frameworks of such organizations as OECD and the European Commission. The national system of innovation has been defined by Lundvall (1992) as:

“...the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge... either

located within or rooted inside the borders of a nation state” (Lundvall, 1992: 2)

This concept has emerged in recent decades, especially in work that seeks to define the composition of innovation actors. Other strands within the systems approach are represented by, e.g., sectoral systems of innovation (Malerba, 2002), regional systems of innovation (Cooke, 1996, 2002) and technological systems of innovation (Carlsson et al., 2002).

The system rests on the ability of all actors to collaborate and interact. Interaction is assisted through nearness and collaborative initiatives; joint research activities and licensing agreements between public and private sector actors. In the system approach, private sector actors can access and exploit the pure science competencies generated in public organizations and institutions and the public sector can realize the transfer and application of its technology into new commercial products. The national system of innovation framework argues that such a system creates, stores, and transfers information, knowledge and skills to technologies and new innovative projects. Although academics and policy makers employ different definitions and perspectives to the system approach, the basic premise is interaction. This includes understanding the linkages between the actors involved in innovation.

After reviewing the innovation models, which counteracts and complements the linear approach in different ways, an obvious next step is to analyse the early phases of corporate venture firms in a different, non-linear light. This draws on these critical frameworks to different degrees, and creates new analytical approaches to the early phases of the corporate venture process by these means.

1.6.5 A critique of the linear approach in corporate venturing

As has been indicated by the various models of innovation, part of the scientific community has opened up for a more dynamic and interactive approach to analyse the creation of innovations. Corporate venture firms, however, are still cited (in academic work) for operating according to obsolete models. When analysing the process and pipeline approach in relation to the previous critique of the linear research model, one may easily question whether such methodology should also be changed in a corporate venture context. The corporate venture process perspective is very much a reflection of the user and producer distinction where specific actors have been assigned predefined tasks in the process (Block, 1982). While the process-models provide a good overview of the corporate venture checklist it may not function very well for analysing how to use, access and develop innovations.

A large proportion of the founding literature on corporate venturing uses the planning and development perspective from strategic management (e.g. Block, 1982, Block and MacMillan, 1993). The venture capital process descriptions also have their basis in this tradition, also known as the planning school, which focuses on how decisions are supposed to be made and carried out in a sequential order (Block and McMillan, 1993; Bygrave and Timmons, 1992; Gorman and Sahlman, 1989; Fried and Hisrich, 1994; Timmons and Bygrave, 1986; Tyebjee and Bruno, 1984). This school of thought describes how decisions are carried out, but not as often as how and by whom they are made.

The process literature was developed for analysing large corporations which operated in relatively certain environments characterised by incremental change in production processes and products. The corporate venture literature applies the same approach to analyse the emergence of new firm formation under conditions of high uncertainty with challenging demands from both entrepreneurs and investors. In this context the planning approach carries several disadvantages. It lacks flexibility, neglects the complication of implementation, presumes that the firm is managed from the top down and distinguishes between planners and managers, and is not well suited for taking into account discontinuities (Mintzberg, 1998). While these processes can work well for building firm strategies in stable environments, they are problematic when used for managing dynamic entrepreneurial developments.

Yet another important complication of the process approach in a corporate venture context is that it presumes that new venture firms develop according to predictable stages along the value chain (Ruhnka and Young, 1987). The “process” literature describes the development of new venture formation where the venture goes through a predictable lifecycle (Bhave, 1994; Birley, 1984). These lifecycles are described chronologically as a natural progression that constitutes the maturation of new venture firms. A contradicting academic view, however, argues that ventures do not always develop in a linear and relatively sequential process (Hansen and Bird, 1997; Reynolds and Miller, 1992; Ruhnka and Young, 1987). This argument goes hand in hand with the previous critique of the linear model. Authors with this view argue that task accomplishments in new ventures may happen chronologically, but are just as likely to occur in any random order (Kline and Rosenberg, 1986). Also, Wright and Robbie (1998) argue that a clear gap exists in the process literature, which neglects the dynamics of the venture development process. This tradition argues that while some steps in the process may be included in the venture’s development, others will not. One thing is clear, and that is the process seldom develops chronologically. These changes happen as discontinuities in the venture’s development.

There is a multitude of examples to illustrate the significant changes entrepreneurial ventures experience from the initial discovery of opportunities to the final business. Similar evidence of

changes exists when the entrepreneurial team finally captures the attention of future investors. When investors engage in investments it is common knowledge that deadline, milestones and new strategic directions all influences the new venture in new and unpredictable directions; these factors will direct the young ventures in new directions which are different from the natural predictable progression. This perception also opens for a new interpretation of the strategy for corporate venture firms, which is highly dependent on the development of new venture firms. When the development of the venture is more unpredictable, corporate ventures need to be involved in the early part of this process to provide direction and predict the outcomes. Corporate ventures can not predict a natural progression but must reach back in the value chain to acquire knowledge for future decision-making about the research intensive new ventures. This further accentuates both the early phase focus and a new dynamic approach to understand corporate venturing.

This thesis argues that literature on corporate venture firms, like the scientific research community on innovation, have to break with the linear model and open up to a more interactive involvement particularly in the early phases of the venture process. Corporate venture firms are part of the "innovation ecosystem" and must therefore also be analyzed as part of the innovation process. As emphasised in the previous chapters, there is conceptual, empirical and theoretical evidence that indicates that a complementary academic focus on the early phases of the venture development process could also be valuable for corporate ventures. The early phases focus less on the maturity and development of the ventures and to a greater extent on the type of involvement that is needed from corporate ventures when including the innovative process at the beginning of a venture's life.

The analysis builds on new models of innovation, and therefore introduces a new way of seeing and developing corporate venture strategies. While this view acknowledges that specific tasks are included in corporate venturing it interlinks them and connects them in ways that does not necessarily follow sequentially (Burgelman, 1996; Wright and Robbie, 1998). By contrast to many other previous corporate venture models this thesis develops its analyses in a non-linear light. Study V (Vintergaard and Husted, Submitted) however makes the claim linear dimensions also in some cases proves valuable to provide direction for decision-making, safe resources etc.

As a challenge to the linear pipe-line perspective on corporate venturing, this thesis studies the ability to create, discover and evaluate original investment opportunities using an interactive approach. The knowledge creation process needed to accomplish activities is of particular interest to this thesis and its studies. In the following chapter a literature review will be

conducted of the early phase. This review will address to early phases of the venture process from a knowledge and network perspective. The review will create a broader foundation for the studies in the subsequent section. Drawing on this review the studies develop their arguments in more detailed and narrow way.

2. REVIEW OF THE EARLY PHASES: A DYNAMIC PROCESS PERSPECTIVE.

Based on the previous chapter it is indicated that a complementary corporate venture perspective can benefit the current literature in the field. This thesis rests on established literature on corporate venturing, but also challenges the pipeline and linear process perspective presented in this tradition. This includes new ways actors are involved in the innovation and learning process. To ground this new perspective in the literature, the following chapter provides an overview and review of the topics and perspectives used in this thesis. The review departs from the earlier academic work on corporate venturing, but also covers research areas which are of particular relevance for establishing a new dimension. Such a perspective includes literature from knowledge creation in networks and entrepreneurship. The review does not intent to break new academic ground, but to provide the reader with an academic foundation which support the arguments presented in the Studies in the next section. The combination and use of the literature in relation to the early phases of corporate venturing is however new.

Different from previous research on corporate venture strategies this thesis brings together users and producers of knowledge and technology – an approach which is well covered in the knowledge and network litterateur. It develops a multi-actor framework where corporate venture firms co-operate in network formations. In this analysis, the traditional theoretical strategic management perspective on corporate venturing (e.g. Block, 1982; Block and MacMillan, 1993; MacMillan, Block and Narasimha (1986); Siegel, Siegel and MacMillan, 1988; Sweetig, 1981; Winters and Murfin, 1988) is supplemented with perspectives from entrepreneurship (e.g. Brazeal, 1993; Day, 1994; Hornsby, Kuratko and Zahra, 2001; O’Conner & Rice, 2001; Shane and Venkataraman, 2000; Zahra, 1991) and social studies of science and knowledge production in networks (Etzkowitz, 1998; Etzkowitz and Leydesdorff, 1997; Gibbons et. al., 1994; Powel et. al, 1996, 2002; Seufert, Von Krogh, Bach, 1999).

Previous strategic management perspectives on corporate venturing, analyse the choices, tradeoffs and activities of the venture managers striving for a strong competitive position. This strand of research builds on theories and methods of behavioural science, economics and other disciplines to understand the effects on firms. Here, allocation of resources, firm structure and new product development was the object for the investigation. This thesis complements these issues. It focuses on the corporate venture firm’s knowledge creation in interactive networks to develop the knowledge needed for developing and evaluating new innovative ventures. This puts emphasis on the structure and context in which knowledge is created and shaped, and more

specifically how this facilitates the dynamic management of the early phases of the venture process.

The knowledge for managing in particular the early phase is created in negotiation among a waist-high amount of actors; issues well argued for the interfaces of the network, managerial and organizational behaviour and entrepreneurship literature. Managerial and organizational behaviour focuses on how people use information and how they interact with one another to make decisions. Other aspects include negotiation processes, teamwork, and evaluation. The entrepreneurship literature supplements this tradition well, as it covers areas of idea generation, opportunity discovering, shaping and maturing a new venture.

The following three sub-sections will include a literature review which mirrors the development of venture ideas, discovery of business opportunities, and preparation for making an investment evaluation. This review will facilitate and position the studies included in this thesis and create the broader base for their arguments. The studies don't cover the field in a totalitarian matter, but contributes to current and future discussions on early phase dynamics in corporate venturing.

2.1 Knowledge creation for innovative ventures

The primary interest of corporate venture firms is to generate a combined strategic and financial return on their investments (McNally, 1997). Needless to say, but however very important, this demands that they have something to invest in! One could claim that the new innovative ventures are the “primary fuel” for the corporate venture capitalists “engines” (McNally, 1997). If the corporate venture firm doesn't have access to novel new ventures it is not able to create a sufficient level of profitability and will eventually terminate (Block and MacMillan, 1993). The development of new venture opportunities and particularly the knowledge production needed to facilitate these, will be examined in this section. This theme is of particular interest in relation to Study I (Munk and Vintergaard, 2004), Study II (Jørgensen and Vintergaard, 2006) and Study III (Husted and Vintergaard, 2004).

As indicated in the previous chapter, many venture ideas are developed from scientific research. One of the characteristics is the innovativeness or novelty of the investment opportunities (venture ideas) (Block and McMillan, 1993; McNally, 1997). The investment opportunities for corporate venturing have to be genuinely original in order to fit the risk and return profile that venture capitalists expect. The importance of having access to novel ideas was emphasised by Timmons (1999: 96) by saying:

“At the heart of the entrepreneurial process is the opportunity. The entrepreneurial process starts with the opportunity, not money, not networks, not the team, not the business plan”.

Timmons further emphasized that identifying a potential business opportunity is mostly a matter of being the right person, in the right place, at the right time. From the earlier discussions about the development of scientific results, the perspective has however changed from “the right person” to a network of persons. Since we know, that no single person holds all relevant knowledge or competence for developing novel ideas, the later analyses will focus on networks of people and their collective knowledge creation. Freemann (1976) broadens the network perspective by defining technological innovations as:

“...a process which includes the technical, design, manufacturing, management, and commercial activities involved in the marketing of a new or improved product...” (Chiesa, 2001: 3)

Roberts (1988) further argued that a prerequisite for creating technological innovations is inventions and market connection. Roberts (1988: 12) claimed that a technological innovation is defined as the product of an invention and exploitation. The invention is often seen as something that did not exist before, and exploitation is the conversion of the idea into new ventures or other useful projects (Ettlie, 2000; Roberts, 1988). Kline and Rosenberg (1986) linked this argument to uncertainty:

“...generally, the greater change introduced, the greater the uncertainty not only about technical performance but also about the market response and the ability of the organisation to absorb and utilize the requisite changes effectively” (p. 276)

When talking about innovations the dimensions are however very dispersed (e.g. Christensen, 1992). This includes such parameters as:

- Extent of change (radical—incremental)
- Modality of change (product—process)
- Complexity of change (component—architecture)
- Materiality of change (physical—intangible)
- Capabilities, change and consequences (enhance or destroys market/ technological capabilities)

- Relatedness of change (replaces a firm's existing product or extends it)
- Cycle of innovation (time between discontinuities)

Innovations are most often intended to create a substantial improvement or functionality of a particular product/ service and/or reduce the cost structure of a particular industry. Ettlie (2000) argues that technological innovations in particular can cause change in unanticipated and unintended ways. However, innovations can take on many other forms than new product offerings, some of these are: offering it in a new way, offer something which others find difficult to master, contribute a platform on which other variations can build etc. The novelty of an innovation is however often related to how *radical* it is. This refers to innovations which represents:

“...discontinuous events unattainable through incremental adjustments of the pre-existing state of affairs” (Lundgren, 1995: 17)

Therefore, a novel idea is an invention, which has the potential to create a radical innovation (Leifer et al., 2000). Burgelman et al. (1996) argues that this type of innovation establishes a new dominant design with a new set of core design concepts for the set of components that constitute the product. Such components are often a result of knowledge intensive research, which later leads to new investment opportunities. This will require new sets of knowledge.

It has been argued that only six to ten percent of new products are truly new to the world (Ettlie, 2000: 40). In general, unique venture ideas are rare, involve a long development time, and include a high level of uncertainty. Because venture ideas are rare and novel an uncertainty, their outcome is correspondently difficult to predict. Discovering new ideas and developing them into novel technological innovations involves a high level of uncertainty as a very high percentage of new technological innovations will fail (Garud et al., 1997; Pedersen and Vintergaard, 2001). This is particularly true in high tech industries (Mønsted, 2003).

Timmons (1991) finds that over twenty (20) percent of new ventures fail within one year and sixty-six (66) percent fail within six. In an explorative study of the courses of venture failure Zacharakis, Meyer and Decastro (1999) find that venture capitalists most often believe that environmental factors are cursing ventures to fail. Since these factors can not be controlled by the venture capitalist or the entrepreneur, it follows that the venture investors need a high velocity of investment proposals to choose from. In a continuum, here of Block and Macmillan (1993) stress the importance for corporate venture firms to develop more ideas than they can possibly exploit to have a large sample of available novel ideas to choose from due to the high failure rate. Focus is on the ability to make something out of the few successes, and less on making more ventures succeed. This argument fits well with the pipeline perspective presented

in earlier corporate venture literature, but also disconnects the producers of innovations from the rest of society. More specifically it removes the corporate venture firms away from facilitating the development of new innovative firms. These arguments are also presented in Study III (Husted and Vintergaard, 2004).

2.1.1 Contributions from the corporate venture literature

In the corporate venture literature, limited research is conducted on the development of new venture firms (Floyd and Wooldridge, 1999). While the corporate venturing literature has focused substantially on the reasons for establishing venture units and predicting their potential rents, only limited attention is paid to the development of a steady flow of high rewarding and innovative venture ideas.

As a key author in the field of corporate venturing, Burgelman (1983) analyses the idea stage from a strategic management perspective when discussing the conceptualization and pre-venture stages of the development process:

“...As the definition process takes shape, an idea for a new business opportunity evolves into a concrete new product, process or system around which a pre-venture team of people is formed. As a result of the successful technical and market development efforts of this pre-venture team, it grows into an embryonic business organization. These stages take place in the context of the corporate R&D department”
(p. 231)

This elaboration focuses on the team who enacts, but pays less attention to how this is carried out. Burgelman’s (1984) well cited development model depicts both sequential and simultaneous strategic activities. These activities happen on three different organizational levels. At the lowest level, the activities are performed by the group leader or the venture manager, the middle level is the new venture division management and the highest level is corporate management. Dimensions of this model are later brought to a different use in connection to strategic business exits (Burgelman, 1996).

Block and MacMillan (1993) (like Burgelman) argue mostly from an internal corporate venturing perspective, for the importance of building a *venture base* on the basis of current competencies. Here, the employees are responsible for developing new venture ideas. External corporate venturing on the other hand focuses on the ideas generated in the environment outside the borders of the parent firm (Keil, 2004; Sharma and Chrisman, 1999). In Study III the venture base is the origin of the future ventures. The notion of a venture base is derived from Hannan’s

(1976) early work on the venturing process. Block and Macmillan's (1993) analysis of how to influence the idea population explains under which conditions the internal and external environments are good sources for new ideas. Their starting point is that corporate venture firms should be receptive to ideas generated both inside and outside the organization. Like the work of Burgelman (1983), Block and Macmillan include an organisational perspective of which actors to include in the process. They argue that the venture bases are imbedded in what they call a venturesome climate – a climate developed by venture managers (Block and MacMillan, 1993: 37). From their analyses they argue that the senior management should:

- Insist that the entire division pursue new-business development.
- Don't assume that the firm must offer specific, extrinsic rewards for new-business activities.
- Demonstrate significant and visible personal commitment.
- Sustain the commitment over a longer period of time.
- Assign very good people to the new business.
- Develop an in-depth knowledge of customers and markets.
- Build organizational confidence.
- Empower the creators of the new business.
- Build momentum.

Based on organizational studies from authors such as Byron (1994), we also know that different types of so called "venture modes" i.e. organisational and legal structure also provides different ways of managing new firm formation. This research focus is on the type of personal and organizational structure and less on the innovative process as such. In the corporate venture literature, such organisational distinction often analyses where the ideas come i.e. internal and external corporate venturing.

Taking an internal corporate venture perspective; the venture bases is primarily built on current organisational knowledge production processes, areas of knowledge, skills, technology, market position, distribution channels, product gaps, or product improvements (Block, 1982). In internal corporate venturing, one should begin with the analysis of the firm, rather than its environment. As mentioned earlier, development should be based on the resources of the firm and not around external possibilities. It is argued that following this strategy can lead to competitive advantages and thereby superior profits as the firm is better than its competitors in utilizing its unique resources (Barney, 1991). Venture ideas, which are developed from internal sources, have some kind of relation to the base business of the corporation. The intrapreneurs from an internal venture have developed cognitive schemes, which make them more capable of developing highly related ventures for the corporation (Block and Macmillan, 1993). Thus, profits are often created

through entrepreneurial rents, stemming from firm-level efficiencies (Grant, 1991). Nevertheless, internal ventures are closely related to the core business areas of the corporation. In many cases, it could even be supporting activities to the current line of business (Block and MacMillan, 1993). These business ideas are developed on the basis of past development, and these types of venture ideas might therefore be less prone to lead to a diversification of major consequences (i.e. new products to new markets) (Block, 1982). Simultaneously, internal ideas may be limiting, but also a more safe choice as knowledge of the core business already exist (Block and MacMillan, 1993). Being bound by past dependencies further implies that firms can only see the possibilities that have been useful in the past and not so much, what can be useful in the future (Burgelman and Grove, 1996).

In bridging strategic management and entrepreneurship Hornsby, Kuratko and Zahra (2001) also identified the internal conditions that influence middle managers participation in corporate entrepreneurship. They found that rewards, top management support, available resources, supportive organizational structures, risk taking and tolerance for failure do in fact have a positive influence on corporate entrepreneurship. Slightly divergent from this view Day (1994) argues that the intrapreneur does not necessarily have to hold a particular position in the firm. Day (1994) argues that champions for the highly innovative ventures have their origins in all levels of the organization.

In other corporate venture programs, it is realized that the market (external corporate venturing) is somewhat better at identifying new developments, whereas traditional innovation programs often are given directions (Keil, 2004; Block and MacMillan, 1993). This thesis argues that developing the basis for new ventures happens best in a network environment, an environment that strives to combine internal and external knowledge. A network construct would eventually make the distinction between internal and external corporate venturing less profound as the two melt into one. This perspective strives to combine the innovative capacity of current employees and the network that surrounds the corporate venture firm. In the following a review will be made of the literature combining network and innovation. This will make valuable contributions to most of the studies included in this thesis.

2.1.2 The origin of networks

Several authors have argued that the creation of new innovations happens in a network structure (e.g. Powell et al., 2002, 1996; Seufert et al., 1999). One particularly important source of new venture ideas and entrepreneurial opportunities may be the entrepreneurs' and venture capitalists social networks (Hills, Lumpkin, and Singh, 1997). Some argue that social networks encompass all of the people an individual knows: family members, friends, business associates etc.

Johannisson (1990: 41) describes entrepreneurs' personal networks as the “*most significant resource of the firm*”. It may therefore be of significant insight to analyse new innovations from a network perspective. Such perspective is also highly supportive of the dynamic approach in this thesis. Before analysing how new and innovative ideas develop under these network structures, an initial understanding of the network phenomena is created. This develops from understanding the nature of *the firm* to understand the connection between firms.

Coase's considerations of the existence of *the firm* was the beginning of a discussion of different governance structures and also a starting point for analysing the origins of the organisation (Coase, 1937). This interpretation shaped as he tried to bridge arguments of pricing mechanisms with personal based coordination's – an interpretation which later gave birth to new interpretations of networks. Coase argues that some transactions are not carried out through market coordination and that firms emerge because of significant lower transaction cost through coordination by hierarchy (Coase, 1937). He argues that the:

“...task is to attempt to discover why a firm emerges at all in a specialised economy” (p. 390)

Based upon this dichotomy of the firm and the market, Williamson categorized the so called hybrid modes (e.g. inter-organizational networks) as an intermediate form of coordination between market and hierarchy. This interpretation was the first genuine conceptualisation of the nature of a network. Therefore network formation or structures are in most cases described as organisational orchestration located between market and hierarchy (Seufert, von Krogh and Bach, 1999).

A main characteristic of markets is free exchange of goods. Organizations demand goods and services that they do not produce themselves, hence exchange of these makes an economy develop. Hierarchical coordination is based on influence and control of coordinating the firm. The firm integrates goods and services, but it also processes orders in the market regulated by contractual agreements. Therefore a hierarchy is regulated by internal control systems and by authority. On the contrary, network formations or interfirm coordination is, by Jones, Hesterly and Borgatti (1997), characterized as organic or informal social systems, in contrast to bureaucratic structures within firms and formal contractual relationships between them (Gerlach, 1992; Nohria, 1992). A further nuance of such relationship and networks is according to Williamson's (1975) argumentation described:

“...as a spectrum of arrangements, from loose to tight, from arms-length bargaining to total integration, from spot transactions via standing

relations to the internalization of their tasks. (...) At one end of the spectrum is what we may call the open market. At the other we find the firm which is relatively self-sufficient in terms of vertical or functional integration.” (Thorelli, 1986: 37)

This interpretation later gave birth to Burts (1992) categorisations of network structures (more details will follow this section).

Within organizational theory; transaction cost economics is one of the most frequently mentioned approaches for analysing networks (e.g. Williamson, 1994). Williamson (1994) even argues that organisational theory is often at times, based on the arguments previously presented in transaction cost economics. Based on Coase's (1937) insights into the existence of firms, Williamson (1975) argues that transaction costs like opportunism, early-mover advantages and other strategic considerations lead companies to integrate activities that could normally be performed by others more efficiently. Put differently, firms would not integrate activities if they had no transaction costs when trading on the open market. Under this assumption, Jarillo (1988) points out that firms are able to lower transaction costs by co-operation and therefore will become less integrated and more efficient. The latter consists of focusing solely on distinctive competencies, reaping all benefits of economies-of-scale and by increasing flexibility to switch partners in case of dynamic changing conditions in the business environment. According to Williamson (1991), governance structures are typically characterized by at least five distinguishing attributes: incentive intensity, administrative control, autonomous adaptation, cooperative adaptation, and contract law. Incentive intensity describes the extent to which economic incentives vary according to performance. Administrative controls refer to the firm's ability to monitor and either reward or penalize behaviour that supports its objectives. Autonomous adaptation deals with the capacity of the individual actors in an operation to make changes to unforeseen contingencies or instabilities. Cooperative adaptation refers to the ability of network actors to respond to disturbances in a coordinated way. This happens either through administrative action or bargaining. Finally, contract law deals with different requirements on contracts of particular governance structures.

2.1.3 Network governance

Networks, however, do not always provide the best mechanism for coordination and governance. Therefore, Jones, Hesterly and Borgatti (1997) developed a framework for analysing network governance in the likely event that a mechanism would accrue and be of a competitive advantage. This kind of analyses links very well to the choice of market and hierarchy. Present literature on network governance takes point of departure in two distinct clusters: first, the

patterns of interaction in exchange and relationships and second, the line of research concerns the flows of resources between independent units (Jones, Hasterly and Borgatti, 1997). In order to combine the two into a coherent structure, an integrated framework of transaction costs, and social network theory was established. In combination, Jones, Hasterly and Borgatti found that the condition mechanisms for efficient exchange factors are dependent on: 1) demand uncertainty, 2) asset specificity, 3) frequency and 4) task complexity. Depending on a combination of these factors we can find indications of the advantage of a network structure. These categories also provide a useful set of parameters for showing the use of network formations when analysing the early phases of the venturing process and in this context the knowledge creation for new venture development.

Environmental uncertainty refers to an inability to predict future events (Milliken, 1987). Sources of uncertainty can come from suppliers, customers, competitors, regulatory agencies, unions, or financial markets etc. (Miles and Snow, 1978). High-level uncertainty often prompts firms to vertically integrate (Helfat and Teece, 1987). This can be due to obsolescence, (Balakrishnan and Wernerfelt, 1986; Mariotti and Cainarca, 1986), and specialisation etc. As it has already been pointed out, corporate venturing strategies are by definition influenced by a high level of uncertainty. The corporate venture firms are searching for new business ideas, which are more risky than the base business of the corporate setting. Demand uncertainty is also generated by rapid changes in knowledge, or technology which results in short product lifecycles and makes the rapid dissemination of information critical (Barley, Freeman and Hybels, 1992; Garud and Kumaraswamy, 1993; Powell and Brantley, 1992; Robertson and Langlois, 1995). By adapting a network structure in the process of developing new venture ideas, it increases the flexibility and ability to respond faster and broader to a wide range of opportunities. Due to that fact, resources are exchanged rather than owned and information and knowledge can also be reallocated and exchanged upon demand at a much lower cost.

The second factor is asset specific exchange. According to Jones, Hesterly and Borgatti (1997) this involves unique equipment, processes, or knowledge developed by participants to complete exchanges. The more specific the task is the more emphasis is needed on coordination between parties. Customization combined with uncertainty also pressures safeguarding on exchanges through reducing behavioural uncertainty (Hesterly and Zenger, 1993).

Knowledge for new venture ideas has to be novel to facilitate genuine and unique innovative process. As it will also be pointed out later in this thesis other authors have stressed that the possibilities of renewal happens best in the overlaps between the different disciplines and not in units of one (Powell et al., 1996; Wilks, 2000). Such overlaps are often seen from the perspectives of cooperation between academic research and research done in cooperation as well

as across different industries (Gibbons et. al, 1994). Universities are, to a greater extent, starting to take responsibility in relation to the overall need of society e.g. production of research based knowledge for practical implementation. Likewise, we see that commercial scientists are equally on the research forefront. This makes academic and commercial scientists part of the same community (Powell and Owen-Smith, 2002, 1998).

Frequency is important for several reasons: First, frequency facilitates sharing tacit knowledge, especially for specialized processes or knowledge. Second, frequent interactions between actors facilitate conditions for relational and structural embeddedness which provides the foundation for social mechanisms to adapt, coordinate, and safeguard exchanges effectively. As this thesis will show later, different kinds of relational and structural embeddedness will also be powerful when collecting knowledge for investment evaluation. Additionally, frequent interactions decrease the costs of using specialized governance structures (Williamson, 1985: 60). Frequent exchanges not only justify but also enable interfirm networks as an alternative governance form. Some degree of frequency is important with human asset specific exchanges because human asset specificity results from learning-by-doing, deepens through continued interaction, and creates exchanges where the identity of the other network actors matters (Williamson, 1991: 281-282). Human asset specificity requires frequent exchanges to transfer tacit knowledge among parties.

The composition of knowledge in today's products and services are reaching increasing levels of complication – accentuating the final element of task complexity. This demands an increasing level of competencies and diversification of knowledge (Bach, Seufert and Krogh, 1999; Gibbons et. al 1994). A major consequence is that even though firms are allocating more and more resources to their in-house R&D functions, they can rarely carry the burden of a full blown program alone. Task complexity in conjunction with time pressures has led to team coordination where diversely skilled members work simultaneously to produce a good or service (Faulkner and Anderson, 1987; Goodman and Goodman, 1976; Van de Ven, Delbecq and Koenig, 1976). As teams coordinate activities and mutually adjusted information flows, it leads to increased speed in information sharing among parties and reduces the time to complete complex tasks (Clark and Fujimoto, 1989; Imai, Nonaka and Takeuchi, 1985). This implies that firms are seeking resources from a wide spectrum of firms in order to facilitate the innovative process. Small firms are often forced (due to the complexity in specific tasks and lack of human resources) to use outside networks (e.g. Mønsted, 2003; Nygaard, 2000). Large firms have, as it has been exemplified, often difficulties in innovating why networks also are a prerequisite for them (Block and MacMillan, 1993).

2.1.4 Network and innovation

As highlighted above, networks seem to function particularly good for managing the early phases of the venturing process - especially for governing the knowledge creation and utilisation necessary for developing new innovative ventures. Therefore it is often argued that interorganizational collaboration is the locus of innovation (e.g. Newell and Swan, 2000).

Authors describing the creation of innovation in networks stresses that firms are changing from well-defined entities consisting of fixed structures of managing systems into an entanglement of network systems with indistinct boundaries (Seufert et al., 1999). One could argue that this illustrates Williamson's (1983, 1975) description of balances between markets and hierarchies very well. The focus has shifted from products and firms as units of analysis to people and the social process that connects them in ongoing relationships. Most firms are realizing that a key factor in obtaining a lasting competitive advantage is not the ability to administer existing knowledge, but the capacity to continually generate new knowledge (Powell et al., 1996). The locus is interorganisational relationships where participation and invitation of knowledge exchange is core (Arora and Gambardella, 1990; Powell et al., 1996). A network serves as the locus of innovation in many high-tech fields:

"...because it provides timely access to knowledge and resources that are otherwise unavailable, while also testing internal expertise and learning capabilities" (Powell, 1996: 231)

This trend will presumably continue, thus making the process of opportunity creation and transfer of new knowledge into network structures. As an extreme illustration it has also been recognized that also competitive organizations have started to make collaborations units (Gibbons et. al, 1994; Nowotny et al., 2001; Wilks, 2000). It indicates a tendency of reorganizing the knowledge production process in new physiological and organisational structures. In these setups, knowledge is exchanged and developed in structures that previously did not exist (Gibbons et al, 1994). These setups are often executing so-called "systematic innovation", as they engage in the determined and organized search for changes and the systematic analysis of the opportunities (e.g. Drucker, 1986). Such changes might offer product as well as social innovations.

To further understand the development of new ventures and innovation, Powell et al. argues that networking should be seen in a learning perspective (Powell et al., 1996). Here learning unfolds in the trade zone between e.g. established firms, start-ups, universities, research units, suppliers and customers; situations well argued for in the previous chapter on new dynamic innovation models. Contrary to the strategic network arguments of risk speeding (which sees network

activities as calculative and strategic) the learning perspective focuses on building and maintaining skills and routines - a central activity in organizations (Powell et al., 1996). Collaborative research and development can function as an eye opener for accessing ideas and knowledge from a variety of sources, in order to exploit already achieved research results in a commercial context. Experience in collaboration is however needed to develop the capacity to benefit from interdependencies across collaborative behaviour (Mønsted, 2002).

Bridging organizational studies and innovation literature, Powell et al. (1996) and others argue that the locus of innovation should be thought of as a network of inter-organizational relations. For these authors the composition of the network actors is key. Powell et al. finds that innovation requires diverse types of institutions and organizational practices. Innovation is created by interfaces and overlaps between the different industries and disciplines (e.g. Etzkowitz, 1998). In the earlier mentioned work of Etzkowitz and Leydesdorff (1997) we know that such organizations in some incidents even have been categorized into separate but collaborative arrangements.

Other authors have focused on the specific context in which such network agreements takes place. For example, knowledge production that focuses on problem solving in the context of application is as mentioned earlier characterized by both Gibbons et al. (1994) and Nowotny et al. (2001) as Mode 2 knowledge. Mode 2 knowledge production was initially developed for testing and shaping university research, but in this thesis, it is put to a broader use. This argument follows the previous dynamic models for developing innovations, and making them socially robust. An important element in the process of making the research results socially robust is the process of the contextualization. Here, results are tested in broad context and feedback for further development as provided. Mode 2 refers to knowledge produced in the context of application, which implies that research can be used by industry or society to solve specific problems (Nowotny et al, 2001). Apart from being produced in the context of application, Mode 2 knowledge production has two other characteristics: *Transdisciplinary* and *heterogeneity*, which influence the knowledge production.

Transdisciplinary and heterogeneity refers to the variety of skills and experiences people contribute to produce Mode 2 knowledge. By focusing on the new forms of knowledge production in such a heterogeneous character, a greater understanding will be created of the knowledge production process to be utilized in innovative projects. There seems to be two prime reasons for engaging in heterogeneous networks: first, production/development of viable knowledge which can result in significant novel ideas and second, to ground and test the developments. In these networks, resources are not only collected, but also generated in a dynamic interplay (Gibbons et al. 1994; Kline and Rosenberg, 1986). Effective knowledge

creation, both in terms of renewal and in terms of the frequency, can happen if resources are committed to the process. One of the main drivers for these networks is the significant output, which is found in organizing knowledge production, but also because it is socially robust. This has potential in establishing innovations, as it automatically ensures heterogeneity (Gibbons et al, 1994).

One of the largest challenges is the ability to appreciate the value of novel ideas (Weick, 2001). Gibbons et al. (1994) argues that while the novelty of the ideas will increase in these types of networks, so will their trustworthiness (robustness). Later in this chapter a more elaborative analysis of this type of collaboration will be described. This shows particularly powerful when analysing some of the mechanisms that corporate venture firms could use, when they evaluate new investment opportunities (please also see Study V about evaluation).

Consensibility and consensuality also relates to innovation processes in Mode 2 knowledge production (Nowotny et al., 2001). That is, the content of knowledge should not be ambiguous or obscure in the sense that the essence of it becomes difficult for others to assent or contest. Hence, knowledge should provide a sense of consensibility. Furthermore, science should be based on facts as well as principles that have been accepted and hereby a broad range of actors. In other words, science should possess a high degree of consensuality. Thus,:

“...it is through the operation of the twin processes of consensibility and consensuality that science is able to produce reliable knowledge...”
(Nowotny et al., 2001: 170)

As earlier argued, the process of knowledge creation is not linear. On the contrary, the production of knowledge should be seen as a circular and intertwined process (Kline and Rosenberg, 1986). It is thus, not a question of right and wrong but on the contrary, a question of creating knowledge based on sound arguments. In this way the process of creating not just new knowledge but knowledge that is sensible to more than the researcher himself becomes a question of an ongoing process where the researcher incrementally expands his or her pool of knowledge. Hence, in a sense, scientific knowledge is contextualized in a process of research and discovery where “feedback loops” constantly are created to reach incremental increases in quality.

The quality of the conclusions put forward for determining the robustness of innovations for new venture firms depends on the quality of the knowledge produced and its iterative testing procedures. Ensuring that the knowledge produced is reliable is crucial as it affects the quality of the conclusions put forward for future decision making in the different research initiatives. Nowotny et al. (2001:167-178) recognize the importance of producing reliable knowledge and,

thus, introduce the concept of socially robust knowledge. The concept of socially robust knowledge builds on the findings of Ziman (1991), who argued that reliable scientific knowledge is produced when researchers make individual contributions, which then are filtered and elaborated by mutual evaluation and intellectual challenges from other researchers. To Ziman (1991), scientific knowledge becomes reliable by going through continuous evaluation and criticisms posed by other researchers and practitioners:

“...”science” is not a well-bounded, coherent thing, capable of being more or less “understood”...what counts as science is something defined very differently by different people – or even by the same people under different circumstances.” (p.100)

Through the process of continuous testing, the knowledge is improved and reaches a state of stability. It is the process of testing and improving the knowledge that makes the knowledge receive a larger degree of reliability and simultaneously turns it more applicable, also for the corporate venture firms. While the Mode 2 framework was initially developed for scientific research at universities, it also finds particular good use in venture context, which carries many of the same attributes and belong to many of the same communities. Most noticeable is that corporate ventures in most cases invest in science based ventures.

According to Nowotny et al. (2001), the process of creating socially robust knowledge is repeated continuously, as the reliability of the knowledge will always be challenged. This means that knowledge will always, to some extent, be incomplete as the questioning and criticisms posed by other researchers will continue. Based on the discussion, the concept of socially robust knowledge could be interpreted as knowledge, which has been subject to frequent testing, feedback, and improvements enhancing the reliability of the knowledge produced. A point that further illustrates the dynamic nature of innovation processes.

As illustrated above, creating socially robust knowledge is an iterative process of continuous testing and improving the knowledge created through interaction with others. In line with this argumentation, it is not possible to create knowledge that is purely socially robust, as the quality of the knowledge produced will always be questioned by other researchers, costumers, academics, other venture capitalists, etc.

The previous section paid special attention to the literature written about network formations and knowledge productions process for the development of new ventures ideas and opportunities. The following section will move further up the value chain and provide a literature review of corporate venture firm’s discovery of entrepreneurial opportunities.

2.2 Discovering the investment opportunity

This chapter will review a new and developing theme from the entrepreneurship tradition: discovery of venture opportunities. Particularly, how different investment opportunities gets on “the radar” of corporate venture firms. These arguments are also presented in Study IV (Vintergaard, 2005) and Study V (Vintergaard and Husted, Submitted). While overlaps may occur, this chapter does not directly pay attention to venture evaluation which is addressed in the next section.

Most articles on entrepreneurial opportunities have been analysed in the framework of individual entrepreneurs discovering new business opportunities. This process is often analysed in some relation to Robert’s (1988) idea of linking markets and technologies. In this terminology it is the job of the entrepreneur to link technologies and solutions to market needs. This thesis uses some of these same findings to construct arguments in a corporate venture structure. While the corporate strategies differ in many concerns to the entrepreneurial venture many of the arguments still have relevance. For corporate venture investors, discovering new venture opportunities is one of their primary tasks. If no venture ideas are discovered, no investments nor results can be harvested. As a contribution to the entrepreneurship tradition, opportunity recognition is moved to the investor’s point of view. This shift requires that not only should the entrepreneur discover new entrepreneurial opportunities, but the corporate venture should have a similar positive attitude for the venture to develop. The following sections provide a review of the literature for analysing the discovery of venture opportunities. To accompany the analysis, literature from the corporate venture tradition will initially be reviewed.

2.2.1 Contributions from the corporate venture literature

In Wright and Robbie’s review and syntheses of the wide body of venture capital literature, they argue that only limited attention is paid to the discovery stage of the venture process (deal generation) even though it remains an important area to the corporate world (Wright and Robbie, 1998). Their own review and analysis of what venture capitalists do, however, also neglects this phase. Wright and Robbie do pay attention to deal generation but moves on directly to the problems associated with venture evaluation. This leaves out the search process and therefore also the process associated with opportunity discovery. While this stage of the process remains relatively untouched, below will follow some of the main findings made in the venture capital and corporate venture literature.

There are two different approaches to discover new venture opportunities: a proactive and a reactive approach (Sweeting, 1991). In the proactive approach, venture investors are actively looking for potential ventures to invest in, for instance by attending industry fairs, business plan competitions, springboards, and other networks, or by direct involvement in influencing the entrepreneurial communities. The reactive approach is characterized by venture investors passively awaiting business plan proposals. In an analysis of venture capital firms in the mid-1980's Tyebjerg and Bruno (1984) found that the behaviour by venture capitalists in seeking out investments was to wait passively for new deal proposals to be given to them. Sweeting (1991) also found that most deals were referred by third parties and that venture capitalists rarely act proactively in discovering new investment opportunities. The two major sources investors gain access to investment opportunities from are: entrepreneurs themselves and the informal networks. Other sources were (in descending order): Formal network/ partners, financial intermediaries and proactive search. In their analysis, both Sweeting (1991) and Tyebjerg and Bruno (1984) concluded that venture capitalists almost without exception were applying a reactive and passive approach to deal generation.

The investment opportunities are most often exchanged between investors who have a high degree of trust between each other and therefore believe that they are not served a lemon. The reason for including other investors is primarily to spread risk, access more opportunities, and to create a broader knowledge base for investment decisions. Syndicated investments are especially for established investors that wish to work with new and untried markets (Albrinck et al. 2000). McNally (1997: 111) argues:

“Co-investments with venture capitalists (parallel investments) are a potentially beneficial way of identifying investment opportunities and also accessing the investment expertise of the venture capitalist”.

This relationship often constitutes a syndicate investment situation between two or more venture capitalists investors (Bygrave, 1987, 1988; Dotzler, 2001; McNally, 1997). In order for venture managers to gain access to an opportunity from other venture managers, there is a reversible commitment to provide these managers with other venture opportunities. A common characteristic of this type of opportunity is that they are presented as venture proposals/ business plans and sometimes even established ventures. Selling an investment to another venture capitalist is also a variant of this kind of relationship. In the next section some of the problems associated with investment evaluation are reviewed.

Other authors have found that venture capitalists also discover new investment opportunities from other actors than entrepreneurs and other venture capitalists (Burgelman, 1983; Sharma and Chrisman, 1999; Sweetig, 1981; von Hippel, 1977). Venture capitalists often have a broad network and therefore manage to access and make themselves visible in many different contexts. As earlier indicated, venture capitalists are also often searching for knowledge and research intensive venture opportunities at universities (Etzkowitz and Leydesdorff, 1997). Other authors have found that venture ideas also derive from corporate firms which are spun off. These are often ideas that do not fit with the core business of the firm (Nicolaou and Birley, 2003).

2.2.2 Defining entrepreneurial opportunities

When reviewing the entrepreneurship and general innovation literature, the definition of an entrepreneurial opportunity reveals large deviations (Bygrave and Hofer, 1991; Shane and Venkataraman, 2001; Singh, 2001). For example, corporate entrepreneurship, use entrepreneurial opportunities to describe the business idea that the venture initially possesses (Bhave, 1994; Hills et al., 1997; Long and McMullan, 1984). However from the traditional entrepreneurship tradition focus is more on the entrepreneurial act i.e. finding the good idea. Some of the most recognised definitions even define and distinguish the field of entrepreneurship as the study of sources and exploitation of opportunities (Venkataraman, 1997; Zahra and Dess, 2001). In Bygrave and Hofer (1991: 14) they define the entrepreneurial event as the creation of a new organisation to pursue an opportunity. In this work, the organisation as a distinctive institution, takes a central role for describing entrepreneurship. Shane and Venkataraman (2000) further, use opportunities as a means to delineate the field of entrepreneurship. They argue that:

“...entrepreneurship is the scholarly examination of how, by whom and with what effects opportunities to create future goods and services are discovered, evaluated and exploited” (p. 218)

This definition draws on Venkataraman’s article from (1997), which aim at a broader context. In the more specific article from 2000 Shane and Venkataraman additionally argues that the following three sets of research questions are especially central for the entrepreneurship field (and also point out that this makes the field distinct from e.g. statistic management): a) why, when and how opportunities for the creation of goods and services come into existence; b) why, when and how some people and not others discover and exploit these opportunities; and c) why, when and how different modes of action are used to exploit entrepreneurial opportunities.

In a later dialogue with Zahra and Dess (2001) it is argued that several points have not been yet accounted for by Shane and Venkataraman, but that it creates a good starting point for making

entrepreneurship an academic field on its own. Very insightful, Zahra and Dess make the claim that a fourth dimension is to be found in the outcome of the exploitation process: they rightfully argue that most entrepreneurial activities never become successes. In the work of Shane and Venkataraman (2000) they successfully manage to delineate the scholarly domain of entrepreneurship rather than suggesting yet another definition of the academic phenomenon. As part of this elaboration, Zahra and Dess nevertheless managed to point out the existence of alternative modes of exploitation for given opportunities as an important research question. However, entrepreneurial opportunities differ from the larger set of other profit-seeking opportunities because the former requires the discovery of new means and ends relationships, whereas the latter also involves optimization within existing means/ends relationships (Kirzner, 1997).

In a later article of Eckhardt and Shane (2003) they attempted to solve some of the critical points that derived from describing the entrepreneurship field, as the study of entrepreneurial opportunities (e.g. Singh, 2001; Zahra and Dess, 2001). Here, a more thorough discussion of the role of opportunities is made. In the discussion they: 1) break with the previous equilibrium orientation of entrepreneurship, 2) explain why entrepreneurship requires theories based on the existence of opportunities and the actions of agents, and 3) explain what opportunities are (and their type) and how they are discovered and exhausted.

2.2.3 Opportunities and profitability

As a further comment to the field of entrepreneurship, Shane and Venkataraman (2000) argue that opportunity can imply several different modes of exploitation and state:

“...opportunities can be sold to other individuals or to existing organisations” (p. 220)

This makes opportunities more transit than the usual perception of products and organisations. Differently, Christensen, Madsen and Peterson (1994) offer a definition of opportunities in the business context, where they define an opportunity as a new profit potential through: 1) the founding and formation of a new venture, or 2) the significant improvement of an existing venture. Like for Shane and Venkataraman (2000) this turns profitability and commercial issues into key parameters of an entrepreneurial opportunity, but also makes the interpretation of entrepreneurial opportunities narrower. Others have argued that while an opportunity to create value is a necessary part of the entrepreneurial process, it is not sufficient to generate wealth for the entrepreneur (Casson, 1982). This line of argument somewhat supports Zahra and Dess (2001) in earlier arguments of venture failures.

As part of the same dialog by Zahra and Dess (2001) in *Academy of Management Review* regarding the article of Shane and Venkataraman (2000); Singh (2001), makes the claim that many opportunities would be jeopardized when analyzed from the perspective of profitability. One could say that this perspective is very much in line with Zahra and Dess (2001) and Casson (1992). Singh argues that technological advances and a high degree of uncertainty conceivably could cause ventures to lose their “status” as opportunities if they later turn unprofitable. In this vein, Singh (2001) proposes:

“...that an entrepreneurial opportunity should be defined as a feasible, profit-seeking, potential venture that provides an innovative new product or service to the market, improves on an existing product/service, or imitates a profitable product/service in a less-than-saturated market” (p. 11)

He further argues that by focusing on feasibility and profit seeking, an opportunity can be defined prior to venture founding and profitability (Singh, 2001). Recalling Roberts (1988) previous definition of an innovation (invention and marketability), there are tight links to the definition of an opportunity. The new dimensions from the entrepreneurship tradition come from a more dynamic and process oriented analysis. This kind of analysis often has the entrepreneurs as the focal point of investigation.

In an earlier definition; Casson (1982) elaborated on new profit potentials by defining opportunities as situations in which new goods, services, raw materials and organizing methods can be introduced and sold with a yield. Shane and Venkataraman (2000) subscribe to Casson's (1982) definition of entrepreneurial opportunities, but later extend it to a conceptual element of entrepreneurship. In a later and more comprehensive explanation of entrepreneurial opportunities Eckhardt and Shane (2003: 336) argues that opportunities:

“...do not need to change the terms of economic exchange to be entrepreneurial opportunities, but need to have the potential to alter the terms of economic exchange”

The important word here is the *potential*, which softens the previous dimension of profitability. One may however question, when the economic potential is present (or can be determined) in a situation when the balance between economic success and failure is so tightly connected as it is for venture capital investments. This is however somewhat included as Eckhardt and Shane argues that prices are incomplete indicators of opportunities.

2.2.4 Entrepreneurial opportunities: discovered or created

In the entrepreneurship literature, a further diversifying element is whether entrepreneurs discover opportunities or whether they actively create them. For some authors, their perspective on entrepreneurial opportunities are perceived as a natural happening in the world where alert and sometimes fortunate entrepreneurs make a discovery and take actions to exploit it (e.g. Shane and Venkataraman, 2000; Shane, 2003). Based on this kind perspective Shane and Venkataraman (2000) argue that:

“because the range of options and the consequences of exploiting new things are unknown, entrepreneurial decisions cannot be made through an optimal process in which mechanical calculations are made in response to a given set of alternatives...” (p. 220)

In this context an optimal process is interpreted as the active peruse of a given mean to an end. From a recent book of Shane (2003) he extends the analysis of entrepreneurship by offering an overarching conceptual framework that explains the different parts of the entrepreneurial process. This process includes: the opportunities, the people who pursue them, the skills and strategies used to organize and exploit opportunities, and the environmental conditions favourable to them. As a further elaboration of the entrepreneurs and how they discover new opportunities Eckhardt and Shane argue that:

“...entrepreneurs... allocate resources better than they are currently allocated or would be allocated in the future on the basis of information not incorporated in prices” (p. 338)

This perception is based on the assumption that entrepreneurs buy, make new, use or sell resources and does not assume that new resources can be defined.

Different arguments suggest that opportunities should be analysed in the light of entrepreneurs who actively try to create their own opportunities. In this interpretation the entrepreneurial opportunity fundamentally depends on the entrepreneurial action. Different from e.g. Shane and Venkataraman, 2000; and Shane, 2003, this view believes that opportunities are not discovered before exploitation but rather seen as the final result of a creative and social process (e.g. Gartner et al., 2003; Sarasvathy, 2001; Sarasvathy, 2004). These kinds of results are primarily driven by an underlying technology-push strategy where the entrepreneurs in their extreme form know and create future demands of the market. Such interpretation could in an absolute case be seen as the linear model, which was discussed and critiqued earlier in this thesis.

Others have emphasised that the creation process is strongly coupled with organisational development and environmental change. In this context the creation process is a central proof of

being an entrepreneur. In Bygrave and Hofer (1991) it is claimed that the act of becoming an entrepreneur involves changing the external environment from one state (without the venture) to another (with the venture). For such an argument the organisational process is a key variable.

In a current academic contribution, the two previous strands (creation versus discovery) is incorporated into a larger comprehensive framework, a framework also including recognition of opportunities. Sarasvathy, Dew, Velamuri and Venkatarman (2003) developed a conceptual understanding of the distinction between opportunities recognition, discovery and creation. In this framework they try to:

... model an entrepreneurial opportunity as a function, or a process of decisions, respectively” (p. 142)

Sarasvathy, Dew, Velamuri and Venkatarman (2003) refer to opportunity recognition as an entrepreneur who manages to combine existing technologies and markets. In this context:

“...both sources of supply and demand exist rather obviously, the opportunity for bringing them together has to be recognized and then the match-up between supply and demand has to be implemented either through an existing firm or a new firm” (p. 145)

This view has its origination in neoclassical economies where resource allocation can lead to efficiency perfectly competitive markets.

On the contrary, the process of opportunity discovery describes the process where only one of the variables exists and the other needs to be created (technology or market). This is a situation where a technology has been developed, but not marketed yet. The last possible (and less frequent) situation, opportunity creation, is where neither market nor technology exists. Such situation is however difficult to imagine. For corporate ventures demand or supply will most likely be given. Therefore opportunity discovery will be the typology used from now on.

2.2.5 Discovery of opportunities: a process

In current entrepreneurship literature on entrepreneurial opportunities, it becomes more and more accepted that opportunity discovery is a *process* and not an act out of sudden intuition (e.g. Sarasvathy, Dew, Velamuri and Venkatarman, 2003). We will see that incremental information exposure will result in a process driven discovery. Some authors have also argued that entrepreneurial opportunity discovery is a behavioural phenomenon and an approach to management involving a progressive course of action (Stevenson and Jarillo, 1990). This progressive course is further illustrated in Study IV (Vintergaard, 2005).

Working with processes, as one of the explaining variables to discover new opportunities, leads many authors to focus on the individual entrepreneur or the individuals assisting him. Therefore the process of opportunity discovery is often explained as the process through which individuals acting alone perceive a previous unseen or unknown opportunity (Eckhardt and Shane, 2003). Some have even argued that entrepreneurship researchers must recognize the importance of human volition (Bygrave and Hofer, 1991: 17).

Earlier literature perceived entrepreneurs as someone with a specific cognitive mindset. Entrepreneurs were born with a specific gene-structure which leads them to start up new ventures. Current literature on the personal attributes of entrepreneur tends to distant itself from this interpretation, by focusing more in the cognition of humans in general. This kind of literature strives to explain how individuals interpret information and make decisions. A central area of analysis in the entrepreneurship literature is how entrepreneurs think, what they do, etc. Such analysis is a core theme in the Austrian economic literature (Foss, 1994; Foss and Kline, 2002; Hayek, 1945; Kirzner, 1979). Hence it is central in Austrian economics to focus on how knowledge and information is produced and distributed between individuals and consequently how the individuals act. The discovery of new entrepreneurial opportunities becomes a key challenge for individual entrepreneurs in this regard. The source of opportunities here separates defenders of Austrian economics into those who believe that new opportunities are based on different accesses to existing information (Kirzner, 1973, 1997) and those who believe they are based on new information used to recombine information (Schumpeter, 1934). More recent research suggests that both types of opportunities can be presented in the same market (Shane and Venkataraman, 2000). Schumpeterian opportunities are however more radical and less frequent and will most often be of interest for venture investors.

The process of opportunity discovery has also been studied within existing firms (Stevenson and Jarillo, 1990; Venkataraman, 1997). Such analysis often stresses how information and new venture ideas travel in organisations. This analytical focus is also core to the early corporate venture literature of e.g. Burgelman (1983). In Burgelman's, (1983) specific attention is given to the development process of the ideas and the people involved. Other authors developed analytical frameworks of the kinds of paths that ideas travel on. In Hellström and Hellström (2002) they developed a structural understanding of how ideas travel in large organisations. The article develops an understanding that successful idea development depends on the capacity of actors and ideas to move on "organisational highways", alleys and by lanes. Hellström and Hellström (2002) highlight that opportunities can travel in many different ways through an organisation, and it can meet many different obstacles on its ways. This also opened for a different analysis of management position to facilitate the process. In the work of O'Conner and

Rice (2001) they analyse how large firms recognize new radical innovative ideas. Hence they develop an understanding of how different management positions in organizations enable recognition of opportunities.

This section has highlighted some of the recent discussions about entrepreneurial opportunities and the process of their discovery. The next section will review and elaborate on the preconditions for the corporate venture investor's evaluation process of these opportunities. More specifically the review will include the challenges associated with evaluation and the means to overcome them.

2.3 Preparing for investment evaluation

As venture opportunities have been discovered, they need to undergo an evaluation process before the corporate venture firm makes its investment (Block, 1982; Block and MacMillan, 1993). Following the dynamic logic of this thesis, the evaluation process often proceeds over a period of time – in many cases from the very early phases of the venture process. Study V further analyse the complications in venture evaluation whereas Study IV illustrate how the process proceeds over time.

This section reviews the literature on corporate venture firm's evaluation process. The evaluation processes includes activities which prepare the investors for value assessment and selection of the venture investments. The evaluation phase of the venture process includes some of the most important activities in the process for both corporate venture investors and entrepreneurs, as it is during this phase investors create and collect the knowledge needed for the investment decision.

The review will focus on the knowledge production for evaluation which takes place in networks. Such knowledge production makes venture managers better prepared for evaluation. The later processes of: selection and commitment of capital will not be included in the review e.g. contracting, financial structuring, due diligence etc. More specifically, this chapter will review the evaluation literature in perspective to how knowledge can be created and acquired to establish a better platform for decision-making. Here knowledge production in networks will be of particular interest.

The evaluation phase will (like the previous phases) not always follow strict chronological procedures but sometimes advance in parallel or decoupled from the rest of the innovation process. Often the entrepreneur presents his business idea to venture capitalists many times before he ends up having his business plan evaluated. During this period, investors try to disclose as much information of the venture opportunity as possible. Yet, other times the idea is presented by other investors etc. Therefore the process is highly dynamic and includes a wide range of people and organizations.

Initially a review of the relevant corporate venture and venture capital literature will be presented. This includes some of the most often mentioned struggles associated with evaluating new innovative ventures and the most frequent methods of overcoming these. Secondly a review of alternative strands of literature will be conducted, including how to manage knowledge creation for evaluation in a network. This review has in particular contributed to Study V (Vintergaard and Husted, Submitted).

2.3.1 Contributions from the corporate venture literature

Research has shown that for each project accepted for investment, venture capitalists reject most of the proposals in the screening process (Harrison and Mason, 1996; Pedersen and Vintergaard, 2001). Given the low rate of success for new ventures there has to be something particular compelling before venture investors are convinced of the viability of the venture (Foo, Wong and Ong, 2005). The investment evaluation phase is an important and very time-consuming activity. Tybjee and Bruno (1981) found that venture capitalists spend almost fifty per cent (50%) of their time screening and evaluating business proposals. Ironically, other authors have found that venture capitalists seldom utilize the potential beneficial decision aids (Shepherd and Zacharakis, 2002).

Since only a few emerging ventures have the right risk and reward profile, competition for good venture projects is fierce and the capability to make the right decision on the right foundation is critical. A series of arguments exists as to why the decision-making process is critical: There is first and foremost a risk of wrongly promoting a malign venture or wrongly rejecting a beneficial one. If less rewarding projects are selected it prevents the venture capitalist from using its limited resources on other projects and hence loses profits from other business. Additionally, there is a chance that unprofitable projects can hurt the image of the investor.

When evaluating private firms (e.g. new ventures), a number of estimation issues arise that do not exist when valuing public firms (Damodaran, 2002). These differences affect both the valuation process and the final value of the private firm. Firstly, public firms display items in the financial statements according to accepted accounting standards and private firms operate in a less regulated environment. Secondly, while public firms are under a legal obligation to make certain kinds of information available to the public, there is less information available about private firms. Thirdly, current and historical prices for equity can be obtained for public firms but not for private ones. Fourthly, the costs associated with liquidating an equity position in a private firm are higher and the task more difficult due to the absence of a marketplace. In the markets such as the Danish, legislators have just recently started to build a market place for

unquoted stocks attempting to make a better market for both buyer and seller. Finally, owners of a private firm also tends to be a part of the management structure of the firm and, as such, often fail to differentiate between personal and business expenses, management salary and dividends. All of these differences will affect the discount rates used, cash flows and expected growth rates and hence the value of the private firm.

2.3.2 Evaluation condition

In the corporate venture literature on venture opportunity evaluation, the following arguments are often proposed as to why the evaluation process is a particularly troublesome task for such private firms and new venture firms.

New innovative ventures build on transdisciplinary and heterogenic knowledge

The first reason for substantial difficulties in evaluating new venture firms is found in the risk (and return) that is associated with early stage projects (Bygrave, 1987; Liles, 1974). Many venture projects only entail limited information about the products or services (Mønsted, 2003). The business may only consist of sketched out business plans and preferable intellectual property rights of the product or service. The limited information is caused by limited knowledge about future market conditions and customer segments etc. Consequently there is a high level of uncertainty about the level of success as things easily can change and markets can disappear.

As an additional complicating matter, new venture ideas are often representing the work of many different disciplines and competencies (e.g. Christensen, Gregersen and Rogaczewska, 1999). In an analysis of how team diversity affects external decision-making Foo, Wong and Ong (2005) found that by having a task-related diversity of team members, their characteristics enhances team effectiveness. We also know from the earlier sections that innovations are no longer developed through inputs of homogeneous character (Foo, Wong and Ong, 2005) nor according to linear progression (Kline and Rosenberg, 1986). This is particularly relevant for ventures which build on scientific results. As mentioned earlier, formalized and systematic knowledge production in research is increasingly carried out in a context of application and is characterized by transdisciplinarity and heterogeneity (Harvey, Pettigrew, Ferlie, 2002; Nowotny et al., 2001). This dominant mode of knowledge production in the present knowledge society is expected to be:

“...more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a

problem defined in a specific and localized context” (Gibbons et al., 1994: 3)

In addition to the new and innovative nature of venture projects, these new conditions further challenge venture capitalists in their own knowledge production to make them capable of evaluating and later be able to make the final selection assessment. Venture capitalists need to decode the collection of knowledge in the new venture in order to make a proper evaluation. Therefore, the capacity to access and develop such knowledge becomes key. Central to the pre-evaluation process is the ability to mirror or be part of the knowledge production which has led to the new venture. As argued later in this section and in Study V, such capacity can only be developed if venture capitalists know how to engage themselves in the early phases of the venturing process where such knowledge is created.

Information asymmetry: Another often stated problem with new venture evaluation is the high level of information asymmetry (Arrow, 1973) between the entrepreneur and the venture capitalist (Amit, Glosten and Muller, 1990; Christensen, 1992). As many projects have a high technological novelty, investors often have problems in recognizing the potential of the innovation. This is particularly true for highly innovative ideas, which involves many sets of skills. The entrepreneur (or team) carries most of the knowledge about the product and the investor has to make evaluations/decisions with incomplete knowledge about the innovation. The principal/agent theory has often been included to explain the possible opportunistic behaviour of the entrepreneur and the control mechanisms employed by the investor (Gompers, 1995; Sahlman, 1990). A central theoretical argument is that the agent (entrepreneur) will only disclose information that is personally benefiting. The entrepreneur possesses much more information and knowledge about their business opportunity and their own capabilities than potential investors do. Therefore, the entrepreneur may exploit the asymmetric distribution of knowledge to his own benefit (Amit et al., 1990) leading to principal/agent conflicts (Barnea, Haugen and Senbet, 1981; Eisenhard, 1989; Gompers, 1996).

Additionally, entrepreneurs are not inclined to share all their knowledge with the potential investor before a favourable investment decision is settled. This is due to fear for potential investor’s opportunistic behaviour. Such investors turn down investment proposals, while exploiting the business opportunity at their own benefit. However the asymmetric distribution of knowledge poses a serious challenge to potential investors especially in making the investment evaluation and decision.

Difficulties in explaining the knowledge behind the venture idea makes the relationship between the entrepreneur and the venture capitalists even more challenging as it can lead the entrepreneur to unintentionally hoard knowledge. Here communication of knowledge becomes key as:

“...projects cannot be documented at this stage...” (Mønsted, 2003: 194)

The principal (venture capitalist) will force different management initiatives in order to make the entrepreneur disclose information about the value of the venture. It is often argued that the inability of outsiders to assess the entrepreneurs core attributes, namely their entrepreneurial skills and abilities, may affect both the decisions of entrepreneurs to involve outsiders and the prices venture capitalists may be willing to pay for new ventures (Amit, Glosten and Muller, 1990: 1233). Research has also found that the agency costs associated with evaluation are increasing when assets become less tangible, growth options increase, and asset specificity raises (Gompers, 1995: 1461).

Idiosyncratic evaluation: The argument has been made in the previous section that information about a given entrepreneurial opportunity makes prices change for a given venture (Ziman, 1991). The capacity to evaluate entrepreneurial opportunities depends on prior knowledge, which is idiosyncratic in nature, and therefore will lead people to perceive opportunities differently (Shane, 2000). Educational and professional experiences lead people to assess ventures in very different ways. At the same time, information asymmetry is crucial for the investor's ability to earn an above average return on the successful investments (Gompers and Lerner, 1999). If markets were perfect (in a Neoclassical definition) and people's interpretations were alike, then venture capitalists couldn't earn the expected high returns. It is almost a prerequisite that the venture opportunity shouldn't be subjected to perfect competition as the opportunity would then become too obvious and therefore lose its high commercial upside. Shared beliefs and interpretation of business opportunities among entrepreneurs would reduce competition and thereby the potential of earning entrepreneurial profits (Schumpeter, 1943). The idiosyncratic nature of entrepreneurial opportunities, however also obstructs the evaluation process by increasing the difficulties of the potential investor in recognizing the potential of the proposed idea. This is particularly true in the very early phases of the ventures development as it is only discovered by a limited proportion of the market.

Broad spectrum of expectations: Another challenge for evaluation is that corporate venture investors additionally face the challenge of satisfying a broad spectrum of expectations besides the financial (Block and MacMillan 1993; Burgelman, 1983). As already indicated in the earlier chapter, corporate venturing is predominantly seen as a mean for large, well-established

companies to increase their level of innovation (Burgelman, 1984). However, there are several additional related motives for setting up a corporate venture unit. Among those motives are securing growth and responding to competitive pressures (Block and MacMillan, 1993), improving corporate profitability (Zahra, 1996), stimulating strategic renewal (Guth and Ginsberg, 1990; Wielemaker, Elfring, and Volberda, 2000, 2001) and knowledge creation that may be parlayed into future revenue streams (Venkataraman, MacMillan and McGrath, 1992). Due to the diversity of these additional and sometimes contra dictionary objectives, corporate venture firms are further complicated in their evaluation. Finally, as mentioned earlier in this thesis, different from traditional venture capital funds, corporate venture capitalists often receive funds from their corporate parent for investments on an ad hoc basis (Siegel, Siegel and MacMillan, 1988). Formal investment approval is needed from top management, which can hamper the flexibility of the venture division (Block and MacMillan, 1993).

2.3.3 Evaluation strategies

In order to accommodate for the previously mentioned evaluation conditions, investors make use of several methods and strategies. In the following the most frequently mentioned are reviewed:

Self-selection: An often suggested mean to overcome the problem of information asymmetry is by allocating contractual rights, staging capital, and shifting risks. Such mechanisms often lead entrepreneurs to self-select and disclose more information about their business opportunity and themselves to the potential investor (Gompers and Lerner, 1999). In such a case, the relation between the entrepreneur and investor would shift together with the risk. By specifying a number of sanctions the entrepreneur would lose shares if the venture under performs. The premise is that it would be foolish of the entrepreneur to accept these conditions if he is in doubt about the promises of the venture or his own abilities (Sahlman, 1990). At the same time these sanctions keeps the entrepreneur at a high performing level.

Self-selection can further be reinforced if corporate ventures communicate specific selection criteria to the entrepreneurs. Transparency in selection criteria stimulate self-screening among the potential entrepreneurs which therefore, contribute to reducing the disadvantages of information asymmetry and at the same time lesser the investor's resources spending on identifying and selecting business ideas. The criteria are, as mentioned in the earlier chapter, based on industry focus, investment stage, expected return on investment etc. The criteria should be disseminated throughout the organization in order to achieve a greater organizational sense of purpose and direction (Block and MacMillan, 1993). Similar information can be reviled to entrepreneurs outside of the organisation.

The attempt to deal with information asymmetry by moving the risk from the investor to the entrepreneur is not completely achievable. The main reason is the entrepreneur's extreme optimism about their business opportunity and confidence in their own abilities which in return can promote inefficient self-selection (Shane and Cable, 2002). If that venture eventually fails, the investor still risks losing all the invested capital (Shane and Cable, 2002).

Environmental-selection: Other authors have argued that new venture firms listen to what kinds of investments that are currently being made in the venture market. This makes entrepreneurs fit their idea to market demand (Aldrich, 1979, 1999; Hannan and Freeman, 1977, 1984). Selection-adoption theory provides principles of self-renewal under such conditions (Volberda and Lewin, 2003) while population ecology analyses how firms are selected out. An environmental-selection strategy is, by nature, less easy to influence for investors, unless they find ways to influence general market trends. The ways to activate such initiatives can be through public debate, conference participation and other forums open to a broader audience.

Social networks: Organizational theorists suggest that the disadvantages of asymmetric distribution of knowledge can be reduced by using social ties for supporting the investment decision (Bygrave, 1987; Shane and Cable, 2002; Venkataraman, 1997). Furthermore, networks are often used as means for venture capitalists to discover, develop and exploit business ideas (Bygrave, 1987; Foo, Wong and Ong, 2005; Huffmann and Quigley, 2002). Others yet have argued that strategic networks are critical for information and resource acquisition without carrying the cost of vertical integration (Burt, 1992). It is eminent for investors in high-technology businesses to use social ties for creating access to private information about the entrepreneur and his venture idea (Shane and Cable, 2002). Consequently, some investors clearly prefer to invest in ventures which are referred to them by their network (Fried and Hisrich, 1994) and many investors tend to perform repeat syndication arrangements over time (Bygrave, 1987, 1988). The importance of inter-organisational collaboration arrangement can also be seen in the increased use of equity joint ventures (Wright and Lockett, 2003).

Syndication: As follow-up on the use of social networks, research suggest that one of the ways to overcome lack of critical information in evaluation of venture opportunities is by syndicating investments i.e. co-investment (e.g. Bygrave, 1987, 1988; Sorenson and Stuart, 2001). Networks are viewed as essential for assisting syndicated approaches and therefore are essential in the investment infrastructure. Syndication allows a greater number of venture capitalists to screen potential investments, thus reducing the likelihood of investing in a poor project. Bygrave and

Timmons (1992) further examine the importance of other network externalities that apparently influence venture investing. In an analysis of the UK business angel networks, Harrison and Mason (1993, 1996), found that syndicated investment with other registered angels account for around twenty-five percent (25%) of total investments, while a further ten percent (10%) were with other equity investors, which does not compare favourably to the US (Harrison and Mason, 1993). Where syndicated deals among business angels happen, levels of funds for expanding businesses have increased, but there is still a need for further public support for the establishment of such networks (Harding, 2000).

Data on the US market indicate that relationships between venture capital companies are essential for cheering co-investment (Bygrave, 1987) and that syndications can be linked to greater success in entrepreneurial businesses and for venture capitalists themselves (Bygrave, 1988). As previously indicated, network approaches to investment, help spread risk and engage more people in the investment evaluation. Syndication in networks also assist learning, encourage larger funds to be invested in appropriate ventures, create greater network opportunities and enable entrepreneurial firms to grow more quickly.

One of the problems of relying on co-investors is dependent on the idiosyncratic nature in perception of the project. The consequence for making an investment will change according to the nature of the investor and so will the expectations. However, co-investments have shown to be a valuable way to overcome some of the asymmetric information embedded in the investment. In this process, social capital plays a crucial role in catalyzing the exchange and transfer of knowledge and information in networks (Granovetter 1973, 1985). Later in this chapter further analysis of the different kinds of network structures will be analyzed in relation to how knowledge can be created to prepare for evaluation.

Staged investments: Another strategy to deal with the specific selection conditions in corporate venturing is by staging the investments. Venture capitalists often commit fractions of the entire investment on an ad-hoc basis (Gompers, 1995; Sahlman, 1990). Shalman (1990) noted that this management tool is the most potent mechanism that a venture capitalist can employ. The advantage of this strategy is that capital is injected at the speed of knowledge disclosure and venture development. The duration of the particular round is just one metric for the intensity of monitoring, the size of each investment, total funding provided, and number of financing rounds are also import measures of the staged investment structure (Gompers, 1995: 1462). Using the staging mechanism, capital will be infused to the new venture company according to specified milestones. Such milestones are based on specified progression of the ventures development e.g. development of prototypes, market analysis, employment of new competencies etc. Through this

multi-stage structure, the venture capitalist will have more control over management and the operation of the portfolio business (Sahlman, 1990). Additionally, staged investment also enables investors to limit the losses when choosing to invest in the wrong venture and at the same time, reduce the risk of wrongly selecting away promising ventures.

An additional promising perspective of using a staged approach is the decreasing effect on the ventures “burn rate” of funds. This discussion is a natural link to the often mentioned discussion of balancing autonomy and control between the new venture and the corporate venture organization (Simon, Houghton and Gurney, 1999). Staging the investments can potentially help to find a balance between overly high spending and too little cash.

Criteria lists: One of the most frequent mechanisms in evaluation is the use of *criteria lists* (Block, 1982; Block and MacMillan, 1993; Knight, 1988, 1994, MacMillan et al., 1985). These lists proscribe the investment criteria of the venture investor. According to Block and MacMillan (1993: 54) a company:

“...should define enough criteria to enable managers and potential investors to determine that a proposed venture is consistent with the firm’s overall strategy, likely to produce worthwhile results and feasible for the firm to undertake”.

This stream of literature recommends that in order to select the “best” ventures, corporate venture companies should develop and define both: 1) general criteria (i.e. those which may best reflect a potential ventures' fit with the overriding strategy of the corporate venturing initiative) and 2) specific criteria which stems from encompassing various aspects of the general criteria (i.e. criteria relating to the specification of products, markets or technologies). The general criteria should reflect both the specific goals for the venturing activity and the corporate strategic goals of the parent company. Specific criteria include evidence of consumer needs and the capability to satisfy these, competitive advantage, and various financial criteria (Block and Macmillan, 1993).

In the following, specific criteria are object for the review. The selection criteria often look like the one provided by Block and MacMillan (1993):

- **Is the opportunity consistent with the firm’s strategy?**
 - What factors produce this opportunity?
 - What are the character, size, and nature of the market?
 - What factors are required for the proposed ventures success?

- **Is it worth the effort?**
 - What is the time to break-even?
 - What are the stable gross margins?
 - What is the Payback time?
- **Is it feasible? (Can we do it?)**
 - Can the corporation facilitate the resources required?

Research has shown that inexperienced venture managers often use the same criteria as experienced managers (MacMillan and Day, 1987). Obviously, working with investment criteria does not solve the information asymmetry problem alone, but only directs what to do with the information when first collected and how to secure representation of different stakeholder interests in the decision making process. The need for knowledge is, for example, tackled by employing an analytical team for evaluating proposals, producing recommendations for selection, and reporting to senior corporate executives (Block, 1982). The team should contain skills of market demand, technical and financial. This should be combined with empathy and understanding of the venturing process (Block, 1982).

From the venture capital tradition most studies about the criteria used for investment decisions have found that management-related-criteria are key factors in influencing their decision-making (e.g. Bachher and Guild, 1996; Hall and Hofer, 1993; MacMillan et al., 1985). MacMillan et al. (1985) summarize their findings:

“There is no question that irrespective of the horse (product), horse race (market), or odds (financial criteria), it is the jockey (entrepreneur) who fundamentally determines whether the venture capitalist will place a bet at all” (p. 119)

The capability of the management team to manage the venture is often seen as an investment criterion. Venture capitalists often prefer to select an investment opportunity that offers a good management team even at only reasonable financial and market characteristics (Muzyka, Birley and Leleux, 1996). Shifting the selection focus away from the entrepreneurial opportunity to the management team’s previous track records is an attempt to reduce the effect of information asymmetry. Since it is difficult to analyse the future prospects of a venture idea, evaluating the team based on their past performance can be a more reliable measure. Such analysis includes the entrepreneur’s former experiences with running an entrepreneurial firm, their knowledge of the industry, the team composition etc. Investor’s often stress evaluation of the entrepreneur mostly in the earlier phases. The marginal importance decreases as the company reaches a more mature

level. This is a natural reflection of the disclosure and exploitation of knowledge as the venture develops. Cash flows seem to play a modest role when evaluating firms in early phases. Lastly, the management team of the venture always is important during evaluation.

In corporate venturing, it is important that the selection criteria also cover issues such as operational relatedness. Operational relatedness measures the degree to which venture ideas relate to the core capabilities of the parent organization and expected strategic importance for corporate development (Burgelman, 1984).

While both the academic and the business community have paid significant attention to criteria lists, from which investment decisions can be made, others have argued that such lists only contribute limited use and value (Shepherd and Zacharakis, 2002). The first critical element of using criteria lists is that the value of early stage ventures is difficult to assess. Since the ventures value proposition is new to the market, criteria of sales prognostics provide only limited value. As mentioned earlier there is a high degree of uncertainty with the commercial potential of the ventures offering, and the focus of the entrepreneurial firm can easily change depending on exogenous shocks (Casson, 1997). With limited information available, the foundation for decision making is very incomplete.

Secondly, the criteria lists, and the answers to the questions they pose, can be easily manipulated by the entrepreneur himself. This is due to the problem of asymmetric information between the corporate venture investor and the entrepreneur, which was mentioned earlier. The principal/agent theory would argue that the entrepreneurs have an interest in providing overly “optimistic” figures and estimates regarding the future potential of the business opportunity, to give a better evaluation of the venture opportunity.

Thirdly, many of the factors which are value-adding for a new venture are difficult to quantify e.g. skills, excess to network, experience etc. In essence, rating the performance of a particular business opportunity on a list of specified criteria can be difficult. Lastly knowing when enough investment criteria have been added to the list and measure and their appropriate weight is equally difficult to determine.

However one of the reasons why criteria lists continue to be used in the evaluation of ventures is to enhance the legitimacy of the venture process. Venture managers need to justify the investment decision and thereby pose legitimate arguments. The list also creates a guideline of what to look for when presented with an investment proposal.

Emotional parameters: It is unavoidable that the evaluation process is also coloured by emotional and personal parameters when dealing with entrepreneurial ventures in early phases.

Since the investment criteria only provide limited information on the ventures success, other means need to be included. Consequently the investor's evaluation is often assisted by a backbone feeling of the ventures potential and the personal chemistry between the venture capitalist and the entrepreneur (Isaksson et al., 2004). Practitioners claiming this view often use an evaluation approach when considering new investments sometimes referred to as "common sense" or "pit of the stomach". The method is based on investors' experience, knowledge and intuition, thus relying upon the personal skills of the investor. Research of Shepherd et al. (2003) found that venture managers with over fifteen (15) years of experience makes more accurate perditions in rating the business ideas. It could be argued that they have a more "reliable" "pit of the stomach" then less experienced venture managers.

The rather intuitional nature of the common sense approach makes it difficult to determine when a certain investor actually uses it, however as mentioned earlier venture managers seldom make use of the potential decision aids available (Shepherd and Zacharakis, 2002). It may well be an unconscious use of the approach as well as a conscious one. It is often observed that when the next round of financing is needed, the valuation of the firm may considerably alter the initial estimation even under the same market conditions. One could however claim that what determines the "common sense" or "pit of the stomach" is matter of experience and better knowledge of the evaluation methods, and their respectful impact. Therefore this kind of decision-making could be just as qualifying as rational decision-making.

Venture managers often place "pit of the stomach" equal to trust issues. They argue that the evaluation of venture most often is determined by the trustworthiness of the entrepreneur to complete a given task. Isaksson et al. (2004) focused on trust between the portfolio firm and venture capitalist in order to explain the linkage between governance and trust. The analysis shows that trust has a positive effect on performance and that the simple relationship between venture capitalists governance of portfolio firms and portfolio firm's performance can be explained by an indirect effect whereby governance increases trust in the relationship that in turn has a positive effect on performance. In other words, governance is only having a positive effect on performance if there also is trust in the relationship.

From the above review, there still remains a gap as to how venture capitalists prepare for making investment evaluation. This thesis fill part of this gab by arguing that the preparation is determined by the knowledge creation needed for making a sound investment evaluation. In a 1988 article, Bygrave argues that venture capitalists operate in a network environment. Bygrave (1988) demonstrates the importance of information sharing between venture capitalists to reduce the uncertainty inherited in the investments. The principal means of reducing risk is through

syndication of investments in a network of fellow venture investors. Other authors have argued that in addition to the acquired information from fellow investors several other benefits exist for venture capitalists to operate in networks of different structures – many of these found in the knowledge creation used for evaluation. Kreiner and Schultz (1993) emphasize (in a study of collaboration in the biotech sector) the relevance of having access to up-to-date information: In turbulent and fast developing fields, traditional sources such as journals etc. are not sufficient, as they do only provide information of where the technology frontier was in the past, but not where it is now. If firms are to react to "windows of opportunities", they have to be participants of the network since this is their access point to new opportunities (Powell et al., 1996; Kreiner and Schultz, 1993). To further investigate these networks, the following section provides a review of the relevant network literature. Special attention will be given to the different kinds of structures and relations that venture capitalists can engage in. This review contributes especially to Study II (Jørgensen and Vintergaard, 2006) and Study V (Vintergaard and Husted, Submitted).

2.3.4 Network structures for evaluation

To understand the notion of networks and how corporate ventures can use these, an initial review of the literature provides a foundation. As one of the pioneers in the field of assessing networks and a counterpart to classical and neoclassic economics, Granovetter (1985), developed the notion of embeddedness. In his well-sited work from 1985, he critiqued the classical and neoclassic economics for viewing humans as under-socialized actors, and modern sociology for its conception of over-socialized man. He presents the idea that most behaviours are closely embedded in networks of interpersonal relations. Granovetter examined the problem of trust and malfeasance in economic life. He uses the previously presented "market and hierarchies" argument of Williamson (1975) to illustrate how the embeddedness approach generates different understandings and predictions from that implemented by economists. Later other authors have likewise critiqued the market and hierarchies approach and argued for a unique form of governance (e.g. Gulati, 1998; Powell, 1990).

Among others, Williamson tries to answer the following question: under what conditions economic functions are performed within the boundaries of hierarchical firms rather than by market powers that cross these boundaries. Williamson (1986) argues that:

“...the markets and hierarchies approach is interdisciplinary in that it draws extensively on contributions from both economics and organisation theory” (p. 7)

Granovetter (1985) criticized this by arguing that even with complex transactions, a high level of order can be found in the "market" - that is, across firm boundaries - and a correspondingly high level of disorder within the firm. The natures of human relations and networks between and within firms determine whether order or disorder, sincerely of malfeasance, will succeed. Granovetter (1985) further criticized the assumptions about hierarchical structures. He argued that social relations between firms are more important than power within firms, in bringing order to economic development. Granovetter (1985) makes the point that Williamson (1975) overestimates the effectiveness of hierarchical power within organizations. He further claims that whenever internalization within a firm does lead to a better handling of complex transactions; it could be due to the increase of the density of social relations within the firm of previously independent market entities. Complexities that arise, when formal agents negotiate with one another, can be resolved by implicit or explicit power relations among firms and not only by the assumption of all parties under a single hierarchy. For Granovetter (1985), networks of social relations, rather than institutional coordination or generalized structures, are responsible for the production and maintenance of trust and order in economic life. By analyzing concrete patterns of social relations, the embeddedness approach makes no all-encompassing predictions. Rather, it assumes that the details of social structure will determine the outcome.

Relational and structural embeddedness – Strong and weak ties

Building on Granovetter's work on embeddedness, the notions of relational and structural embeddedness was developed (Gulati, 1998; Granovetter, 1992, 1973; Rowley, Behrens and Krackhardt, 2000). Departing in the overall social context in which both social actors and firms are embedded, Gulati (1998: 295) argues that such structural context could be parted into two: First, relational embeddedness characterises relationships and second, structural embeddedness describes the relationship structure:

“Relational embeddedness or cohesion perspectives on networks stress the role of direct cohesive ties as a mechanism for gaining fine-grained information.... Structural embeddedness or positional perspectives on networks go beyond the immediate ties of firms and emphasize the informational value of the structural position these partners occupy in the network” (Gulati, 1998: 296).

Relational embeddedness is often analysed based on the kinds of ties which are established between social actors. These ties may be strongly or weakly connected.

One group of researchers claims that densely, embedded networks grants competitive advantage (Powell, Koput and Smith-Doerr, 1996; Powell 1998; Seufert, Von Krogh, Bach, 1999).

Granovetter (1992) argues that strong ties facilitate the exchange of important information and tacit knowledge since strong ties are built on a high level of trust and insight into the partnering company's organisation. Actors who share direct connections with each other are likely to possess more information and knowledge about each other (Gulati, 1998: 296). There is a common understanding that networks of social actors that are often highly involved with each other and therefore have strong ties, will more likely develop a shared understanding based on mutual interaction and discussion (Coleman, Katz and Menzel, 1966). Therefore, companies bound together by strong ties also often become very dependent on each other (Rowley, Behrens and Krackhardt, 2000).

In tightly linked networks, information about the behaviour and performance of the individual participant in the network travel faster and dense network are therefore better at reducing opportunism (Ahuja, 2000). Closeness and the strength of ties between network participants are important factors in the ability to mobilizing knowledge between firms (Granovetter, 1985). Repeated partnerships seem to be more important than proximity of firms in the network for stimulating exchange of valuable knowledge (Soh, 2003). The explanation may be as Bouty (2000) points out that the sharing of valuable knowledge between firms depends on the level of trust among the exchange partners and this trust is matured through past successful exchanges. As economic literature has pointed out, in a venture capital context, investment syndication is a mechanism by which trust is created around a specific investment and knowledge is shared. The legitimacy of such investment is built on trust and is something which develops over time. Repeated interorganizational collaboration often results in increased trust, developing and improving collaboration routines and reduces opportunism. One could argue that since evaluation in corporate venturing demands a trusted network partner, then it should be expected that direct ties are more important. As argued, strong ties to network actors promote knowledge transfer; they however hold search disadvantages (Hansen, 1999). Acknowledging that working with a broad set of actors will enhance corporate venture diversity of information; strong ties are not always efficient.

Weak ties, on the other hand, do not involve the same degree of dependency (as strong ties) and they do not facilitate the type of information exchange and therefore do not require the same level of trust building. They do still provide novel information by functioning as gatekeepers to other companies hereby acting as a kind of sensor following up on new trends and ideas (Granovetter, 1973). Loosely connected networks carries the advantages that they are cheaper to obtain information from because of the lower maintenance costs (Burt, 1992) but also because indirect ties reduce the cost of social interaction in the form of time and investment required to gather information (Nahapiet and Ghoshal, 1998). Even though it is known that indirect ties

primarily support information spill-over (Ahuja, 2000) they carry the advances of a broader base of connections.

Seen in connection to the structure of the strategic networks, Rowley, Behrens and Krackhardt (2000) discuss whether or not strong or weak ties enhance performance is contingent on the environment. In settings with little uncertainty and a high demand for exploitation of existing product or processes, strong ties are more efficient as they facilitate information of tacit knowledge, high quality information and hereby learning. However, where uncertainty is high and exploration is crucial, relationships bound together through weak ties is the best solution to improve performance as they provide quick access to new trends and opportunities (Rowley, Behrens and Krackhardt, 2000). Direct and strong ties promote the exchange of knowledge and resources, however, weak ties favour knowledge search (Burt, 1992). This does not imply that an actor in a certain environment should only favour one type of tie binding mechanism. According to Rowley, Behrens and Krackhardt (2000) a mix of the two types would be beneficial but depending on the environment one type should be dominating. A company hereby avoids getting locked in to a certain structure.

Contrary to relational embeddedness, structural embeddedness concerns the informational role of the position that an actor or firms occupy in a network (Gulati, 1998). This type of embeddedness analyses the firm as a position in a larger system. From the perspective of structural embeddedness, a picture will also emerge of the firms who are directly connected. While most network theory highlights the information advantages between social actors or firms Burt (1992) and Gulati (1998) also emphasises the control benefits of being in a network. Actors who manage to locate themselves in-between two or more actors gain the advantage of being the *tertius gaudens* (i.e. a broker). Once a firm begins collaborating, it gains experience in cooperation and a status as a partner (Powell et al. 1996). In the context of venture evaluation, such a position is valuable as the investor can obtain a key position between investors and new ventures. Experience will over time help the corporate venturing firm to be more effective in exploiting collaborations. Reputation, on the other hand, is a fertile ground for both formal partnerships and an expanding array of informal "relationships". This is very important; as a broad range of collaborative endeavours provides central connectedness in the network and help generate visibility and over time access to resources. Such a central position can be of extreme value to uphold but also requires firms to overlook the entire network. For further insight to the use of structural embeddedness of firms please see Study II (Jørgensen and Vintergaard, 2006) and Study III (Husted and Vintergaard, 2004).

Burt (1992) refers to the issue of maximising a company's possibilities within its strategic network by incorporating what he refers to as "structural holes". His arguments are based on a combination of sociology and traditional economic ideas of monopoly and oligopoly powers. The main point in his arguments on structural holes was developed based on network theorists such as Freeman's (1977) concept on betweenness centrality, Cook and Emerson's (1978) and Cook et al. (1983) exclusive exchange powers, and Burt's (1980) own analysis of structural autonomy created by network complexity.

As an important element for understanding the concept of structural holes, we start with Freeman's (1977) review of different kinds of measurements on centrality in social networks. In this review he finds their methods misleading as measures. As a counteraction and an extension of the arguments, he developed the notion of betweenness centrality from Bavelas's (1948) perception of centrality. In this analysis Freeman argue that individuals can find themselves in a negotiation and communicating position between two or more social actors. In the work from Cook and Emerson (1978) and Cook, Emerson and Gillmore (1983), the relation between actors was further analysed. In Cook and Emerson (1978), the analysis of social agents is analysed using a laboratory method to analyse social structural determinants of power and normative constrains on the use of power. They propose that social exchange networks are frameworks for bargaining structures. What Cook and Emerson (1978: 721) find is that:

“...(a) power is an attribute of position in a network structure observable in the occupant's behaviour, even though the occupant does not know what position or what amount of power s/he possesses; (b) equity or justice concerns constrain the use of that power; (c) emergent interpersonal commitment impede the use of power; and (d) when power is unequally distributed among actors in a network, females form stronger commitments to their exchange partners than do males”.

A further theoretical component for understanding the structural holes argument came from Burt's own work from 1980 about "structural autonomy". This concept embeds aspects from both oligopoly theories (economics) and group-affiliation (sociology). From a network perspective, this proposes an analytical framework for seeing a pattern of relations. This analysis defines an actor's position in a system that determines his autonomy, that is, his ability to pursue and realize interests without constrains from other actors in the system (Burt, 1980: 893)

In combining these authors, they contributed to the structural holes argument. Burt (1992) argues that a company has a number of redundant relationships i.e. relationships that relate to the same persons and hereby provide access to the same kind of information. Henceforth Burt (1992) argues that it is important for a company to incorporate some non-redundant relationships i.e.

relationships that are strictly dyadic with no further relation to any other of the company's relationships. These relationships are connected by what Burt (1992) calls structural holes. Structural holes are thus defined as:

“a relationship of nonredundancy between two contacts” (Burt, 1992: 65)

Due to the existence of structural holes and non-redundant relationships, access to information and persons are obtained, that does not relate to the knowledge already obtained, from other relationships. New information is thus added that does not overlap with already existing knowledge (Burt, 1992). Non-redundant relations are often represented by Granovetter's (1973) weak tie binding as they function as a kind of safeguard by keeping possibilities open to the company in case of unforeseen problems with its redundant relations or due to environmental change. Hereby, avenues are kept open to take action that is not facilitated by the dominant structure. In other words, by adding some loosely coupled relations representing the opposite form of tie binding than the general structure of relationships within the business network a company can avoid getting stuck in an unwanted position (Ibarra, 1992).

As argued, several different positions in a network can facilitate the knowledge needed for venture evaluation. The different structures and tie-binding facilitates knowledge creation in different ways. Understanding the different values and drawback from the structures are of essence. However, much of the information needed to make a proper evaluation requires that the investor is part of the innovative process or has significant insight to the process. Investors can also benefit from considering the network arguments for venture creation and opportunity discovery.

The content of the above review of literature has provided a foundation for the studies in this thesis. The review has provided insight to what has currently been written in the field of corporate venturing and how this can be complemented with new perspectives from knowledge creation, network and entrepreneurship litterateur. This has lead to a new understanding of how the dynamics of idea development, discovery and evaluation better can be explained. Such explanation includes the actors and the structures which drives and supports the innovative development.

The individual studies in the next section draw on the review independently and base many of their arguments on this foundation. In this section, the studies and their connections are presented. This will be followed by a general conclusion and discussion.

3. THE STUDIES

The above positioning and literature review has materialized into 5 studies representing a combination of: International peer review articles and book chapters. A summary of each of the studies, and the connection between these is followed by the full versions. The studies included in this thesis are:

- I. Munk, B. K and Vintergaard, C. (2004). Accentuating the role of venture capitalists in systems of innovation. *(VEST) Journal for Science and Technology Studies*. 1-2(17): 65.
- II. Jørgensen, H. and Vintergaard, C. (2006). *Connecting Company Strategy and Network Identity*. In: *Managing Dynamic Networks Organisational Perspectives of Technology Enabled Inter-Firm Collaboration*. Poulymenakou A. and Klein S. (eds.) Heidelberg: Springer.
- III. Husted, K and Vintergaard, C. (2004). Stimulating innovation through corporate venture bases. *Journal of World Business*. 39(3): 296-306.
- IV. Vintergaard, C. (2005). Opportunities in Corporate Venturing – Actors Creating Passageways. *International Journal of Innovation Management (IJIM)*. 9(1): 215-239.
- V. Vintergaard, C. and Husted, K. (Submitted). *Corporate Venture Companies Linear and Dynamic Evaluation Strategies for Science Based Venture Opportunities*. In: *Handbook of Corporate Entrepreneurship* by Shaker Zahra. Elger.

Summery and connection between the studies:

Study I

Research question: What is the unique role of venture capitalists in facilitating innovation?

(Munk and Vintergaard, 2004) creates through a network perspective an understanding of the role of venture capitalists in the framework of the national innovation system. While recognizing the importance of corporate and traditional venture capitalists in supporting innovation the literature so fare provides only limited information the role of venture capitalists in society in relation to other actors in the innovation system.

Study II

Research question: What are the relations between a company's network strategy and its corporate strategy?

After having mapped the role and importance of venture capitalists in Study I the reader become aware that managing social networks is of essence. The second study analyses how companies

use their network as part of their overall strategic intent (Study II). In this study Jørgensen and Vintergaard (2006) creates a link between different business typologies and their network strategies. While acknowledging that different companies peruse different strategies we know little about how this relates to how they manage their network.

Study III

Research question: How can corporate venture firms secure the development of innovative ideas by systematically working with the organization's venture base?

As the scene for corporate venturing has been set both from a micro and macro perspective, it becomes clear that the focus on early stages is very important; both from a theoretical and empirical standpoint. Understanding the early phase's dynamics is presented in Study III by Husted and Vintergaard's (2004) work, published in Journal of World Business. This study develop and understanding of the prerequisites for developing genuine original ideas – the venture base. The venture base includes those characteristics and prerequisites of a firm and its environment, which can serve as resources for starting new ventures.

Study IV

Research question: How do corporate ventures discover new investment opportunities?

Due to the innovative nature of the new ventures which come from the venture base; discovering the entrepreneurial opportunities becomes a key challenge involving a diversified set of actors (Study IV). Vintergaard (2005) argues in an article in International Journal of Innovation Management that the process of opportunity discovery needs special attention. Acknowledging the limitation of the framework; this study provides the first insights in to the dynamic passageways from which venture capitalists gain access to future ventures. The passageway represents a continuous development process of investment opportunities as they are shaped between a variety of actors.

Study V

Research question: What are the implications on evaluation strategies when relying on dynamic innovation models instead of the linear?

While Study III provides arguments for idea creation, and Study IV for opportunity discovery a gap still reminds as to how corporate investors prepare for the investment evaluation. In Study V Vintergaard and Husted (Submitted) it is proposed how corporate venture companies can design appropriate evaluation strategies to deal with the ambiguity of science based venture

opportunities. Especially the paper discusses the implications on evaluation strategies when relying on dynamic innovation models instead of the linear.

This section has provided insights to the connection between the 5 studies. The following will present the studies their full length. After the studies have been presented a general conclusion will try to embrace the work carried out in this thesis – presented in the final chapter.

3.1 Study I – Munk and Vintergaard (2004)

No. 1-2. 04. P. 41.64

VEST

vol. 17

Accentuating the role of venture capitalists in systems of innovation

Kasper Birkeholm Munk
&
Christian Vintergaard

ABSTRACT

In contemporary literature, venture capital financial infrastructures are identified as major contributors to a large proportion of today's innovations. Yet quite contradictory, the literature on systems of innovation, hardly ever treats venture capitalists as a coherent actor in neither national nor regional innovation systems. In attempt to locate and determine the potentials and importance of the venture capitalists in the innovation system, a two-dimensional taxonomy is constructed and used to illuminate their role and position. The taxonomy gains insight through theoretical reasoning and the possible location is exemplified by a case of the Danish venture capital market. It is argued in this article that venture capitalists stand a better chance of realizing their potential when they take and are given direct and formal responsibility in the innovation system. In relation hereto, the authors thus present initiatives to be taken to raise venture capitalists to a more direct and formal role in the context of systems of innovation.

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INTRODUCTION

What is the unique role of venture capitalists in facilitating innovation? Theoretical studies on venture capital closely link the existence of risk-seeking capital to the continuous development and formation of new products and processes (e.g. Kortum & Lerner 2000; Gompers & Lerner, 1999; Block & McMillan, 1993). Studies within the tradition of systems of innovation stress the relevance of network relations where innovation can happen through continuous interaction and collaboration between diverse actors (Lundvall, 1992; Nelson, 1993; Edquist, 1997; Chung, 2002; Niosi, 2002). Systems of innovation have emerged during the last two decades, especially working with defining the composition of innovation actors and their relations. The systems of innovation literature works implicitly with the existence of capital to facilitate innovative and collaborative processes, yet fails to explain how and where capital or venture capitalists can leverage resource problems and provide financial competencies. As a result, venture capitalists are seldom mentioned as more than an important factor for innovation-based growth.

At the same time, most of the studies in the area of venture capital and venture capital management takes place outside the system framework, whereby the potential role and influence of venture capitalists in the innovation system is rather neglected.

This paper therefore aims at providing a conceptual and theoretical understanding of the potential role and influence of the venture capitalist in the innovation system. By using the system of innovation approach, explicit strategies for venture capitalists to engage in collaboration with other innovation actors are formulated. Consequently the extracted contribution of the paper is presented in a coherence framework. It is argued in this article that constructing a macro approach describing and positioning venture capitalists in relation to other innovation actors, enhances both the self-understanding and the awareness in and between actor subsets. It is additionally argued that creating such understanding will support the possible synergies between actors in the innovation system and leverage possible resource constraints related to capital access and access to ideas.

Based on a theoretical discussion and an exemplifying case about actors in the Danish market, the paper analyzes venture capitalists in the system of innovation, in relation to mapping innovation actors and the relationships between the two. Primary effort is put on discussing how to realize the potential of venture capitalists as collaborative innovation partners in the system.

It is argued that incorporating financial structures, especially risk-seeking venture capitalists in collaborative arrangements (with different actors in the system of innovation), will cause macro economic benefits (i.e. support the development of new technology based firms). By committing to a closer relationship to *investees*, the venture capitalist will simultaneously gain strategic intelligence on markets, technologies, etc., hereby enhancing their capacity to select new investment opportunities (Vintergaard and Husted, 2003).

THEORETICAL FRAMEWORK

Current research has discovered several economic drivers which influence the initiative for venture capitalists to engage in innovation, e.g. the past performance of venture capitalists (Balboa & Marti, 2000), GDP growth (Gompers & Lerner, 1998), the state of the IPO market (Jeng & Wells 2000; Black & Gilson, 1998) (Berlin, G&L), and the stock market capitalization growth (Jeng & Wells, 2000). However, little of this literature has viewed venture capitalists as a distinct actor group in a macroeconomic context – to some degree, neglecting the overall picture of how venture capital is related to other actors in the innovation system. Hence, the following will initially provide an understanding of the dimensions within the innovation system, and will later review how venture capitalists are perceived in this system.

Structuring the system

In order to ensure the most favourable involvement of venture capitalists in a larger macro economic perspective - i.e. to focus on the relationships that carry innovative capacity – there is an obvious need to understand the systems approach. A dominant part of the systems of innovation literature focuses on the

national level. The central theoretical and empirical contributions within this approach have been published during the last decades by the works of Lundvall (1992), Nelson (1993), Edquist (1997), setting forth a framework allowing for a systems approach in understanding the possibilities and opportunities in innovation (Lundvall, 1992, 2000). The national perspective in analyzing the innovative capacity of nations has become widely diffused and is now an integral part of the analytical tool-box of such organizations as the OECD and the European Commission.

The functioning of the system rests on the ability for all actors to interact. Interaction is facilitated through proximity and collaborative initiatives; joint research activities and licensing agreements between public and private sector actors. In this capacity, private sector actors can access and leverage the pure science competencies generated in public organizations. Institutions and the public sector can therefore realize the transfer and application of its technology into commercially viable products, thus achieving objectives for enhanced social welfare. Investigating venture capitalists as actors in a macro perspective helps us illuminate the possible potential of the venture capitalist in more general terms than a micro perspective would do.

The main assertions in the innovation system are intuitively and empirically based on a set of components, the relations between these components and the influence of institutions (Niosi, 2002, Edquist, 2001, Carlsson et. al, 2002). The components comprise a set of interlinked organizations of which the core is constituted by those organizations that produce, use and diffuse new knowledge. Relations comprise the links between these organizations, be they of formal, informal, human, regulatory or of commercial kind. A striking feature of the systems approach is the relevance of institutions. In the systems literature the term institutions is used to worked with from two angles, one as a complex set of normative structures, regimes and routines (Lundvall, 2000), and another as formal and explicit organizations (Nelson and Rosenberg, 1993). Though it is not the purpose of this paper to theoretically clarify this duality, it is important to stress that the term institutions in this paper falls between these two concepts and is used to describe both objects pattern behaviour and more formal organizations that create these objects. Yet, what is in our interest is to introduce the terms of formal and informal institutions. Formal institutions namely describe the previously mentioned "formal organizations" while the informal institutions refer to the existence of attitudes, norms and behavioural patterns constituting the innovation culture. The formal institutions in the innovation system are often equal to Etzkowitz and Leydesdorff's (1996) components in their Triple Helix model.

The influence of informal institutions on the innovativeness of the national economy is only slightly touched upon in previous research of this kind. Yet other contributions in scientific literature, outside the definition of innovation systems, point to the fact that informal institutions are also decisive for the innovativeness of a national economy (Saxenian, 1994). Schertler (2002) argued that a highly educated population might not be the same as a very entrepreneurial population with a lot of start-ups, but the very nature of the businesses that highly educated people are likely to start making venture capital funding very relevant. Distinguishing formal and informal institutions becomes a key element. As argued by Carlsson et al. (2002; p. 242):

A technological system has a number of different types of actors: firms, organizations, policy bodies, venture capitalists, etc. To evaluate the performance of a system, therefore, means to evaluate each of these players, not primarily as single entities, but connected in the entire system.

Hence we become aware that analysing the level of formality also becomes a key parameter in analysing actors in the innovation system.

Venture capital in the innovation system

When analyzing venture capitalists from a systems perspective, one needs to know how they relate to other actors in the environment. Taking a financial perspective on innovation, a very fundamental element is the distribution of venture capital investments (Gompers and Lerner, 2000; Hellmann and Puri, 2000; Kortum and Lerner, 2000) even though the macro economic benefits to some degree are acknowledged (Jaffe, 1996; Griliches, 1992). Other similar attempts have been made to illuminate the potential of venture capitalists from the entrepreneurship literature (e.g. Arrow, 1974; Evans & Jovanovic, 1989; Amit, Gloten & Muler, 1990). These strands of literature however reveal only limited attention to macro economic dimensions and places more emphasis on the individual actor in the system.

Based on research on industry clusters, it is known that venture capitals are often used as a proxy for clusters of success (Nilsson, 2001). This statement is followed up by Cooke (2002, p. 134) who argues:

Probably the key limitation on regional initiatives for advanced technology is funding for basic and applied research, since most regional administrations do not have remotely enough of such capital, especially in biotechnology. The second limitation is venture capital and other sources of investment capital for the commercialisation stages of biotechnology, although this is less of a limitation in certain cases.

The research of Nilsson (2001) also reveals a diversification in types of investors as markets mature.

Based on research from the Swedish market, venture capitalists serve a special duty in the innovation process, which reflects their competencies (Karaömerlioglu and Jacobsson, 2000). Karaömerlioglu and Jacobsson (2000) argue that the development of a venture capital market is also governed by the institutional set-up and economic context in which it operates. More specifically they argue that the growth of the venture capital industry is determined by its size, diversity and competence. Eilasson (2000) follows this line of argumentation in his work on competence blocs from institutional theory. In this framework he refers to venture capitalists as actors who should guide the selection of successful innovations through their competent filters.

Much of the research which has been conducted on venture capitalists, reveal only limited attention to the macroeconomic positions. The center of attention is how capital is distributed to entrepreneurs, and less on what makes this actor group unique. As argued by Van Kersbergen and Waarden (2001, p. 1):

[...] the concept of institutions has mostly been reduced to organization sets that provide resources, possibilities, and constraints for innovation: banks, venture capital providers, research organizations, training 'institutes', unions, and standardization agencies. The literature recognizes that the organizations that make up 'national systems of innovations' are influenced by 'institutions', now used in the more specific meaning of 'norms, habits, conventions and rules' of a society. However, the latter remain largely unexplored".

By looking at some of the ways researchers have perceived venture capitalists in relation to the system of innovation, much of this seems plausible. It becomes evident that the venture capitalist is not considered a direct actor subset in the system, but merely as a resource provider. Many scholars within systems of innovation have implicitly treated venture capitalists in this way (Lundvall, 1992; Nelson, 1993; Edquist, 1996; Freeman, 1999). Freeman argues in *Venture Capital as an Economy of Time* (1999) that venture capitalists are an important participant in the innovative process as they provide funding for new ventures and also help build the new ventures. He further argues that this is done by making social connections to other important actors.

In combining systems of innovation theory and research of venture capitalists' present research, we discover a gap. In research on systems of innovation, we seek to explain how actors are connected and why. Ironically studies of venture capitalists in a contextual framework provide limited foothold for explaining their unique behaviour in connection to these actors. This leads us to believe that Van Kersbergen and Waarden (2001) arguments are also valid for venture capitalists. As indicated, venture capitalists are predominantly viewed as resource providers, making their exact role and potential difficult to analyze. To an even greater extent it becomes difficult to determine what makes them distinct from

other actors in the innovation system. Consequently their relations to other actors in the innovation system and their possible position and role in the innovation systems become open-ended. What seems to be missing is unfolding their relative involvement in the innovative process and their level of formality.

Consequently the following case of the Danish venture capital market has been selected as an illustrative example of the arguments presented in the paper. The case serves as a practical illustration of how venture capitalists have tried to position themselves in relation to other innovation actors. Based on the case and our knowledge of systems theory from organisational behaviour, a framework will be presented in this paper to illustrate the uniqueness of venture capitalists in relation to other actor groups.

VENTURE CAPITALISTS IN THE DANISH SYSTEM OF INNOVATION

In order to provide examples of the current role and positions of venture capitalists in the innovation system, the following case functions as an illustration (Eisenhardt, 1999; Glaser and Strauss, 1967). The empirical evidence offers a rich illustration of how venture capitalists perceive themselves in relation to actors in the innovation system.

The data presented here consists of 25 in-depth semi-structured interviews conducted in 15 venture capital organizations. The organizations were selected according to their industry focus with the intention to cover as many different sectors as possible (Yin, 1984). All the chosen organizations render traditional venture capital services, by which we have excluded informal investors such as business angels as well as corporate investors.

The interviewees from the 15 organizations were all selected from top and middle management in order to get data from seniors with several years of experience. It was the intent to interview somebody who represents the strategy of the venture capital investor. The interviews were carried out from November 2002 to March 2003. The interviews covered a wide range of themes relating to network interaction, selection criteria, knowledge sharing, political influence and the incentives to increased interaction as an actor in innovation-related setups to mention a few. Each interview lasted approximately 2 hours and were all tape-recorded and transcribed. Transcribed interviews were sent back to interviewees to rule out possible misunderstandings. Later the context of the individual interviews was organized in themes relating to the overall theoretical framework for this paper. In the following empirical case a combination of citations and explanations will be used. Each citation has been selected based on its appropriateness for explaining and exemplifying the role of venture capitalists in this context.

Additionally the case is supported by peer review articles, books, news services, venture capital statistics etc.

Role and position in the innovation system

The Danish venture capital market is relatively young compared to the rest of the European countries and especially the United States. The market was initiated in the late 70's and the early 80's. From 1982 to 1985, 10-15 new venture funds were established. The positive development, however, did not last and a few years later the number was reduced to only a few (Christensen, 1998, 2000). After this downturn, it took almost 10 years before focus once again was on venture capital in Denmark. In 1992 the establishment of the governmental institution, the Danish Investment Fund, again shaded light on the entrepreneurs. The focus has remained since 1994, although the market experienced a downturn after the year 2000. Today, the market for venture capital is growing, which is supported by statistics concluding that the total number of venture capital companies increased from 33 in 1998 to almost 70 today (EVCA, Vækstfonden 2003). The same sources also report a high level of diversity in the types of investors. We know from the venture capital research (e.g. Gompers and Lerner, 1999; Cowling, 1999) that venture capitalists pursuing different strategies also have a significant impact in engaging in innovations.

The Danish venture capital industry is still trying to find its feet and define what kind of role it should play in the innovation system. Lars Bruhn, managing partner of the venture capital company IVS A/S and former chairman of the Danish Venture Capital Association, clearly states: "I hope that we will get more venture capitalists in the market that take active part in influencing the political agenda". Trends towards a more mature market have however started to show. As an example, it can be mentioned that the Danish Venture Capital Association (DVCA) is increasingly making an impact. In 2002 to 2004 DVCA had established several committees in order to influence the political agendas and ensure the right climate for venture capitalists. Trends towards a greater interest in developing the market however, have started to show by the Danish Government. The DVCA succeeded in getting 5 out of 10 suggestions accepted by the government in 2003. DVCA has established several committees in order to influence the political agendas and ensure the right climate for venture capitalists. The latest committee which has been established is trying to support and promote education in entrepreneurship and venture capital. This initiative also tries to create the link between entrepreneurs and venture capitalists. Other committees are responsible for supplying historical market data, which can later be used, or decision-making and international comparison.

It is argued by Thor Birkmand, Futuri Invest, manager of Slottsbacken Funds, that such initiatives are needed as "...entrepreneurs are not as well aware of venture capital to help them grow their business as in many other countries". He further argues, "... as a result of the immature Danish market many entrepreneurs perceive venture capitalists as hunters that shoots around and pick up whatever ends of on the floor". He stresses however that many venture capitalists operate in an immature fashion, in the most sense more like traditional financial institutions than venture capitalists. Most of the initiatives in DVCA still remain on the basis of volunteers. In order to gain more momentum on a macro economical level Thomas Weilby Knudsen (Chief Financial Officer) InternetventuresScandinavia A/S stresses "Even though IVS do not formally have a task in this context, we do prioritise active work in organizations such as DVCA [Danish Venture Capital Association] and other organizations, in order to improve conditions for innovation"... "As IVS is dependent on attractive investment cases, it is part of our concern". These statements give indications that only a limited proportion of the Danish venture capital industry has yet started to influence agendas on macro economic level – becoming a more formalised group of actors. As part of this development, a number of actors see the possibilities and incitements to pursue a more formal existence in the innovation system.

In relation to governmental influence, venture capitalists are also seeking additional help too boost the support to new ventures. Poul Andersson, CEO of the investment company BioVision, says "When venture funds move to a higher level on the scale of risk they leave an open gap where there is no funds to push the companies further on. If the early projects are not to die out there is more then ever a need for the government to take on a proactive role". In this relation, Mark Sonne Kharazmi from Danske Venture Partners/Nordic Venture Partners argues that venture capitalists have just initiated actions that will influence government decisions. This initiative included a list of practical initiatives to improve the conditions for venture capitalists. Mark Sonne Kharazmi further argues that venture capitalists are starting to find niches in which they can specialize, thereby they will create a broader interface with the market, and become known to a larger group of actors.

A large proportion of new venture capitalists in the market spend most of their time on developing their business structure while spending limited energy on positioning activities e.g. influencing the degree of innovation. This indicates little interest in fertilizing the grounds for new innovations.

Many Danish venture capitalists count on the educational system to provide good investment opportunities. In relation to the educational system Henrik Albertsen, managing partner and CEO of the Danish venture capital company Nordic Venture Partners expresses: "We need to have an educational system, which is of international standard. It's our job to discover, evaluate and capitalize on this research". A similar quote from Thomas Weilby Knudsen (Chief Financial Officer) position the role of Internetventures Scandinavia A/S (IVS) in the Danish innovation system: "IVS sees its role as twofold: as a facilitator of the innovative environment, and as a partner. The facilitator role is visible through our

promotion and investment in companies, thus creating further growth and success stories about innovative entrepreneurs who succeed in building a business. As a partner IVS is highly dependent on sourcing for its investments opportunities. The innovative environment is an important source". Directed by the quotes, it becomes obvious that the role ascribed to venture capitalists is focused on the area of facilitating the innovation process, rarely taking an active part in actual creation. This goes hand in hand with the early theoretical separation of markets. In relation to the involvement, the following quote answers the question of whether Internetventures Scandinavia A/S takes active part in the innovation process: "No, however, we do spend effort on improving conditions for entrepreneurs on different levels," says Thomas Weilby Knudsen.

The practical distinction of markets is very much grounded in traditional financial funding as provided by banks and other credit institutions. The common perceived value-adding element of venture capitalists lies in their ability to help entrepreneurs develop their idea into a viable business. These quotes provide some empirical perspectives: "We meet entrepreneurs who believe that having a significant technology is equal to a brilliant firm... it is one of our obligations to make these evaluations and aid management and entrepreneurs to best possible approach the market and then later on bring these to market" (Thor Birkmand, Futuri Invest, manager of Slottsbacken Funds). An additional quote further underline this point, "It is our role to provide capital, but also advise and make resources available that the entrepreneur didn't have access to before" (Helle Busck Fensvig, Partner, Danske Life Science). Helle Busck Fensvig further argues "This type of active involvement in the investment is something that is often stated by Danish venture capitalists, but something that they rarely do". Venture capitalists are however well aware that innovation is the main fuel for their business model. Indirect action for improving such conditions has therefore also started to be formulated as direct proposal to the government. DVCA tries through its committees to ensure that the pipeline is filled with new venture ideas, while at the same time creating general support to the industry.

The case provides examples as to how venture capitalists see themselves in the innovation system. Only in rare cases venture capitalists take part in the process of idea creation and consequently early phase innovation, and acknowledging this fact, we find evidence that the heterogeneous nature of the venture capital market makes the result less significant. Henrik Albertsen, Managing partner, CEO of the Danish venture capital company Nordic Venture Partners illustrates this diversity by saying "We represent some of the actors which are actively search for ideas at the universities ... other actors are more relying on follow on investments which demands less active involvement". This underlines that venture capitalists engage in investments at different stages and therefore also in the innovative process (Elango et al., 1995). Venture capitalists, who have the primary objective of investing in later stages, consequently run the risk of not being viewed as a direct component in the system as such, but function as a facilitating sub-layer providing innovations with financial resources for it to develop. Yet, some venture managers from the Danish case indicate that the sector is in a transitional phase and that in future perspective venture capitalists might gain enough market intelligence to identify special viable opportunities in the market and later on act on these. It is left unsaid if this will result in a higher level of engagement with the process of innovation or if venture capitalists will become competent in recognizing opportunities and later evaluate them. According to Henrik Albertsen (Managing partner, CEO, Nordic Venture Partners) it will most likely be the latter: "...we are not here to create innovations... we are here to make evaluations and participate in the subsequent value adding process"

Referring to Lars Bruhn's (Managing partner, IVS A/S and former chairman of the Danish Venture Capital Association) statement of setting political agendas, one might however make the distinction between the level of engagement in influencing political agendas that will subsequently provide better opportunities for the venture capital industry, and their direct engagement with the process of innovation. This indirect/direct influence will consequently provide important dimensions for analyzing the role of venture capitalists in relation to other actors. The case together with the previous theoretical review provides an indication that the degree of involvement in innovation is only one parameter when mapping the venture capitalist's role and importance; the level of formality as an actor subset is equally

important. A better understanding of this connection is provided in the coming chapter.

CREATING CONSENSUS

It is historically grounded that venture capitalists are not as publicly known as other financial institutions. The early rise of the venture capital industry and its development towards maturity was initially constituted of “business angles”. A common characteristic of these business angles is that they are individual investors investing their private money (Mason and Harrison, 1992). Quite obvious these single individuals, not being part of a larger organization, were not as identifiable as the larger organization in the institutional landscape (Fenn and Liang, 1998). These elements have however shied in mature venture areas, yet we find these characteristics present in the Danish case. Comparing mature and immature venture capital industries thus show conspicuous differences in the degree by which venture capitalists have established themselves around a professional body or community. Evidently Danish venture capitalists to a lesser degree, have established themselves as an actor subset or community, whereby their official appearance as a collective in the innovation context is blurred. This problem is in many cases due to the fact that venture capitalists to a large extent have relied on their informal relations and specifically their ‘nose’ for sniffing up good investment proposals, reserving fewer resources for positioning activities. Mitchell Berlin (1998) argues that most venture capital firms often consist of small independent partnerships with a professional staff of between 6 and 12 people, including a few general partners and a small number of associates who are venture capitalists in training. This naturally makes the individual venture capitalist appear less formal than traditional banks, which are far greater in size (Berlin, 1998).

Callahan and Muegge (2003, p. 641-667) argue that only:

In rare instances, a venture capitalist may become involved in the development of a new venture before it is ready for investments of the size and type appropriate for VCs. More commonly, however, the deals seek out the VC, who often maintains a high profile in their investment community – spending significant amounts of time at business events and conferences. The timing of VC financial entry into an opportunity can depend greatly on the supply of and demand for good opportunities by VCs.

Following this line of argumentation, researchers such as Hellman (1997) stress that if investors play an active role in the development of new start-up companies, the identity of the investor becomes an important determinant of the venture process. Trying to deal with this problem venture capitalists often make syndicate investments and exchange good proposals (Amit, Glosten, & Muller, 1990).

Even though research in this area is only an indirect representation of venture capitalists practice it does give a clear indication of how the relationship is between the innovation system and venture capitalists. Venture capitalists can primarily be seen as organizations that are willing to provide risk-willing capital in return for an abnormal payoff (e.g. Block & McMillan, 1993). A central issue is to be found in the strong separation of markets for capital and entrepreneurial opportunities. Venture capitalist and the primary innovation network often do not see one another to have inter-correlated interests. There is a strong belief that separate organizations should do what they are best at (Thornton, 1999). In this way the components and relations in the system of innovation should be the ones providing innovations and venture capitalists should be the ones, exploiting these opportunities (Sarasvathy, Dew, Velamuri and Venkatarman, 2003).

A partial reason for this indirect position in relation to the innovation system is stemming from a strong belief that venture capitalists cannot contribute with any value in the innovative process. There is a common perception that the value that these organisations render should be brought in much later in the process: i.e. exploring the opportunities, staffing, growing the business etc. It is often argued that venture capitalists play a critical rule in the innovation process, not only as a source of finance to innovation but through other functions that lie at the core of high tech development (Burgelman, 1985). Another reason for the level of directness in the approach of the venture capitalists might also be found in not knowing where and how the contribution should take place. The venture capital actors in many cases carry traditions from traditional funding; such as we know it from banks and other financial institutions.

Taxonomy

Condensing the illustrations from the Danish case and the present research on venture capitalists in the system of innovation, a framework starts to take shape. The clarity by which venture capitalists operate in the system with clear tasks to fulfil is only in the making in the Danish case. This development can be seen in perspective of network theory, where there is an increased focus on formal or informal positions as the locus of innovation (Pyka 1997, Waldstrøm 2001, Dahl 2002, Cross et. al., 2002). These theories help to provide one dimension of the position of venture capitalists: formality or informality. This dimension of formality/informality helps us determine the possible potential of venture capitalists and also provide an important element in the taxonomy. This determines to what degree venture capitalist are known in the system. The analytical context, when looking at formal/informal factors influencing innovation, implicitly touches upon the extent and scope by which formal and informal entities influence innovation. Adapting the formal/informal terms to the taxonomy with connection to the innovation process also reveals the concepts of direct/indirect influence on the innovation process i.e. are the actors formally or informally involved in the innovation process and is the involvement direct or indirect. Direct/indirect naturally refers to the degree involvement in the innovative process.

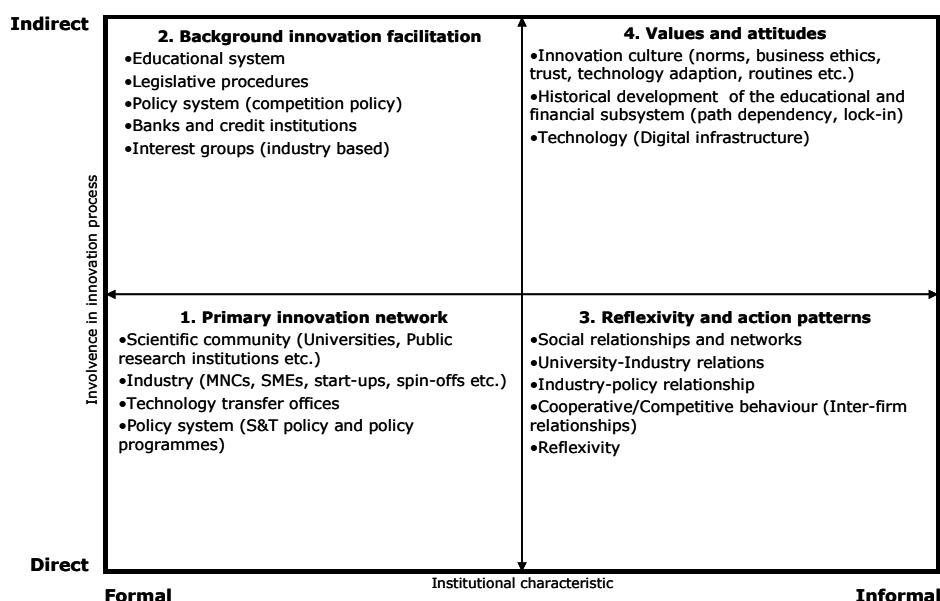
As the purpose of the present paper is to analyse the potential of venture capitalists in the system of innovation as well as their influence on the system, the criteria of formal/informal actors and of direct/indirect participation in innovation are chosen to support the line of argumentation. From the Danish case it becomes evident that formal/informal and direct/indirect are central dimensions when mapping venture capitalists in the innovation system. What appears is a two-dimensional taxonomy categorizing central institutions in the system of innovation. As analytical criteria these create a two-dimensional taxonomy in which it is possible to position the components in the innovation system. In relation to the taxonomy the location of the venture capitalists can later on be carried out in perspectives of various inputs from research as well as the Danish case.

Schloser 1999 (p. 4) presents a similar model, and as he notes that

[...]to simplify the model assume that only two values for each of the independent variables exist: for each either a high or a low value. It may however be added that the two dimensions can be considered continua.

This of course is a simplification of reality, yet this categorization helps to disclose and systematize the components and relations involved in innovation in a quadrant model. As a result of the classification, the tracking of innovations and formal/informal institutions involved in these innovations can be carried out in a more systematic order than through traditional NIS analysis. This tracking and mapping process involves actors making it possible to conclude on innovations' pervasiveness (Schloser, 1999), while at the same time providing with a common set of analytical variables that are constructive to cross-system comparisons.

Figure 1: Components and relations in the innovation system'



Primary innovation network (Formal/direct)

The primary innovation network is basically constituted of the explicit core of the innovation system (Etzkowitz & Leydesdorf 1996, Nowotny et. al, 2001). As can be seen, the group comprises public research institutions and universities as well as private companies – yet all with direct responsibility for the generation and application of new knowledge within their fields, and at the same time participating in collaborative arrangements and networks. The entities in this quadrant of the figure are the same that are worked with in the theories of the triple helix (Etzkowitz and Leydesdorf, 1996) and the mode 2 knowledge production (Gibbons et. al, 1994, Novotny et. al, 2001).

As an example, the development of S&T policy and the diffusion of these policies highly influence the processes of innovation as well as implementing programmes that facilitate the development of new technologies and set forth future research goals. A collective characteristic of the group is a close and continuous interaction with other components in the innovation system and awareness of their position and contribution to the system as a whole.

Background innovation facilitation (Formal/indirect)

Background innovation facilitation represents formal components indirectly affecting the innovation system – not as directly carrying innovations from idea stage to actual development but through their influence on the systems ability to actually run. Taking the example of the policy system, it is evident that the development of policies that support business goals are essential, otherwise hampering the firm's autonomy of action. The educational systems can be regarded from the same perspective – feeding the system with both qualified manpower and knowledge needed to develop new products and processes. Shertler (2002) concluded that human capital, defined as the number of people employed in research and development relative to the total labour force, is a good explanation for the level of venture capital, i.e. the higher the percentage of the workforce that works in research and development, the more often they innovate.

Reflexivity and action patterns (Informal/direct)

This section deals with the same agents as the first, but the starting point here is the relational network. The informal character of the factors constituting this quadrant has proven to influence innovation to a

great length. While these factors often are not bound within any formal organization, they frequently are the sources of both strategic and operational success. Studies (e.g. analysing collaborative arrangements between universities and industry) are increasingly pointing towards the importance of informal networks. (Powell, 1996; Jones et. al, 1997, Lundvall, 1992)

The most indicative examples of informal networks are the networks of individuals – constituted by former fellow students, colleagues etc. Moreover many organizations have placed themselves in networks of informal character. Networks of this kind first and foremost exist because they bring people together and because there is a need for continuous cultivation of ones network (Pyka, 1997).

Values and attitudes (Informal/indirect)

This section comprises a sub layer of historical and cultural features that primarily show themselves as attitudes and behavioural patterns in society – entrepreneurial culture (Hornsby, Kuratko & Zahra, 2002). The layer can be characterized as the innovation culture from which entrepreneurial behaviour, risk-willingness, adoption of new technologies and general social attitude towards the system as a whole emerges (Kuratko, Hornsby, Naffziger & Montagno, 1993). These factors influence the behaviour on markets, strategic decisions and political processes, thus indirectly influencing the innovation processes.

DISCUSSION

Four different positions are revealed in the previous figure and as indicated, there are both institutional and organizational overlaps between the quadrants. At this point, it is important to emphasize that one quadrant in the taxonomy is not better than the other, but each quadrant carries specific benefits depending on the task at hand. It will however be argued that in order to use and exploit the potentials of venture capitalists in the innovation system, the best foundation will be a formal direct position. From this position, venture capitalists will have a better starting point for influencing the agendas in the other quadrants and contribute to the overall performance of the system.

During the innovation process, it is important that venture capitalists recognize and finance commercially viable opportunities (Stasch, 1994). They represent a vital actor subset for the innovation system to perform. A consequence of separation of markets venture capitalists however, often take an informal and indirect part in early phase of innovations even though studies indicate that direct and formal involvement host potential value for the venture capitalists (Husted & Vintergaard, 2004; Vintergaard & Husted, 2003).

Venture capitalists are highly dependent on accessing new unique ventures, which can provide them significant return – the “raw material” in their business model. In addition, it is argued that one of the most significant impediments for many companies is too few mainstream ideas (Block & MacMillan, 1993; Tidd et al., 2001). If venture capitalists have no access to a sufficient number of unique ideas, the venture unit will not be able to create a sufficient number of profitable ventures and will eventually cease (Block & MacMillan, 1993:94). Etzkowitz et. al (2001) stress that commercialisation of university science largely depends on a marriage between venture capital and university scientists. Such involvement will also benefit the innovation system by providing better exploitation of the capabilities and resources which venture capitalists possesses i.e. increasing the level of innovation.

It is argued in this article that through a more formal and direct role in the innovation system, venture capitalists will surpass the position as intermediaries and will gain access to a larger stream of ideas. Obtaining this position is however only achieved through collective means. Venture capitalists have to learn to become more proactive and direct partners in the process of innovation while also ensuring a more formal position. *Pari passu*, it is also important that other actors and the policy system support this process. Only through a collective effort will the system harvest from a new actor group in the system.

Even though reconfiguration of the venture capitalist in the innovation taxonomy model has appealing outputs, there are strong demands on the venture capitalist as a specific group of actors and on the rest of the actors in the system. In order for venture capitalists to achieve the possible benefits of

innovation and achieve a direct and formal position in the system, several actions can be proposed:

Dynamic participation. The first initial consideration is to establish concrete actions in order to achieve a fruitful position in the innovation system. In order for this to manifest itself, proactive initiatives need to be taken from the collective of venture capitalists. Simultaneous efforts from other actors of the “primary innovation network” should strive to include the capabilities of the venture capitalists. The reason to take active part in the system as such is naturally twofold: 1) for venture capitalists to gain access to and benefit from innovations (Vintergaard & Husted, 2004) and 2) in order to facilitate the system as such. As earlier illustrated, indicators have shown that active involvement in the process leads to a potential higher profit. Simultaneous direct and formal participation will also enhance the facilitation of the other parts of the system of innovation. As described in relation to the separation of markets, it is often taken for granted that innovations and thereby entrepreneurs automatically generate venture ideas and that no initiatives are necessary to facilitate them. The type of actions that can be proposed could be to accommodate stronger ties between venture capitalists, universities, government and other parts of the “primary innovation network”.

Setting agendas. In order to achieve a formal position in the innovation system, an important element is to take part in influencing agendas (political and institutional) in the formal and informal networks that constitute the relations between different components in the innovation system. Doing this will enhance the position and resource allocation and focus will move in a desired direction. In order to achieve such a position, the venture capital actors must nevertheless learn where and how to position themselves in such a structure. Huxham and Vangen (2000, p. 1166) argue that:

Structures thus play an important leadership role because they determine such key factors as: who has an influence on shaping a partnership agenda, which has power to act, and what resources are tapped.

They further argue that when the structure of collaboration is part of a system of multiple overlapping partnerships, the influence on the agenda may be even more significant (Huxham & Vangen, 2000). By taking active part in influencing the agendas in the network, corporations will also have a greater chance of gaining a central position in the network.

Reconfigure the innovation network. Knowledge on how to position oneself, influence the common agenda and to actively interact in the innovation system is essential. Given proactive presence in the network, one quite evidently becomes more interesting as a collaborative partner (Powell et. al, 1996, Cross et. al, 2002). In general it is often important to understand the extent to which the network as a whole is reliant on one both as individual and as group. Understanding how ones enactment might impact connectivity and information flow is critical to ensuring network resiliency. The network relations discussed above of course applies within the systems of innovation. As argued by Seufert et. al 1999: “*the locus of innovation should be thought of as a network of inter-organizational relations*”[p.181]. In relation to the presence in the system of innovation, he further argues that successful organizations position themselves at the hubs in the center of overlapping networks stimulating rewarding research collaborations among the various actors.

A direct position in the system cannot be based purely on facilitating the system. A central task for the primary innovation network is learning how to interact and create networks in order to be able to manage their position in the innovation system (Powell et. al, 1996). Seufert, Krogh and Bach (1999) argue that individuals in an organization should be able to recognize personally relevant knowledge within the organization, which can be exploited. The ability to create and participate in a network and to contextualize one’s knowledge (Gibbons et. al, 2001) has to be seen as something that can be learned, but also something that often depends on personal traits.

Have something to offer and the ability to absorb. Following argumentation above, the actors in the primary innovation network need to engage in network formation and also have something to offer in terms of knowledge production, reputation etc. Venture capitalists will not become part of a value-creating innovation system unless they contribute with unique competencies that are not already present in the network. The absorptive capacity of other actors in the system in this sense becomes a necessary precondition in order to be able to make use of the resources and capabilities possessed by venture capitalists. Powell et al. (1996) argues that a partnering decision depends on each partner's size and position in the "value-chain" and the level of technological sophistication. They further argue that to remain current in a rapidly moving field, an organization must be involved in the research process. Passive recipients of new knowledge are less likely to appreciate or be able to respond rapidly. In industries where knowledge is crucial, companies must be experts in both in-house research and in cooperative research with external partners, such as university scientists, research organizations, and skilled competitors.

Boundary objects

We acknowledge that a formal and direct position will improve the position of venture capitalists. However, there exists a continuum of reasons why venture capitalists do not engage themselves in early stage technology development.

A central issue stems from the strong separation of markets. Venture capitalists and entrepreneurial organizations do not perceive mutual interests. There is a strong belief that separate organizations should do what they are best at. In this context, the national system of innovation should create innovations and the venture organisations should exploit these opportunities. Secondly, there is a strong belief that venture capitalists do not deliver value-added services to the innovative process. The common perception is that the value provided by these organisations emerges much later in the process: i.e. exploring the opportunities, staffing, growing the business etc. It is often argued that venture capitalists play a critical role in the innovation process, not only as financial source, but also through other functions that lie at the core of high tech development (e.g. Block & MacMillan, 1995, Gompers & Lerner, 2000).

Thirdly one of the central problems for the level of separation of venture capital and the innovation systems might also be found in not knowing where and how the contribution could take place. The venture capital players in many cases carry traits from traditional finance institutions as banks and other financial institutions.

CONCLUSION

Following the reasoning above, venture capitalists that are presently informal entities in the system can earn potential benefits by taking a more formal and direct part in the system – a shift demanding collective effort. It is likely to believe that the shift will follow temporary trajectories until reaching the formal and direct sphere. It is pertinent to mention that utility cannot be ascribed to one position or the other, as well the shift not binding the venture capitalists to a distinct area or place within the primary innovation network or the background innovation facilitation – yet it constitutes a shift in self-perception and the degree and type of interaction with other key innovation actors.

Conclusively, it is still important to note that despite the possibilities of a transition towards a more formal role in leveraging innovations, venture capitalists are actually feeding on the formality of the system, or rather the rigidity of institutions affecting the other primary network actors. Values and attitudes are holding the formal actors in rigid positions, eventually preventing i.e. banks and credit institutions, from providing the innovation system with services comparable to those delivered by venture capitalists. A diversified strategy of combining a formalized and direct involvement in innovation, influencing the formation of norms and values as well as becoming present in network relations e.g. brokering in university-industry relations, is important.

REFERENCES

- Amit R., Glosten L., & Muller, E. (1990). Entrepreneurial Ability, Venture Investments, and Risk Sharing. *Management Science*, 36, 1232-1245.
- Arrow K. (1974). General Economic Equilibrium: Purpose, Analytic Techniques, Collective Choice. *American Economic Review*, 64, (3), 253-272.
- Balboa M. & Marti, J. (2000). Determinants of Private Equity Fundraising in Western Europe. Working paper, European Financial Management Association, Spain.
- Berlin M. (1998). That thing venture capitalists do. Business Review. Philadelphia, PA: Federal Reserve Bank of Philadelphia (Can be retrieved from <http://www.phil.frb.org/files/br/brjf98mb.pdf>)
- Black S. & Gilson R. (1998). Venture capital and the structure of capital markets: banks versus stock markets. *Journal of Financial Economics*, 47, 234-277.
- Block Z. & MacMillan I. C. (1993). *Corporate Venturing – Creating New Businesses within the Firm*. Cambridge, MA: Harvard Business School Press.
- Burgelman R. (1983). Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science*, 29, 1349-1364.
- Burgelman R. A. (1985). Managing the new venture division: Research findings and implications for strategic management. *Strategic Management Journal*, 6, (1), 39-54.
- Bygrave W.D. & Timmons J.A. (1992). *Venture Capital at the Crossroads*. Boston. Harvard Business School Press.
- Callahan J. and Muegge S. (2003). Venture Capital's Role in Innovation: Issues, Research and Stakeholder Interests. In L.V. Shavinina (Ed), *The International Handbook on Innovation*, Elsevier Science.
- Carlsson B., Jacobsson S., Holmén M. & Rickne A. (2002). Innovation systems: Analytical and methodological issues. *Research Policy*, 31, 233-245.
- Christensen J.L. (1998). Private investors bidrag til innovation. Ervervsudviklingsrådet. DISKO, Aalborg University
- Christensen J.L. (2000). Effekter af venturekapital på innovation og vækst. Erhvervsministeriet.
- Chung S. (2002). Building a national innovation system through regional innovation systems. *Technovation*, 22, 485-491.
- Cross R., Prusak L. & Parker A. (2002). Where Work Happens: The Care and Feeding of Informal Networks in Organizations", Institute for knowledge-based organizations, IBM
- Cooke P. (2002). Biotechnology clusters as regional, sectoral innovation systems. *International Regional Science Review*, 25, (1), 8-37.
- Dahl M.S. & Pedersen C.Ø.R. (2002). Informal Networks in a Dynamic Regional Cluster. Paper for the Druid Academy Winter Ph.D. Conference 2002 on Industry Evolution, 17-19 January 2002
- Dobbin F.R. & Dowd T. (1997). How policy shapes competition: early railroad foundings in Massachusetts. *Administrative Science Quarterly*, 42, 501-29.
- Edquist C., (1997). Systems of innovation approaches - their emergence and characteristics in Edquist, C. (ed.) *Systems of Innovation: Technologies, Institutions and Organizations*. London: Pinter/Cassell .
- Edquist C. (ed.) (1997). *Systems of Innovation: Technologies, Institutions and Organizations*. London: Pinter/Cassell.
- Edquist C. & Johnson B. 1997. Institutions and organisations in systems of innovation, in C. Edquist (ed.), *Systems of Innovation: Technologies, Institutions and Organizations*. London and Washington: Pinter/Cassell Academic.
- Edquist C. & McKelvey M. (Eds.) (2000). *Systems of Innovation: Growth, Competitiveness and Employment*. An Elgar Reference Collection (two volumes), Cheltenham: Edward Elgar.
- Eisenhardt, K (1999). Building theories from case study research. *Academy of Management Review*, 14, 532-550.
- Eliasson G. (2000). Industrial policy, competence blocs and the role of science in economic development. *Evolutionary Economics*, 10, 217-241.

Elango B., Fried V.H., Hisrich R.D., & Polonchek A. (1995). How venture capital firms differ. *Journal of Business Venturing* 10, 157-179.

Etzkowitz H. and Leydesdorff, L. (1996). Emergence of a Triple Helix of University-Industry-Government Relations. *Science and Public Policy*, 23, 279-286.

Etzkowitz Henry, Gulbrandsen, M., and Levitt, J. (2001). *Public Venture Capital: Sources of Government Funding for Technology Entrepreneurs*. New York: Aspen/Kluwer.

Evan D. & Jovanovic B., (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*, 97, (4), 808-827.

Fenn G. W., N. Liang. (1998). New resources and new ideas: Private equity for small businesses. *Journal of Banking and Finance*, 22, 1077-1084.

Freemann J. (1999). Venture Capital as an Economy of Time. In Roger Th. A.J. Leenders and Shaul M. Gabbay (Ed.), *Corporate Social Capital and Liability*. Kluwer Academic Publishers, Dordrecht.

Gibbons, M., Limoges C., Nowotny, H., Schwartzmann S., Scott P. (1994). *The new production of knowledge - the dynamics of science and research in contemporary societies*. SAGE Publications.

Ginsberg A. & Hay M. (1994). Confronting the Challenges of Corporate Entrepreneurship: Guidelines for Venture Managers. *European Management Journal*, 12, 382 – 389.

Glaser B. and Strauss A. (1967) *The discovery of grounded theory. Strategies of qualitative research*. London, Wiedenfeld and Nicholson.

Gompers P. A. & Lerner J. (1999). *The Venture Capital Cycle*. Cambridge, Massachusetts: MIT Press.

Griliches Z. (1992). The search for R&D spillovers. *Scandinavian Journal of Economics*, 94, Supplement, 29-47.

Hellmann T. & Puri, M. (2000). The Interaction between Product Market and Financing Strategy: The Role of Venture Capital". *Review of Financial Studies*, 13, (4)

Hellmann T. (1997). Venture Capital: A Challenge for Commercial Banks. *Journal of Private Equity*, 1, (1), 49-55.

Husted K. & Vintergaard C. (2004). Stimulating innovation through corporate venture bases". *Journal of World Business*, 39, 3

Huxman C. & Vangen S. Leadership in the Shaping and Implementation of Collaboration Agendas: How Things Happen in a (Not Quite) Joined-Up World. *Academy of Management Journal*, 43, 1159

Jaffe A. B. (1996). Economic Analysis of Research Spillovers: Implications for the Advanced Technology Program. Washington, D.C.: U.S. Department of Commerce, National Institute of Standards and Technology, Advanced Technology Program.

Jeng L. & Wells P. (2000). The Determinants of Venture Capital funding: evidence across countries. *Journal of Corporate Finance*, 6, 248-289

Karaömerlioglu D. & Jacobsson S. (1999). The Swedish Venture Capital Industry – an Infant, Adolescent or Grown-up? *Venture Capital*, 2, (1), 61-88

Kenney M. & Richard F. (2000). Venture Capital in Silicon Valley: Fuelling New Firm Formation. In Martin Kenney (ed.), *Understanding Silicon Valley: Anatomy of an Entrepreneurial Region*. Stanford University Press.

King R.G. & Levine R. (1993). Finance and Growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717-737.

Kortum S. & Lerner J. (2000). Assessing the Contribution of Venture Capital to Innovation" *RAND Journal of Economics*, 31, (4), 674-692

Lundvall B-Å. (1992) (ed.). *National Systems of Innovation: Towards a Theory of Innovation and Interactive learning*. London: Pinter.

Lundvall B-Å. (2000). Innovation policy and knowledge management in the learning economy – the interplay between firm strategies and national systems of competence building and innovation, Mimeo, Department of Business Studies, Aalborg University.

Lundvall B-Å., Johnson B. & et.al (2002). National systems of production, innovation and competence building. *Research Policy*, 31, 213-231.

Mason C.M. & Harrison R.T. (1992). Strategies for Expanding the Informal Venture Capital Market, *International Small Business Journal*, 11, (4), 23-38

Nelson R. (1993). *National innovation systems - a comparative analysis*. Oxford University Press, New York.

Nilsson A. (2001). Biotechnology Firms in Sweden, *Small Business Economics*, 17, 93-103.

Niosi, J. (2000). *Canada's national system of innovation*. Montreal: McGill-Queen's University Press.

Nowotny H. et. al (2001). *Re-Thinking Science – Knowledge and the public in an age of uncertainty*. Blackwell Publishers Inc.

Oughton C., Landabaso M., & Morgan K. (2001). The Regional Innovation Paradox: Innovation Policy and Industrial Policy. *Journal of Technology Transfer*, 27

Powell W., Koput K. & Smith-Doerr L. (1996). Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology. *Administrative Science Quarterly*, 41,116-145

Saxenian A. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press.

Sarasvathy, D.V. & Venkatarman (2003). Three Views of Entrepreneurial Opportunity. In Zoltan J. Acs, David B. Audretsch (Ed.), *Handbook of Entrepreneurship Research: An Interdisciplinary survey and introduction*. Kluwer Academic Publishers Group, Dordrecht

Schertler A. (2002). Under What Conditions Do Venture Capital Markets Emerge? Kiel Institute for World Economics. Working Paper 1119.

Schoser C. (1999). The Institutions defining national systems of innovation: a new taxonomy to analyse the impact of globalisation. Instituts fur Allgemeine Wirtschaftsforschung, Universitat Freiburg im Breisgau. Discussion Papers; No 20

Seufert A., Bach A., & Von Krogh G. (1999). Towards knowledge networking. *Journal of knowledge management*, 3, 180-1090

Shane S. (1996). Hybrid Organizational Arrangements and theirs Implications for Firm Growth and Survival: A Study of New Franchisers, *Academy of Management Journal*, 39, (1), 216-234

Stasch, F.S. (1994). Evaluating New Venture Ideas: Considerations from the New Product Development Process. In Gerald E. Hills (Ed.), *Marketing and Entrepreneurship Research Ideas and Opportunities*. Quorum Books, Westport, Conn.

Vækstfonden (2003). Det danske marked for venturekapital og private equity. Vækstfonden. (can be retrieved from:http://www.vf.dk/download_media.asp?media_id=1445)

Thornton P.H. (1999). The Sociology of Entrepreneurship, *Annual Review of Sociology*, 25, 19-46.

Waldstrøm C. (2001). Informal Networks in Organizations - A literature review. DDL Working Paper No. 2, Aarhus Business School.

White H.C. (1981). Where do markets come from? *American Journal of Sociology*, 87, 517-47.

Wholey D.R., Christianson, J.B., & Sanchez S. (1993). Professional reorganization: The effect of physician and corporate interests on the formation of health maintenance organizations. *American Journal of Sociology*, 99, 175-211.

Van Kersbergen K. & van Waarden F. (2001). *Shifts in Governance: Problems of Legitimacy and Accountability*. The Hague: Social Science Research Council.

Vintergaard, C. & Husted, K. (2003). Enhancing selective capacity through venture bases. CKG working paper

Yin R. (1984). Case study research. Beverly Hills, CA Sage Publications.

Endnotes

¹ The discussion on how to formulate the exact properties of a National System of Innovation has many strands. Niosi (2002) provides with a picture of the semantic core of the concept.

² Inspiration comes from Schloser 1999. Look to Liu and White 2001 for another taxonomy.

3.2 Study II – Jørgensen and Vintergaard (2006)

Connecting Company Strategy and Network Identity

In: Managing Dynamic Networks Organisational Perspectives of Technology Enabled Inter-Firm Collaboration. Klein S. and Poulymenakou A. (eds.) Heidelberg: Springer



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Abstract: Current literature has explained how strategic interorganisational relations can be of concern for management. However when it comes to explain the causalities between these relations and corporate strategies, it is less elaborated. As companies today more than ever operate in networks of relations it is of crucial importance to understand how these networks should be dealt with in relation to corporate strategy. The aim of this empirical study is thus to conceptualize how strategic relations are managed in accordance with the overall corporate strategy. Thus it tries to answer: Are there important connections between a firm's network strategy and its corporate strategy?

Key words: Strategy, network, relational embeddedness, redundant and non-redundant relations network identity, defenders, analysers, prospectors and reactors

1. Introduction

Are there important connections between a firm's network strategy and its corporate strategy? Over the years, a considerable amount of resources have been spent on studying the making of corporate strategy. The main focus has been on analysing single companies in isolation in order to understand how they behave and perform. Today, however, managers increasingly stress the importance of engaging in strategic relations beyond the isolated firm. Since the expected benefits of engaging in a network of strategic relations are high, the concept of networks or networking has gained increasing momentum. As a result, previous measures of effective strategy, i.e., those that focus on the position of a company within an industry (Porter, 1980) or the internal resources and capabilities of a company (Wernerfelt, 1984; Barney, 1991), have become inadequate for predicting the effect and effectiveness of corporate strategies. The concept of networking is well suited to explain how networks of strategic relations can be a concern of management. But it lacks insight when it comes to explaining the relation of strategic networks to corporate strategies. It is this relation that we will shed light on here.

Common sense suggests that companies that differ as to corporate strategies would also differ as to the management of their strategic relations. At present, research enables us neither to verify nor disprove this assertion as the focus has been on the issues such as explaining the factors that have lead to focus on interfirm cooperation (Gulati et al., 2000), determining what constitutes a network and how to maintain and/or develop a company's network relations (Holm et al., 1996;

Håkansson and Johanson, 1993; Miles and Snow, 1992; Ritter, 1999), and determining how to develop a network perspective (Gulati et al., 2000; Dyer and Singh, 1998). While the literature on strategic alliances (e.g., Bresser, 1989) strives to connect network behaviour with business strategy, the link between corporate strategy and network strategy still calls for further theoretical investigation and empirical exemplification. Hence this paper strives to conceptualise the processes by which strategic relations are managed in accordance with the overall corporate strategy.

To this end, the paper applies the well-known framework from organisational behaviour developed by Miles and Snow (1978) to provide distinct categories of firm level or corporate strategies. We do acknowledge the shortcomings of the model (Zahra and Pearce, 1990, 753; Namiki, 1989). However, as pointed out by Torres and Murray (2002) in contrast to Porter, Ansoff and others, Miles and Snow's framework "characterises entire organisations as an integrated and dynamic whole, taking into account the interrelationships of strategy, structure and process" (Torres and Murray, 2002, 2). Another question concerning the applicability of the framework is the strong categorization of each business typology's behaviour. Shortell and Zajac (1990) studied the reliability and validity of Miles and Snow's business typology. They concluded: "researches can use the typology with increased confidence in future work on organizations and their strategies" (Shortell and Zajac, 1990, 829-830). Zahra and Pearce (1990) assessed the status of prior research on the Miles and Snow typology. They concluded that, overall, the predictions put forward by Miles and Snow in regard to the typology relating to the three different element of the adaptive cycle are supported.

To sum up, questions can be raised regarding the validity of some of the elements of Miles and Snow's typology or framework for organisational behavior in general. However, most studies support the validity of Miles and Snow's typology and argue for the wide applicability of the framework. As stated by Torres and Murray (2002) "The Miles and Snow (1978) model has been a robust, integrated, contingency framework for exploring diversity. It sheds light on the nature of diversity in strategy and form by illuminating the simple underlying order." (Torres and Murray, 2002, 2). Despite the shortcomings and the significant developments in the field of strategic management since the 1970s, the original framework provides very workable groupings that clearly illustrate the point of this paper.

Three case studies from the Danish biotech industry will be drawn into the analysis to exemplify and illustrate how a company's corporate strategy is directly correlated to how it manages its strategic network identity. The following section will provide a theoretical overview which includes an introduction to Miles and Snow's (1978) framework as well as descriptions of each case company. Furthermore, the methodology and a review of existing network literature will be

presented. Section three will contain the analysis where theory will be linked to the findings from the cases. Finally, due to the linkage between the business typology of a company, its patterns of network behaviour and subsequent network identity, the importance for company strategy is to know how to manage these relations. We will present the linkage between these issues in a framework.

2. Theoretical Overview

Strategic models such as Porter's (1980) three generic strategies and Ansoff's (1965) theory of strategic direction both provide useful tools for analysing company positioning in relation to strategy. Miles and Snow's (1978) strategy-structure configuration (compared to the other two) has the additional advantage of incorporating the interrelationship between company strategy, structure and processes. This makes it a more illustrative framework when categorizing network strategies.

A focal premise of Miles and Snow's (1978) typology are patterns of competitive behaviour. Their framework provides four business typologies: *Defenders*, *Prospectors*, *Analysers* and *Reactors*. The business typology of a company is illustrated by the way a company relates to the "adaptive cycle" which consists of three intricately interwoven problems that affect organisational behaviour: 1) the entrepreneurial, 2) the engineering, and 3) the administrative problem (Miles and Snow, 1978). It is often said that managers have to relate to a range of different problems; nevertheless, according to Miles and Snow, they can be categorised into those three main problem areas (Torres and Murray, 2002). The entrepreneurial problem concerns the choice of product and market domain. A company has to decide whether to focus on a wide or narrow product/market domain. The second problem is related to the company's use of technology, i.e., processes that favour scales of economies or effectiveness and flexibility (engineering problems). A correlation exists between the choice of production process (as an enabler) and the company's choice of product/market domain. Lastly, the administrative problem deals with the organisational structure of the company (centralised versus decentralised). Inherently, a company has to deal with all three problems simultaneously but depending on the business typology of the company, the problems will be prioritised differently. A short introduction to the four business typologies as well as a description of the corresponding case company will be given below. It is however important to keep in mind that when using typologies, a variety of companies are dichotomised into narrow categories. Consequently,

corresponding case companies were chosen to illustrate and exemplify the main characteristics of the typologies in this new field (Glasser and Strauss, 1967; Eisenhardt, 1999).

The cases are all drawn from the Danish medical industry. By limiting the analysis to a particular country and industry, the paper tries to overcome some of the possible biases of identifying changes in network behaviour based on different industry contexts. The framework for network behaviour in this paper will not be country- or industry-specific.

The cases were identified (Yin, 1984) based on the characteristics of business typologies developed by Miles and Snow (1978). Each case was selected on the basis of how well it exemplified the relation between the three different parameters of product/market domain, organisational structure and production processes. For this purpose, secondary data (corporate communication such as annual reports, press briefings, etc.) was used to single out a number of qualified companies. The primary data was gathered through several rounds of semi-structured interviews with these companies in 2003/ 2004. The first round of interviews was conducted to verify what typology the company belonged to. This was done by presenting a list of questions that reflected how the companies are related to the three dimensions of the adaptive cycle. The next round of interviews was constructed so that insight was obtained as to how each case company relates to issues of networking. All interviews were tape-recorded and transcribed in order to assure a more accurate interpretation. Based on the information from the interviews, the data was analysed by linking the various answers to the parameters identified as important for network behaviour in the theoretical part of the paper. This provided a comprehensive picture of patterns of network behaviour. By incorporating the data from the case studies, the individual typologies were linked to specific network behaviour; providing for the identification of each business typology's network identity. In the paper, the identity of each case company and the names of the respective interviewees will be kept anonymously. The companies' names will be replaced with synonyms, reflecting their identity.

2.1 The Defender

Defenders want stability. Stability is achieved by reducing the organisation's vulnerability to changes in the environment as well as uncertainty through a series of decisions and actions. Stability and reduced uncertainty is crucial for the defender's entrepreneurial problem (Shortell and Zajac, 1990). A defender's success depends on its ability to stay competitive within its chosen domain, which is defined by price and/or quality, i.e., by relying on high efficiency. As a consequence, the engineering focus of a defender tends to be on efficient production processes (Torres and Murray, 2002; Shortell and Zajac, 1990). However, to ensure the success of this

operating process, a defender must maintain a high level of internal control through a highly centralised organisational structure (Tuominen, 1997; Torres and Murray, 2002). It can be argued that defenders tend to ignore developments outside their core market, consequently achieving growth through market penetration in their current domain (Miles and Snow, 1978). A defender's strategy could thus be characterised as the most stable of the business typologies.

Case 1: Respiratory A/S

Respiratory A/S provides a rich illustration and exemplification of a defender. The company is a leading pharmaceutical company in the field of allergy diagnosis and treatment. Respiratory A/S was founded in 1923 and has approximately 1000 employees. What characterizes this defender company is its perusal in centralising its organisational structure with the main focus on streamlining production processes in order to obtain efficiency gains. Secondly, Respiratory A/S's core product portfolio is relatively focused around products to cure allergies from diagnosis to treatment. To support this strategy, their Director of Strategic Marketing & Sales explains, "Our aim is to have a limited number of product lines out of which two are focused on tablets and one on injections". Another clear example of the company's defender strategy is its focus on quality. As the Director of Strategic Marketing & Sales argues, "We seek to differentiate ourselves on quality – meaning that we aim at setting the standard within the industry". As can be seen, many of the central strategic issues for Respiratory A/S fit well into the characteristics of a defender.

Respiratory A/S's current external relationships centre around four big established companies. Each relationship has a specific objective but seen as a whole, all four serve to improve or maintain the company's leading position within the field of allergy diagnosis and treatment. The relationships are long-term and based on close personal ties. Respiratory A/S also governs a range of relationships of minor importance. These are based on weak connections. The Director of Strategic Sales & Marketing explains, "We do have some minor relations with smaller companies but they are not presented as much as other more important strategic relations".

2.2 The Prospector

Contrary to the defender, a prospector interacts dynamically with its environment and is continuously on the look out for new business opportunities (Miles and Snow, 1978). A prospector's solution to the entrepreneurial problem focuses on a relatively wide product/market domain (Morgan et al., 2000). The strategy of a prospector is often associated with innovation, and companies that pursue this strategy are often trying to promote change (Miles and Snow,

1984). The engineering problem is to increase effectiveness. This allows for more flexible production processes. Correspondingly, the solution to a prospector's administrative problem is a decentralised organisational structure (Torres and Murray, 2002). Compared to the reactive posture of a defender, a prospector can thus be characterised as being very pro-active.

Case 2: Innovator A/S

The strategy of Innovator A/S unmistakably exemplifies the basic ideas of a prospector. Innovator A/S is a biotech-based company, which has become the world leader in industrial enzymes. The company was recently spun off from another major pharmaceutical company and has approximately 3.700 employees. The organisational structure gives a first indication that Innovator A/S is a prospector. Senior Director of Innovator A/S explains, "There is a very short distance between top management and lower levels. Our focus is on easy flow of communication between all employees and levels". Secondly, the target market and the product portfolio are very broad as the company is represented within 120 countries and carries over 700 different products. Thirdly, and very typical for a prospector, Innovator A/S is dedicated to a strategy of continued innovation of new products as well as development of new business areas. The Senior Director of Innovator A/S explains the strategy, "At the outset, we were only into enzymes. But we have to continue developing new areas such as bio-polymers and bio-pharmaceuticals. It is our vision to keep building new areas". These are not based on enzymes but they do provide synergy when combined with the enzyme business. As is typical for the prospector, the focus is thus not specifically on efficiency but instead on effectiveness.

Innovator A/S has a different perspective on strategic relationships, which also serve many different functions. That is, many of Innovator A/S's strategic relations are with the company's biggest clients. Coupled with the long development process of new products in this industry, these strategic relationships are generally long-term and personal. The reason for this strategy, according to the Senior Director of the company, is that "You have to make it work on the personal level. Otherwise it cannot function on the commercial level". If an opportunity arises or other changes make current relationships obsolete, Innovator A/S will have to eliminate existing long-term relations. Senior Director of Innovator A/S explains the necessity of this in relation to its strategy: "When changing business focus we sometimes have to change our strategic partners". Innovator A/S also has an array of informal relationships with smaller companies or organisations. These types of relations often serve the purpose of accessing information that currently lay outside Innovator A/S's core business areas.

2.3 The Analyser

Defenders and prospectors represent the two ends of a continuum, i.e., the two extremes. The analyser typology can be found between the two (Miles and Snow, 1978; Hougaard and Bjerre, 2002). The analyser's entrepreneurial focus aims at positioning itself within a domain defined by both change and stability. As a consequence, focus is both on innovation as well as maintaining its more traditional markets (Torres and Murray, 2002). This duality is also reflected in its solution to its engineering problem. A balance is found between technological flexibility and stability (Touminen, 1997). Correspondingly, an analyser has to accommodate its organisational structure to encompass both the stable and dynamic domains of its operations. A common example of this type of strategy is found in corporate venture companies (Burgelman, 1983; Vintergaard, 2005; Husted and Vintergaard, 2004).

Case 3: Derma A/S

The research- and development-based pharmaceutical company Derma A/S aptly illustrates the business typology of the analyser. Derma A/S was established in 1908 and employs roughly 3200 people today. The company's area of expertise is in dermatology and critical care of humans. It is the vision of Derma A/S to become a global leader in the field of dermatology. The first indication of Derma A/S's analyser strategy is that Derma A/S is currently searching for a new area of expertise while simultaneously retaining its present business focus. Explaining this strategy, Executive Vice President of Marketing & Sale explains, "For our company it is very important to have access to innovation. We are therefore looking for a third leg to stand on which does not have to be directly related to our existing business areas". The company's product domain is thus a blend of its core focus within dermatology and critical care and those derived from research in new areas of business – clearly a perfect example of an analyser strategy. Secondly, the company is committed to a decision making process that is quick and founded on sound principles. This is supported by a relatively flat organisational structure. Explaining this structure, Executive Vice President of Marketing & Sales argues, "You have to keep the finger on the pulse in order to make some qualified decisions. It is therefore important to have a flat organisational structure". Due to Derma A/S's unique position between a defender and prospector strategy (i.e. analyser) it can sometimes be hard to pinpoint any specific characteristics of its production processes. The standpoint is however that efficient production is important.

At present, Derma A/S has very few strategic relations of any importance. Each relation is only to provide Derma A/S with access to resources necessary for the development of a specific product. Supporting this strategic move, Executive Vice President of Marketing & Sales

explains, “It is important to have all the experts in-house. In that way we are able to explain to others what we want them to do for us. The final product is however always entirely developed inside the company”. Derma A/S’s network relations are in general long-term and personal. The reasons for relationships being long-term are that the R&D process in general is very time consuming. In addition to its more stable strategic relationships, Derma A/S is recognised as a venture capital investor in small companies and consequently has several more informal relationships with minor companies.

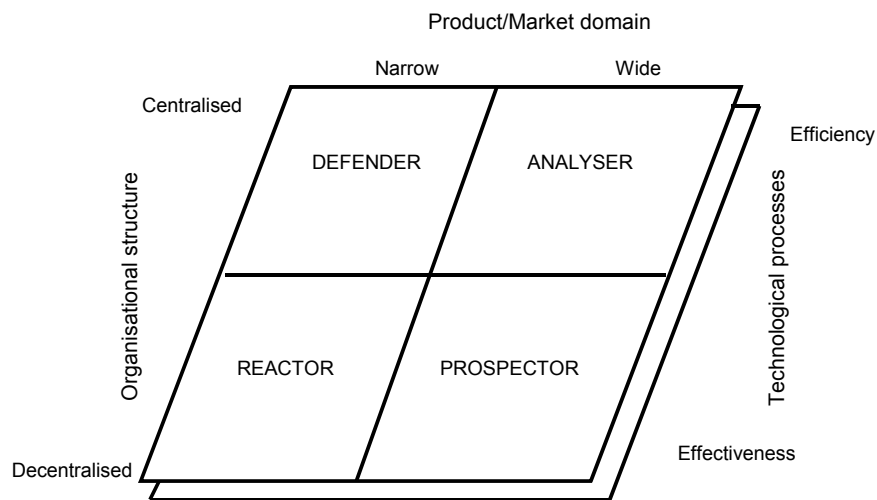
2.4 The Reactor

Reactors have often been described as being positioned in-between the other typologies. Companies belonging to this typology fail to respond reliably to changes in the environment as no consistency exists between the choice of domain, organisational structure, and processes (Torres and Murray, 2002). Reactors perceive changes and opportunities in its external environment but, owing to a lack of internal focus and coordination, it becomes impossible to respond successfully (Touminen, 1997).

Touminen (1997) proposes that a reactor should not be seen as a unique type but rather an illustration of defenders, prospectors and analysers that find themselves “stuck in the middle”. Supporting this argument is the fact that other researchers have refrained from working with this business type (Hambrick, 1993; Touminen, 1997). Furthermore, Miles and Snow’s study of the Electronics and Food Processing industries found that only 2 out of 27 companies analysed could be characterised as reactors (Miles and Snow, 1978, 1993). As a consequence, this paper will not include this business typology in the analysis and only three cases will be presented to exemplify the business typologies.

Based on the three dimensions of the adaptive cycle, the business types can each be fitted into the framework below hereby illustrating how each of them is situated compared the others.

Figure 1: Miles and Snow's framework, Adapted from Touminen (1997)



2.5 A New Strategic Strand: Networks

A central question in strategy research has been why companies behave and perform differently. Until recently, the focus has mostly been on the company's internal resources and capabilities (i.e. the resource-based view of the firm) (Wernerfelt, 1984; Barney, 1991; Hamel and Prahalad, 1996) and how they position themselves within a market, i.e., the industry structure view (Porter, 1980). What characterises both views is that they tend to see companies as single entities. A trend towards interfirm cooperation has become apparent (Gulati et al., 2000) whereas the company and its network have become intertwined and cannot be separated.

2.6 Networks Representing Relations

No clear definition of strategic networks exists. However, the majority of research focuses on the kinds of relationships that bind these network structures together (Gulati et al., 2000). As defined by Anderson et al. (1994), business networks should be seen as connected relationships. The focal company can through its own relations be connected to third parties. Thus, the network does not consist exclusively of dyadic relations but relations established among various companies. Håkansson and Johanson (1993) and Håkansson and Snehota (1997a, 1997b) identify the companies within a network as actors which are bound together by dependencies. Accordingly, actors are the various organisations or individuals represented within the network,

whereas resources are the elements that are central for performing the activities, hereby forming activity chains and structures (Håkansson and Snehota, 1997a). According to Blau (1968) business relations, in many cases, can be compared to social relations with different levels of embeddedness.

Rowley et al. (2000) defines the level of relational embeddedness as being dependent on the use of either weak or strong ties. Strong ties facilitate the exchange of important information and tacit knowledge since strong ties are built on a high level of trust and insight (Granovetter, 1992). This coincides with Blau's (1968) ideas. Companies bound together by strong ties often mutually adapt their processes and therefore often become very dependent on each other (Rowley et al., 2000). Nonetheless, it is important to emphasise that the adaptation process between the two actors can be related to various areas (Johanson and Mattsson, 1994). How much the actors have to adapt to each other thus varies depending on the area of interest. Hence, little adaptation is needed if the objective is to access information as opposed to knowledge. High level of relational embeddedness, i.e. the use of strong ties, can exist while still having a low level of dependency. Weak ties, on the other hand, do not facilitate the same type of information exchange and for that reason do not involve the same degree of dependency. Their function is to provide novel information by functioning as "gatekeepers" to other companies (Granovetter, 1973). Whether or not strong or weak ties enhance performance is contingent on the environment (Rowley et al., 2000). Strong ties are more efficient in settings with low uncertainty and high demand for exploitation of existing product/processes. Where uncertainty is high and exploration is crucial, relationships bound together through weak ties are the best solution (Rowley et al., 2000). Nevertheless, Rowley et al. (2000) argue that a mix of the two types would be beneficial. This argument is supported by Burt (1992) who states that a company's possibilities within its strategic network are maximised by incorporating what he refers to as "structural holes". Non-redundant network ties (e.g., network ties with little overlap) can therefore also be seen to provide a company with innovative possibilities if it wants to expand into new areas. In other words, by adding loosely coupled relations represented by weak tie binding mechanisms, a company can avoid getting stuck in an unwanted position (Ibarra, 1992). Hence, it becomes interesting to analyse how much the level of relational embeddedness influences a company's strategic relations. Secondly, the mixture of redundant and non-redundant relations also seems to play an important part in how a company chooses to design its strategic relations.

2.7 Network Identity

What still seems to be an open-ended question in the discussion of strategic networks is the formation and development of relationships that constitute the network structures (Ahuja, 2000). One explanation for networks to occur, according to Ahuja (2000), is systematically related to inducement and opportunities. Dyer and Singh (1998) support this argument by stating that a company's critical resources may span company boundaries. Opportunities on the other hand relate to a company's prior patterns of relationships. According to Ahuja (1998) the position held in prior network structures influences a company's opportunity to form new relationships. Granovetter (1992) likewise emphasises that a company's history of relations and actions will play a part in shaping the present situation (Granovetter, 1992; Mattson, 1986). It follows that a company must not only be willing to establish relationships but also has to be an attractive partner (Ahuja, 1998).

Anderson et al. (1994) also emphasise the importance of "opportunities". Each company has a certain network identity. Network identity refers to how the focal company sees itself in a network, and how other actors within the business network perceive it. The opportunities open to the company as well as the inducements are thus often dependent on the company's network identity. As argued by Ahuja (1998) as well as Granovetter (1992), it is not only the present but also the past that influences a company's network identity (Anderson et al., 1994; Ford et al., 1986). Network identity can thus have a considerable influence on a company's strategic options in the future, making it of fundamental importance.

Now, several specific elements can be identified to influence companies' strategic options when engaging in strategic relations. What seems to be the most important of all, however, is the issue of network behaviour and hereby network identity. Company behaviour is defined by the internal construction of the company, i.e., strategy, structure and processes. It is thus argued that company network behaviour is defined by these three elements. A company's network identity is naturally mirrored by its network behaviour but other elements also affect network identity. Issues such as past and present network relations, how the company is linked to the partner's resources, the type of relations established also have a great influence on the network identity. Network behaviour is thus dependent on the individual business typology. This is based on the fact that network identity is dependent on a company's relations with other actors and links to their activities as well as resources.

Consequently it becomes necessary to determine how the company relates to elements that are found to have an influence on network behaviour. The level of relational embeddedness, i.e., the development of weak/strong ties and level/area of adaptation as well as the issue of redundant/non-redundant relations have to be established. Furthermore, the importance of what incentives drive the respective business typology to engage in strategic relations as well as its

prior history of relations should not be overlooked as they are often mirrored by the company's network identity.

3. Analysis

We will use Miles and Snow's (1978) framework to categorize network identity and link it to business strategy. Each of the business strategies and examples will be linked with the literature on networks and discussed separately. Thus the individual domains (technology: effectiveness vs. efficiency, product/market: wide vs. narrow, structure: centralised vs. decentralised) of the strategies will be related to how they influence network management.

3.1 The Defender

3.1.1 Product/Market Domain

Respiratory A/S produces medication for patients with allergies and asthma, which constitutes a minor part of the bigger group of respiratory diseases. According to the Director of Strategic Marketing & Business Planning, Respiratory A/S is in a market, which can be characterised as fairly stable, allowing the company to focus on the exploitation of its opportunities. According to the Director of Strategic Marketing & Business Planning, Respiratory A/S's business strategy is based on, "What we try to do with our research and development strategies is to bring new life to existing products" and "We are very focused on the respiratory area". When reviewing the network literature, a company following this type of business strategy is said to be strongly relationally embedded, thus making use of strong tie binding. In the case of Respiratory A/S, the Director of Strategic Marketing & Business Planning argues that personal relations become of crucial importance for the partnership to work, "We have established strong relations in particular with our partners Bayer and Maxygen. It is a question of setting up a personal relation of some kind". This is closely linked with the general nature of the company's relationships. These are sought on the basis of the future partner's core competencies that should complement those of Respiratory A/S. The company creates a strong chain of relations with its strategic partners. This is illustrated by the strategic relation established with Maxygen - a leading company in the field of gene manipulation. The background for the strategic relation is the co-development of a new gene manipulated allergy vaccine. Strategic relations are often established with organisations that complement Respiratory A/S in areas that lie outside its own focus. Interdependency arises because Respiratory A/S relies on access to certain activities provided by its strategic relationship partners. Strong ties therefore have to be established to create the level

of trust necessary to make the transfer of resources possible. When analysing Respiratory A/S's choice of its product/market domain from a network point of view, strong connections exist between its business strategy and its relationship to partners. Contracts could very well be used to protect these relations.

3.1.2 Production Process

Companies such as Respiratory A/S need to focus on efficiency. As pointed out by the company's Director of Strategic Marketing & Business Planning, "We would like to drive the development away from the use of a wide area of vaccines and instead develop a minor set of vaccines. That would give us some sure production gains". Respiratory A/S needs to establish strategic relationships with organisations, which can somehow ensure that efficiency is maintained or improved within the company's existing product/market domain. By having a targeted product portfolio that covers the domain, therefore, efficiency can be obtained in terms of economies of scale. Respiratory A/S has established strategic relationships with companies within each of the areas they cover, i.e., diagnosing, prevention and treatment of allergies. Efficiency gains are obtained through its strategic relationships in that the quality of its products is ensured so as its sales volume.

3.1.3 Organisational Structure

Respiratory A/S is currently striving to streamline its organisational structure. According to their Director of Strategic Marketing & Business Planning, "We are working on streamlining the organisation so that it becomes more centralised". This indicates that it will be difficult for a company like Respiratory A/S to maintain relations that are based on different levels of relational embeddedness and types of ties. The reason for these types of relations is that defenders are often highly dependent on access to activities performed by its strategic relationship partners. As a consequence, a considerable amount of resources have to be spent on each relationship. A consequence of a centralised organisational structure where decision-making is slow and where time and resources are strained can make it difficult to maintain the company's strategic relationships. Relationships built on a high level of trust involve mutuality, which forces defenders, in most cases, to form strategic relationships with organisations with similar characteristics. Respiratory A/S holds some relationships, which are based on weaker ties: the Director of Strategic Marketing and Business Planning states, "We do run some business relationships of minor character with small bio-tech companies. They are however only related to projects of little significance". These relationships may function as non-redundant relationships or as structural holes. This will provide Respiratory A/S access to information

outside its established strategic network and a safety net in case of crises in the established strategic relationships. In sum, a general alignment exists between the organisational structure of a defender and the indications of network behaviour.

3.1.4 Network Identity

As has been shown, Respiratory A/S depends on access to resources outside its internal boundaries. Strong incentives exist for it to establish business relationships with organisations possessing the needed resources. However, the opportunities available to the company depend on its prior history of relationships as well as the present situation of the company (Ahuja, 1998; Anderson et al., 1994). Due to Respiratory A/S's leading position within its field, we presume it has had a considerable level of success. Furthermore, the fact that the company paid attention to the issue of prior relationships indicates that it is aware of the dangers of being negatively influenced by less successful relations. The Director of Strategic Marketing & Business Planning, Respiratory A/S argues, "You do take into account who the company has been working with before and the outcome of it". Consequently, Respiratory A/S benefits from a positive network identity. A defender furthermore has access to a considerable amount of resources and information through their business relationships as they have a high degree of relational embeddedness making them attractive as partners and thus enlarge its opportunity set. The majority of the business relations established by Respiratory A/S are based on strong ties, which exhaust a considerable amount of resources. This can have a negative influence on its network identity and hereby limit its set of opportunities.

3.2 The Prospector

3.2.1 Product/market Domain

Innovator A/S is situated within one specific business environment. The Senior Director of Innovator A/S however states, "It is an industry that keeps on changing. New applications and opportunities are constantly arising and our clients (are) constantly pushing for new products". Innovator A/S has to continually introduce new innovative products and seek to develop new markets. The Senior Director of Innovator A/S, says that "This is our living (introducing new products). Within all areas - also totally new products". In order to successfully follow its explorative strategy, it is important for Innovator A/S to have the resources needed to follow up on new opportunities. Therefore, strategic relationships will in most cases be based on a relatively low degree of relational embeddedness and weak tie binding. This avoids locking resources into permanent relations. The Senior Director of the company refers to the strategic

relationships established by Innovator A/S as strategic accounts rather than as relationship partners. Innovator A/S puts a great deal of effort into maintaining its clients and therefore seeks to develop personal relations between the companies. As the clients in some cases also represent strategic relationships, these relations naturally become long-term and based on personal understanding. The Senior Director of Innovator A/S states, “You have to have a personal understanding to make things work. Building personal relations takes time”. Nevertheless, personal relations are not only developed because the strategic relationship partner is a client. Personal relations also serve the purpose of enhancing the success of the relationship itself.

Using the strategic relations established with Procter & Gamble (P&G) as an example, it becomes clear that Innovator A/S is searching for strategic relationship partners that provide access to knowledge about the future demands of the industry. Hence, as the area of interest for the strategic relationship is built on exchange of information, the level of adaptation and hereby also interdependency in the relationship is limited. The Senior Director explains this by arguing as follows: “Some of our customers (strategic relationship partners) will be the same but as we move away from technical applications over to medical devices and the pharmaceutical business, the customers (strategic relationship partners) will become new ones”. Hence, the level of relational embeddedness may be high in accordance with the level of personal involvement. However, interdependencies in terms of production are not created since the main purpose of the strategic relations established is to access information. It is therefore fair to argue that from a network point of view, alignment exists between Innovator A/S’s choice of product/market domain and established types of strategic relationships.

3.2.2 Production Process

For organisations dedicated to a wide exploration of new products, it is of crucial importance to have a production system that allows for flexibility. For Innovator A/S this means that focus is on the ability to use the same facilities for various purposes, e.g., enzymes and micro-organisms can be grown in the same tanks etc. Hence, synergy exists between all of Innovator A/S businesses as stated by their Senior Director, “Synergies between new businesses and back to what we do today will always be present”. Innovator A/S has therefore established strategic relations with some of the biggest customers in the various markets. E.g., in the market for animal food, Innovator A/S has developed a strong strategic relationship with Roche, which is one of the most dominant producers. It is thus reasonable to argue that according to indications from the network literature as well as empirical data, prospectors will mainly engage with organisations providing access to information on new developments both inside and outside their current business areas.

3.2.3 Organisational Structure

Prospectors need an organisational structure that can help support the dynamic nature of their business. The organisational structure of Innovator A/S provides a good example. As stated by the Senior Director of Innovator A/S, “Even though it looks like our organisation is very hierarchical it is actually very flat. There is a very short distance to the top. You can discuss with all people and management as well”. The flexible structure of Innovator A/S should thus enable it to handle a number of different strategic relationships to access a wide area of information. Furthermore, Innovator A/S seeks to avoid tying up resources with a specific relationship. As stated by the Senior Director, “When we change business focus we have to change partners”. It is therefore unlikely that business relationships will be established with defenders as this typology often invests a considerable amount of resources in its relations. Nevertheless, even the most capable organisation has its limits in terms of resources available. Having non-redundant relationships is therefore wise as they demand less attention while at the same time providing access to unavailable information. Coupled with a decentralised organisational structure, the strain on resources diminishes, thus facilitating the handling of a larger number of strategic relationships.

3.2.4 Network Identity

A company’s network identity is a question of the incentives it offers and the opportunities available to it. In relation to its current situation, Innovator A/S benefits from being positively known as a leader within its field. Furthermore, the fact that Innovator A/S cooperates with some of the biggest companies within various industries adds positively to its network identity. Innovator A/S nonetheless have to be careful not to overstretch its engagement in too many areas as this will drain resources and hereby have a negative effect on its network identity. However, as Innovator A/S emphasises the existence of synergy between all areas of business as well as a satisfactory level of personal understanding and involvement (i.e. medium level of relational embeddedness) the danger of damaging its network identity is diminished.

3.3 The Analyser

3.3.1 Product/Market Domain

Currently Derma A/S is trying to explore new business areas but it has not yet decided which area to target. Derma A/S Executive Vice President of Marketing & Sales explains, “We are searching for a third leg to stand on. It’s somewhat a matter of what falls into our hands”. The

company is thus following a dual strategy of exploitation and exploration. Within existing areas, the goal of Derma A/S is, according to Executive Vice President of Marketing & Sales, “To become the absolute leading company within dermatology. It demands new products but it does not necessarily mean that we have to be the biggest”. Henceforth, the company is securing its position within current markets primarily by introducing new products while still improving existing ones. As can be seen from the previous sections, strategic relationships established by companies following a strategy of exploitation often have a higher degree of relational embeddedness than the ones established by companies focused on exploration. As Derma A/S follows a dual strategy, it engages in strategic relations of different characteristics. The strategic relation with, e.g., GlaxoSmithKlein (GSK) is long-term and based on Derma A/S having access to GSK’s databank of products of interest for dermatological research. The Executive Vice President of Marketing & Sales explains that strategic relationships often become long-term solely due to the fact that the basis for these relationships (R&D) is a time-consuming process. It therefore becomes important to establish personal relations and hereby to develop a certain level of relational embeddedness. Still, Derma A/S makes sure that they do not suddenly get locked into a relation they cannot get out of. It is important to notice that contrary to Respiratory A/S, Derma A/S does not engage in joint development of a specific product. As the example with GSK illustrates, Derma A/S however establishes strategic relations with the purpose of accessing resources that are vital for the further development of its own products. Interdependencies are thus created, as Derma A/S does not possess the competencies necessary for the development of these activities internally. The fact that Derma A/S also functions as a venture capital investor in minor companies illustrates the more explorative side of its dual strategy. The level of relational embeddedness here is much lower as these relations have often been built on weak ties. These business relations are thus not established with the intent to access certain resources or activities. Derma A/S holds a range of informal contacts. Consistency exists between the product/market domain of Derma A/S and established strategic relationships.

3.3.2 Production Processes

Companies that are focused on the exploitation as well as explorative side of business need to apply a production system that can follow up on this dual strategy. Derma A/S illustrates this point well as the strategic relationship with the company Halas Pharma is based purely on the development of new production methods. As mentioned by the Executive Vice President of Marketing & Sales: “we aim to be just as efficient as a generic producer. We are therefore constantly optimising on all fronts”. In addition, effectiveness is sought in the way that existing

production facilities can be used for various purposes: “Our newest product will be produced on our two fabrics using existing production systems”.

It is important to remember that an analyser has to strike a balance between exploitation and exploration and that the production system is merely a means to an end. The previously mentioned relation with Halas Pharma is however a direct example of one that is intended to improve efficiency. Overall Derma A/S seems to establish strategic relations, which can enhance efficiency. However, as the company is searching for a new area of business, the issue of effectiveness is likewise considered.

3.3.3 Organisational Structure

The organisational structure of an analyser often becomes a centralised and decentralised structure. In the case of Derma A/S, the organisational structure is according to the Executive Vice President of Marketing & Sales: “a very flat organisational structure with little distance from the lower levels of the organisation to the top”. When following a dual strategy like Derma A/S’s, it is important that the organisation is capable of working with different types of organisations. Prospectors are organized to make quick decisions. If relationship partners are not organized accordingly, decision-making processes will become slow and problems may arise. On the other hand, defenders are characterised by slower processes and if working with a strategic partner who makes quick decisions, the defender might interpret the partner as superficial. Therefore, the organisational structure of an analyser is created to make room for working with both types. The Executive Vice President of Marketing & Sales explains: “It is a question of having some effective decision making processes and making sure that you have the time you need to make qualified decision”. In order not to put the organisation under too heavy pressure from having to deal with different types of strategic relations it is of vital importance that the analyser has the correct mixture of redundant and non-redundant relations. Since Derma A/S engages in more stable relations while functioning at the same time as a venture capital investor, it seems to illustrate this point well.

3.3.4 Network Identity

The two major incentives driving Derma A/S to establish strategic relationships are: its need for complementary resources and access to information outside its more stable area of business. As analysers in general have a good reputation among defenders, prospectors as well as other analysers, they have abundant opportunities available. Based on the age of Derma A/S and its current position, it can be argued that the company has had success with its prior relationships. Further supporting this is the fact that Derma A/S takes the question of network identity

seriously. As commented by the Executive Vice President of Marketing & Sales: “What we are looking at is their (future partner’s) prior relationships, the size of the company, how flexible they are and if they seem to be on the same wave length as us”. In addition, the company’s ability to engage in different types of strategic relationships as well as its current position within its more stable area of business indicates that the company has a rather positive identity. It can however have a negative influence that the analyser has to allocate its resources among strategic relationships requiring different levels of relational embeddedness. As the analyser uses its activities within the more stable environment to secure its activities within the less stable ones, it can be difficult for it to free up resources needed to “nurse” its strategic relationships within minor areas. Derma A/S does however cope well with this problem as non-redundant relations are used to obtain information on new business opportunities, which require few resources. It hereby secures that the sufficient amount of resources available to handle the strategic relationships requires a higher level of relational embeddedness.

4. Framework and Discussion

The illustration below highlights how different typologies are linked to the network dimensions.

Table 1. Findings linking business typologies with network behaviour

	Level of relational embeddedness		Incentives to establish strategic relations		No. of redundant relations	No. of non-redundant relations	Strategic relationship partners
	Weak ties	Strong ties	Complementary resources	Market information			
Defender	Few	Many	High	Low	Many	Few	Mostly defenders
Prospector	Many	Few	Low	High	Few	Many	Mostly analysers or prospectors
Analyser	Some	Some	High	High	Some	Some	Defenders, analysers and prospectors

As can be seen from the findings above some main differences exist as to how each business type relates to networking. Defenders have a tendency to get more engaged and create a higher level of interdependency with their strategic relationship partners than analysers or prospectors do. This is due to a focus on exploitation of existing products/markets. The main incentive for establishing strategic relations is thus access to complementary resources that can help secure the company's position. Non-redundant relations therefore become less important as their main purpose often is to provide information from outside the existing area of business. Prospectors, on the other hand, get less relationally embedded because they focus on the exploration of new products/markets. Access to information thus becomes the driving force for establishing strategic relations that can secure its position. A low level of interdependency is thus created, as the prospector is not dependent on certain activities/resources. It hereby follows that non-redundant relations are preferred over redundant relations as they provide the needed type of information. Finally analysers seek to find a balance between levels of relational embeddedness as well as levels of interdependency that stem from its activity/resource chains, as they are dedicated to the exploitation as well as exploration of products/markets. It thus follows that access to complementary resources as well as information drives the company to establish business relations. Consequently non-redundant relations become just as important as redundant relations.

This paper has made a first attempt to link business typologies with network behaviour and identity. Evidence has been provided that a clear systematic connection in fact exists. It has been shown that defenders, prospectors and analysers each relate differently to the various elements defined as parameters of network behaviour. From the analysis, support has thus been provided to show that patterns of network relations can be established on the basis of the business typology of a company. The results of the analysis make clear that the relation between business typologies and network identity and behaviour is an important element, which should not be overlooked when pursuing company strategy.

Based on the present paper, insight has been gained as to how the relations between the business typology of a company and patterns of network behaviour can become of importance for a company's network relations. Hence a first attempt has been made to link a company's strategy, structure and processes with indicators of network behaviour. This offers the strategy field a conceptualisation that affords an understanding of how to manage networks and it offers the network literature a better understanding of who links with whom and why. An attempt has been made to link the field of organisational behaviour to the literature on networks, and subsequently to contribute to the understanding of how different types of companies best make use of their network relations.

5. References

- Ahuja G (2000) The Duality of Collaboration. *Strategic Management Journal* 21: 317–343.
- Anderson J.C, Håkansson H, Johanson J (1994) Dyadic Business Relationships within a Business Network Context. *Journal of Marketing* 58: 1-15.
- Ansoff H (1965) *Corporate Strategy*. Penguin Books, London
- Barney J (1991) Firm Resources and Sustained Competitive Advantage. *Journal of Management* 17: 1: 99–120.
- Bresser, Rudi K.F. (1989) Kollektive Unternehmensstrategien. *Zeitschrift für Betriebswirtschaft*, 59: 545-564.
- Blau, P.M. (1968) The Hierarchy of Authority in Organizations. *American Journal of Sociology* 73: 453-67.
- Burgelman R. A. (1983) A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly* 28: 223-244.
- Burt R. S (1992) The Social Structure of Competition. In: Nohria N, Eccles G. E (eds) *Networks and Organizations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 57-91.
- Dyer J. H, Singh H (1998) The Relational View: Cooperative Strategy and Sources of Interorganisational Competitive Advantage. *The Academy of Management Review* 23: 660–679.
- Eisenhardt K (1999) Building theories from case study research. *Academy of Management Review* 14: 532-550.
- Ford D, Håkansson H, Johanson J (1986) How Do Companies Interact? In: Ford D (ed) *Understanding Business Markets*. The Dryden Press, pp 55–67.
- Glasser B, Strauss (1967) *The discovery of grounded theory. Strategies of qualitative research*. London. Wiedenfeld and Nicholson.
- Granovetter M (1992) Problems of Explanation in Economic Sociology. In: Nohria N, Eccles G. E (eds) *Networks and Organizations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 25-56.
- Gulati R, Nohria N, Zaheer A (2000) Strategic Networks. *Strategic Management Journal* 21: 203–215.
- Hambrick D.C (1993) Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types. *The Academy of Management Journal* 26: 5–26.
- Hamel G, Prahalad C. K (1996) The Core Competence of the Corporation. In: Goold M, Sommers K. L (eds) *Managing the Multibusiness Company – strategic issues for diversified groups*. Routledge, London, pp 218-239.
- Holm D.B, Eriksson K, Johanson J (1996) Business Networks and Cooperation in International Business Relationships. *Journal of International Business Strategies* 27: 1033-1053.
- Hougaard S, Bjerre M (2002) *Strategic Relationships Marketing*. Samfundslitteratur.
- Husted K, Vintergaard C (2004) Stimulating innovation through corporate venture bases. Forthcoming in *Journal of World Business* Vol. 39, Nr 3.

- Håkansson H, Johanson J (1993) The network as a Governance Structure: Interfirm Cooperation beyond Markets and Hierarchies. In: Grabher G (ed) *The embedded Firm*. Routledge, London, pp 35-51.
- Håkansson H, Snehota I (1997A) No business is an Island: The Network Concept of Business Strategy. In: Ford D (ed) *Understanding Business Markets*. Thomson Learning, 2002, 3rd edn, pp 150-161.
- Håkansson H, Snehota I (1997B) Analysing Business Relationships. In: Ford D (ed) *Understanding Business Markets*. The Dryden Press, 2nd edn, pp 151-175.
- Ibarra H (1992) Structural Alignments, Individual Strategies, and Managerial Action: Elements Toward a Network Theory of Getting Things Done. In: Nohria N, Eccles G. E (eds) *Networks and Organisations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 165-188.
- Johanson J, and Associates (1994) *Internationalisation, Relationships and Networks*. Uppsala University.
- Johanson J, Mattsson L. G (1994) Interorganisational Relations in Industrial System. In: Johanson J, and Associates (eds) *Internationalisation, Relationships and Networks*. Uppsala University, pp 171-181.
- Mattson L.G (1986) A "Markets-as-Networks" Perspective. In: Pettegrew A (ed) *The Management of Strategic Change*. Basil Blackwell, Oxford, pp 234-256.
- Miles R.E, Snow C.C (1978) *Organizational strategy, structure and process*. McGraw-Hill Book Company, New York.
- Miles R.E, Snow C.C (1984) Fit, Failure and the Hall of Fame. *California Management Review* XXVI: 10-28.
- Miles R. E, Snow C.C (1992) Causes of Failure in Network Organisations. *California Management Review* 34: 53-72.
- Morgan R, Strong C and McGuinness T (2000) Prospector strategy & competitive attributes – a multiattribute analysis of strategy. Research Paper No. 01-12.
- Namiki, N. (1989) The impact of competitive strategy on export sales performance: an exploratory study. *The Mid-Atlantic Journal of Business*, 25: 21-37.
- Porter M (1980) *Competitive Advantage*. The Free Press, NY.
- Ritter T (1999) The Networking Company – Antecedents for Coping with Relationships and Networking Effectively. *Industrial Marketing Management* 28: 467-479.
- Rowley T, Behrens D, Krackhardt D (2000) Redundant Governance Structures. *Strategic Management Journal* 21: 369-386.
- Shortell S. M, Zajac E. J (1990) Perceptual and archival measures of Miles and Snow's strategic types: a comprehensive assessment of reliability and validity. *Academy of Management Journal* 33: 817-832.
- Torres A. M, Murray J. A (2002) Diversity, marketing practice and organisational evolution: Implications for the management of productive evolution. *Journal of Change Management*, London.
- Touminen M (1997) *Marketing Capability and Marketing Orientation in Strategy Interface*. Helsinginkuppakorkeakoulu.
- Vintergaard C (2005) Opportunities in Corporate Venturing – Actors Creating Passageways. *International Journal of Innovation Management (IJIM)* 9(1) 215-239.
- Wernerfelt B (1984) A Resource-based View of the Firm. *Strategic Management Journal* 5: 171- 80.
- Yin R (1984) *Case study research*. Beverly Hills, CA Sage publication.
- Zahra, S.A, Pearce, JA, II. (1990) Research Evidence on the Miles-Snow Typology. *Journal of Management*, 16: 751-768.

3.3 Study III – Husted and Vintergaard (2004)

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Stimulating innovation through corporate venture bases

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Abstract

A common shortcoming, both in the literature on corporate venturing and in practice, is insufficient or no attention to the ability and responsibility of firms to stimulate and influence the creation of innovative ideas that can lead to new ventures. This paper focuses on the initial process of corporate venturing and explores how corporate venture management can stimulate the generation of genuinely original and dynamic ideas by establishing and maintaining a venture base. The following concrete actions are proposed in order to promote and improve the functionality of the venture base: take responsibility, secure access, acquire network capabilities, gain competencies in how to influence the vision and agendas in knowledge-creating networks, contextualize, and invite to discussion at an early stage. The paper is mainly conceptual in nature but draws on 22 semistructured interviews conducted between 2000 and 2002 with managers of corporate venturing departments at six multinational Danish firms in knowledge-intensive industries. The interviews are used to illustrate the main arguments of the paper.

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1. Introduction

Since the early 1990s, corporate venturing has become a significant method for business development (Block & MacMillan, 1993; Burgelman, 1983, 1985; Gompers & Lerner, 1999). The popularity is mainly due to the presumed ability of corporate venturing to facilitate continuous growth by embracing high-level innovation and accessing cutting-edge technological development. To some companies, corporate venturing has become a core concept in their strategic planning (Burgelman, 1983).

Corporate venturing has also received considerable attention in academic literature (McNally, 1997). Much of this attention has been focused on the later stages of the venturing process (Block, 1982; Block & MacMillan, 1993), such as the organizational setup of the corporate venture activity (Block & MacMillan, 1993), the criteria for developing a portfolio of ventures into a winning entity (MacMillan & Day, 1987), the development and growth of a

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venture (Simon, Houghton, & Gurney, 1999), and possible exit strategies (Gompers & Lerner, 2001). In practice, too, we find a strong focus on the later stages of the venture process. Corporate venture firms often rely heavily on their ability to develop firms around “winning” ideas and too little on how they can promote the development of a continuous flow of high quality ideas.

This paper suggests that one of the most crucial aspects of a corporate venturing strategy is the ability to secure a steady flow of genuinely innovative ideas. It further argues that corporate venture firms need to stimulate the flow of ideas by participating actively in the process of developing and shaping new ideas. In other words, corporate venture firms must work systematically with their venture base from where new ideas for ventures emerge. The venture base is defined as the web of internal and external sources of opportunity-creating activities that can foster new ideas for ventures based on the knowledge production of the sources themselves or a combination of knowledge resources.

The development of genuine high technology innovations (from the venture base) demands a combination of scientific skills and intellectual capacity that exceeds the capabilities of an individual corporation (Powell, Koput, & Smith-Doerr, 1996; Seufert, Von Krogh, & Bach, 1999). In particular, when learning and knowledge for innovation is dispersed, learning about new opportunities depends on participation in a network of knowledge-generating relations (Powell, 1998). Since the venture base transcends organizational boundaries, we will apply a network perspective on the very complex process of shaping the venture base. The paper also draws on the insight of the new production of scientific knowledge as taking place in close interaction between knowledge-creating institutions with various norms, values, and justification criteria. As a consequence of this Mode 2 production of knowledge, ideas will not only be conceived and shaped in an individual institution, but also in the interplay between a number of network-organized players. Finally, the paper will provide arguments for how corporate venture companies can influence the venture base in order to increase the quality and flow of original ideas.

2. The study

Our study is based on 22 semistructured interviews conducted at six multinational Danish firms between 2000 and 2002. The six companies all had corporate venturing departments, though with some variation in their level of experience. At one end of the scale, one of the firms had more than 20 years' experience in corporate venturing and a number of extremely successful exits, and at the other were two firms with less than two years' experience and no exits at all. The other three companies included in the study all had between four and eight years' experience in corporate venturing activities.

All interviewees had held positions in corporate venturing at top and middle management level for at least two years. This was an important criterion for their selection as study participants. Each interview lasted between 2 and 3 hr. All interviews were taperecorded and transcribed verbatim.

The interviews served an important role in drawing our attention to barriers faced by corporate venturing units in the early stages of the venturing process, especially in terms of ensuring a sufficient inflow of genuinely innovative ideas from which selection could take place. In the paper, the findings of the study will primarily be presented as quotations and serve to underpin and illustrate the theoretical arguments.

3. Corporate expectations of venturing

Corporate venturing is a strategy for business development. It involves investment in high-risk activities that generate new businesses within or closely related to the activities of the parent corporation, i.e., it is a business development strategy that seeks to generate new businesses for the corporation in which it resides (Von Hippel, 1977). Corporate venturing can be used strategically to encourage corporate renewal in the parent organization (Elfring & Foss, 1997), as a growth driver by investing in ventures with high growth potential, or to diversify the core business of the parent by investing in ventures in diverse industries (Block & MacMillan, 1993). The ideas for new businesses can originate either inside the organization or externally. Activities hosted by the corporate venturing unit will often be new to the organization and require the parent company to extend their resources by acquiring new equipment, people or knowledge (Biggadyke, 1979). Moreover, corporate venturing activities are characterized by a significantly higher risk or failure rate and greater uncertainty (Block & MacMillan, 1993). The characteristics below appear to distinguish corporate venturing from other business development strategies such as takeovers, corporate R&D, traditional venture capital financing, and joint ventures (Albrinck, Hornery, Kletter, & Neilson, 2001).

Firstly, a corporate venture involves a significantly higher risk of failure or substantial losses than the core business of the organization and is therefore often characterized by greater uncertainty. Furthermore, the ventures undertaken are typically subject to less strict management of internal costs than usual research and development activities (Block & MacMillan, 1993). A corporate venture should involve an activity new to the organization, defined broadly as new products, processes, and technologies that can contribute to the organization.

Secondly, in a corporate venturing setup the returns on investments are partly financial and partly strategic (McNally, 1997). The aim is that ventures will be managed separately at some time in the future. A venture is a semiautonomous entity optimally controlled by one manager. While returns on pure venture capital investments are based solely on financial measures, corporate venturing investments are also strategic in the sense that they aim to develop the base business of the corporation (Burgelman & Doz, 2001). The reason for undertaking a venture is to increase and/or improve the resource base of a company and/or its competitive situation in the market while at the same time offering a potential financial gain.

Thirdly, corporate venturing often operates over a longer time frame than traditional business development: compared to the traditional business development process, the aim is to manage developments that extend beyond the development time for current activities. Many of the technologies and services are projected so far into the future that the organization has only a vague idea of the actual outcome. The consequence of long time frames is also reflected in the measures of new venture success (Albrinck et al., 2001), which should emphasize value creation and long-term returns, such as capitalized ROI at the time of exit. In the early stages, measures tend to focus on reaching specific milestones. Funding is provided based on these well-defined achievements, sometimes by outside investors in order to provide the new venture target with external validation (Gompers & Lerner, 1999).

Fourthly, corporate ventures are expected to yield above average returns. The return is tightly linked to the risk associated with the investment, as investors believe they can gain an above average return by seeking and discovering market inefficiencies.

A corporate venture relationship is commonly based on resource exchanges between a parent company and a portfolio of small ventures. Our interviews in the case organizations also illuminate the range of corporate incentives for engaging in corporate venturing. One manager points to the ability of corporate venturing to increase corporate agility. He states:

The aim of the investments was ‘speed to market’ ...[we] wanted to get onto the market quickly when the decision [concerning the venture division] had been made. (Venture manager, telecommunications industry)

Other managers emphasize the strategic value:

The ventures are to be used strategically. The projects are not to be sold at their peak, but used more strategically. Utility has to be seen in terms of new products and technological features complementing our existing portfolio of activities. (Venture manager, high technology industry)

The decision [to go into corporate venturing] was strategic as we wanted to be better able to meet the technological development while simultaneously creating synergies between future ideas and present services. (Venture manager, telecommunications industry)

In order to achieve these benefits the parent company is expected to contribute both financial resources and knowledge resources in management, marketing, production, etc.—all resources to which small ventures seldom have access. Well-established technology and knowledge-based companies in particular find corporate venturing useful to increase their speed and levels of innovation, while maintaining many of the advantages of large resource pools. The relevance of choosing corporate venturing as a business development strategy also relates to the characteristics of the business environment, with the following characteristics particularly conducive to establishing corporate venturing activities (Gompers & Lerner, 1999; McNally, 1997):

- The industry is subject to changes on many fronts emanating from small firms.
- The firm is under threat from new entrants to the market with new technologies that undermine its current capabilities.
- Future business will depend on new capabilities that are not currently central to the organization.
- Retention of key staff in technical departments has become a challenge.
- The corporation is being approached with numerous investment proposals by both internal and external sources.

Companies with a strong technology base are often more inclined to participate in corporate venturing. Such companies frequently see an additional advantage in the contribution of corporate venturing to technological intelligence. Through evaluating and cooperating with small ventures with a different understanding and perspective on technology, the parent company creates a “window on technology.” This window is expected to accelerate product development, the ability to recognize new market developments, and the development of new technologies—all crucial competences in volatile and uncertain environments (Block & MacMillan, 1993). In our empirical data, we also find strong indications that access to innovation is a major reason for undertaking corporate venturing:

[Working with corporate venturing] improves the internal ethos in the direction of innovation ... it teaches the employees to think in innovative paths. (Venture manager, telecommunications industry)

Corporate venturing is seen predominantly as a way for large, established companies to transform their organizations through a process of strategic renewal based on the acquisition of new capabilities (Zahra, 1996; Zahra & Covin, 1995). The strategy is a transformation of large corporations often operating in mature or stagnant business areas (Ginsberg & Hay, 1994). At the same time, it is a strategy to seek new ways to be innovative and flexible and to gain knowledge that may be parlayed into future revenue streams (Greene, Brush, & Hart, 1999).

Many of the characteristics discussed above could not be developed and exploited by other types of business development strategies, but require the structure and strategy that this concept brings. The arguments above emphasize this specific type of business development strategy, but also stress what is often the most essential input in a corporate venture, namely original ideas.

4. Ideas—the raw material

One of the features of corporate venturing activities is the expectation of above average returns on successful investments. Therefore, the business idea, around which a potential new venture is formed, should also reflect the possibility of achieving an above average return. Taking a Schumpeterian view (Schumpeter, 1934, 1950), one could argue that successful entrepreneurial development of new combinations of resources is a kind of rent for a significant period of time. In this view, even if a resource does not yield rents in the long run, as long as the process of adjustment to the zero-rent state is slow, substantial quasi-rents may still be earned in the middle run. This type of competition is not the traditional one based on price but rather the continuous and universal search for substitutes to replace the less desirable.

Corporate venture firms need access to a significant flow of high quality ideas from which selection can take place (Burgelman, 1983). If the corporate venture does not have access to an appropriate number of unique ideas, the venture unit will not be able to create a sufficient number of profitable ventures and will eventually cease (Block & MacMillan, 1993). As observed by a corporate venture manager in a pharmaceutical company:

I see the greatest obstacles to development in the venture market to be associated with competencies—of the entrepreneurs and the venture capital providers—these are greater than the structural and legislative constraints.

A top venture manager makes a similar observation in the high technology industry:

The lack of unique ideas is the most serious obstacle to further growth in the number of ventures.

Corporate venturing needs a critical population of ideas and certain requirements in the quality and innovativeness of these ideas. A further important point is that aiming for one viable business idea often leads to positive spillovers to other potential projects (Haddad & Harrison, 1993).

Current corporate venturing literature has recognized these elements, but has paid only limited attention to the initial stage of providing a steady flow of high quality and innovative ideas for venturing opportunities. In most of the literature on corporate venturing, the flow of ideas is often viewed as rich and generous or is not treated explicitly at all. For example, Burgelman (1983) almost ignores the idea stage when discussing the conceptualization and pre-venture stages of the development process: “As the definition process takes shape, an idea for a new business opportunity evolves into a concrete new product, process or system around which a pre-venture team of people is formed. As a result of the successful technical and market development efforts of this pre-venture team, it grows into an embryonic business organization. These stages take place in the context of the corporate R&D department” (Burgelman, 1983: 231).

However, it may not be so straightforward. The characteristics of corporate venturing as a business development strategy as outlined above emphasize that corporate venturing requires innovative ideas away from the core business in order to fulfill expectations. Only a very small proportion of incoming proposals receive capital from investors (Gompers & Lerner, 1999). This may indicate a lack of highly innovative and viable proposals that meet the criteria for corporate venturing activities.

For many companies, the most significant impediment to create renewal and growth is too few and too traditional mainstream ideas (Block & MacMillan, 1993; Tidd, Bessant, & Pavitt, 2001). Block and Macmillan’s (1993) analysis of how to influence the idea population focuses on explaining under what conditions the internal and external environments are good sources of new ideas. Their starting point is that corporate venture firms should be receptive to ideas generated both inside and outside the organization. However, they do not consider whether firms should take more active steps to encourage the development of innovative and viable ideas, nor do they discuss in any detail how corporate ventures should ensure access to ideas.

A common feature of all the discussed characteristics of corporate venturing as business development is the need for genuine and viable business ideas. Gompers and Lerner (2001) argue that some organizations, particularly research-based organizations, establish corporate venturing activities because they have a surplus of ideas that they cannot utilize or capture value from within their mainstream activities.

However, we also see that the creativity and ability in these organizations to generate new and innovative ideas wanes as the most innovative people become involved in established ventures.

The data also indicate strongly that venture managers experience a shortage of truly innovative ideas and view this as a major impediment to the development of the corporate venturing activity:

The greatest challenge for our corporation at present is to gain access to the ideas that are in the market. Filling the idea pipeline is the foundation for the success of our corporate venture department. (Venture manager, high technology industry)

... there are no restrictions in the venture department—the only restriction is within the individual employee, though they are restricted by not being entrepreneurial enough. (Top venture manager, high technology industry)

The lack of unique ideas is the most serious obstacle to further growth in the number of ventures. (Venture manager, high technology industry)

The respondents share the view that not only is it crucial to have sufficient critical mass in the population of ideas, but also that they face a serious shortage of genuinely innovative ideas. They also point to the failure of the research systems to provide them with a steady supply of genuine input and innovations.

A key problem in our area is to attract a sufficient number of investment proposals that are based on research at an international [high] level. (Venture capitalist, middle manager)

The government should provide students with a high-level basic education and develop fundamental research at the universities. There are too many unambitious researchers at the universities who are not given the proper incentives [to provide ideas]. (Venture capitalist, middle manager)

This further illustrates the importance of focusing on the main input to the corporate venture process, namely ideas that can subsequently be turned into ventures. When analyzing the elements that are central to the concept, it seems obvious that a central activity to corporate venturing should be those processes that facilitate the generation and shaping of new venture ideas.

We have argued that the main challenge in corporate venturing is to ensure a steady supply of original ideas. In the next section, we will discuss the features of the venture base of a firm. It will also be argued that an additional benefit in allocating managerial attention to designing an appropriate venture base is that the underlying knowledge will become socially robust. Particularly for systemic innovations, this can lead to faster acceptance in the market and coordinated action in the value chain. This challenge can be addressed by studying the firms' venture base.

5. Insights into the venture base

Corporate venture units have different strategies for addressing a slow and insufficient inflow of new ideas for ventures activities. One option is to focus on more mature technologies and firms, and develop the venture portfolio by acquiring small, technology-based companies. Another option is to expand the scope for new potential ventures by exploring activities less related to the core business activities of the parent company. A third option to boost the portfolio is through invitations to co-invest with other investment funds. In this section, as an alternative to the strategies mentioned, we suggest that one of the most crucial aspects of a corporate venturing strategy is the ability to secure a steady flow of genuinely innovative ideas. Following this line of argument, corporate venture firms need to stimulate this flow by participating actively in the process of developing and shaping new ideas. Corporate venture literature has already observed that ideas for venturing activities spring from the venturing bases of firms (Block & MacMillan, 1993; Hanan, 1976). The venture base refers to the opportunity-creating activities that can foster new ideas for ventures. These activities are embedded in knowledge-creating actions that will lead to innovation. However, surprisingly little attention has been paid to developing an understanding of how these venture bases function and under what conditions they can systematically generate ideas leading to breakthroughs. A venture base is made up of the opportunity-creating activities of a firm and its environment, which can serve as major resources for starting new ventures (Block, 1982). It is argued in this paper that the ability of the venture base to attract and shape innovative ideas is grounded in the capacity of the venture base to span organizational boundaries and its ability to contextualize the knowledge production underlying the innovations.

Block and MacMillan (1993) is one of the few works to touch on the importance of ensuring the full commitment of the overall organization to the venture bases. The arguments concerning the venture base provided by Block and MacMillan (1993) are, however, primarily from an internal perspective and mainly address the topic of constructing a venture base in order to gain maximum benefit from existing in-house competencies. The argument also rests on the belief that a single person or a small group of individuals is sufficient to create new and innovative ideas capable of changing current paradigms. However, as also illustrated by the following quotes, the internal source of ideas is

seldom sufficiently rich to provide the corporate venture organization with a critical mass of ideas:

Even though we have come quite far in the establishment of a corporate venture department here at our company, we are constantly faced with the problem of finding internal ideas with great potential ... (Venture manager, high technology industry)

We search for unique ideas at universities and conferences, virtually everywhere researchers meet and exchange ideas or search for partners ... (Top venture manager, biotechnology industry)

We are dependent on inventions generated by the external market enabling us to create new ventures ... (Top venture manager, high technology industry)

Moreover, radical new knowledge creation is not likely to occur within the boundaries of a formal organization with its restricting rigidities and bureaucracies. Today, it seems more likely that cooperation between a number of participants increases the chances of new and innovative developments. Arora and Gambardella (1990) and Powell et al. (1996) argue that the locus of innovation should be thought of as a network of interorganizational relations. It has proved to be valuable to analyze knowledge creation as a social activity embedded in a dense web of social, economic, contractual, and administrative relationships. Since sources of innovation are more commonly found in the interstices between organizations with various perspectives, learning occurs within the context of participation and invitation to a community and may require various kinds of organizations and organizational practices to access that community (Powell et al., 1996). It has even been stressed that competition should no longer be regarded as a game with a zerosum outcome (Thurow, 1980), but rather as a positivesum relationship in which new competencies and resources develop, in tandem with advances in knowledge.

Interorganizational learning in networks is viewed as conducive to innovation because the dynamics of knowledge creation are endogenous to a particular network of actors (Lane & Lubatkin, 1998). The building and the harvesting of a venture base demand capabilities that greatly exceed those of an individual person or single firm. Knowledge creation occurs in the context of a network community, one that is fluid and evolving rather than tightly bound or static (Powell et al., 1996). Thus knowledge creation is an ongoing social construction process, which is linked to the conditions and context under which learning takes place. In this way, the venture base becomes transorganizational, relying on activities in networks between firms, universities, consultants, customers, suppliers, national laboratories, and media.

A number of statements from the corporate venturing managers interviewed also underline the importance of focusing on the early stages of the venturing process in the form of the venture base. For example, on their sources of innovations and their effort in accessing and interacting with these sources, they state:

We are aware of our increasing dependence on universities such as the University of Southern Denmark—we are initiating many activities to ensure that we can establish our brand as a venture company. It's a new situation for us. (Venture manager, high technology industry)

We have located our business on [a science park] to benefit from the creative research environment—we know that we must build relationships with scientists and universities to gain access to ideas. (Venture manager, pharmaceutical industry)

The last statement in particular illustrates a corporate awareness of learning and innovations as a phenomenon that occurs in relationships in which new competencies and resources develop, in tandem with advances in knowledge. Within these networks, corporate venture firms need to learn how to transfer knowledge across partnerships to enable them to keep pace with the most promising scientific or technological developments and through these actions develop a more genuine and unique venture base. Similarly, venture managers state that a central requirement for corporate venture firms is to generate venture ideas in collaboration with their environment:

Idea generation is a process where one has to draw inspiration from outside while remembering what competencies one possesses oneself. (Venture manager, high technology industry)

We are dependent on the research results developed at technical universities. So far, we have been very dependent on the ideas that were created at the Technical University of Denmark [DTU]. To be as close as possible to the innovative environment, part of our own activities are located at DTU. (Venture manager, high technology industry)

The corporate venture firms with access to a more diverse set of competencies and activities and those with more experience in collaborating stand a better chance of developing opportunity-creating activities in information-rich positions.

Participating in this kind of broad network also ensures the creation of a high level of socially robust knowledge, which can prove useful in new venture generation in the next stage. Gibbons et al. (1994) suggest a model for knowledge production, referred to as Mode 2 (as opposed to Mode 1). In Mode 2, knowledge is carried out in a

context of application: it is characterized by transdisciplinarity and heterogeneity and is more plentiful and transient. “Mode 2 is more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context” (Gibbons et al., 1994: 3). In contrast, Mode 1 is organized hierarchically and tends to preserve its form. Mode 1 is most often identical to what is meant by “science.” In short, we are experiencing a shift from Mode 1 science, which is expert, discipline-bound and self-referential, to Mode 2 knowledge production.

In terms of production and development, the venture base context is of crucial importance. However, not simply context in the sense that greater attention must be paid to the end users of science—not even in the sense that context helps to define scientific problems and to select appropriate methodologies—but in the more fundamental sense as a result of its contextualization into reliable knowledge. This kind of knowledge is being progressively redefined—or superseded by—knowledge that is socially robust (Nowotny, Gibbons, & Scott, 2001). In this connection, the venture base is developed and shaped during the process of contextualization in order to generate opportunity-creating activities that are socially robust.

Late modern innovative developments are increasingly characterized by interdisciplinary collaboration in contexts of application resulting in the hybridization of knowledge production. Participatory procedures involving scientists, stakeholders, active citizens, and users of knowledge are needed to transform knowledge claims into trustworthy, socially robust, usable knowledge about the realities that matter in social and environmental changes and in the transition to sustainability. As illustrated in the quotations below, some of the interviewees have started to work on the boundaries of the corporate venture and other organizations such as research institutions:

Much of our work to get new products and ideas is done in collaboration with researchers and students at the technical universities. (Venture manager, high technology industry)

You should help researchers by providing them with what they need to develop their idea ... Recently, I lent equipment to a researcher in order for him to carry out his research ... If the researchers ever need to collaborate with a company, I think we will be top of his list ... (Venture manager, biotechnology industry)

Following this line of argument, the aim is to further ground and test the developments to socially robust knowledge as this would: (1) become valid not only to the corporate venture company but also outside the organization, (2) gain validity through the involvement of an extended group of experts, and (3) include “society” as the genesis. In order for this to happen, a space needs to be created where the transdisciplinary can meet and where problems are formulated and negotiated, i.e., an agora. During this process, a better understanding of the content of the venture base will emerge, and interested parties will have the opportunity to reply in a public space or network formation.

The conditions for systematic knowledge creation and utilization in the corporate venture base do not emerge or develop spontaneously, but require a much more deliberate and reflexive design of the venture base, supporting value creation by embodying truly innovative ideas in new ventures controlled by the firm. This kind of value creation is dependent on a certain degree of coordination of both knowledge creation and use in the venture base among the individuals in organizations and across organizations. These design and coordination efforts converge around shared social processes. Until now, such efforts have mostly emerged sporadically and as a result of self-organization, but for firms that have chosen corporate venturing as their growth strategy, there is an increased urgency for intentionally designing and developing their venture bases. The following section outlines these main challenges for corporate venture managers.

6. Nursing the base: management recommendations

This paper argues that, because of its significance, the venture base demands special attention. In the section below, a number of concrete actions will be proposed to promote and improve the ability of the venture base to generate original ideas. There are at least six areas that managers need to consider in relation to their venture base.

6.1. Take responsibility

It is often taken for granted (both in the academic and the business community) that the bases and thereby venture ideas appear from nowhere or serendipitously in the external environment and that no initiatives are necessary to facilitate them. However, companies cannot be passive, rather they need to take active part in creating the bases from which ideas can spring. These actions should be focused both on encouragement of employees and on engagement in sources of innovation outside the organization. Therefore, parent companies need to take responsibility for knowledge production in networks and in the process of conceptualizing knowledge (Munk & Vintergaard, in press).

6.2. Secure access

In order for a corporate venture company to engage in network formation, it must also have something to offer in terms of its own level of knowledge production, reputation, etc. Companies will not become part of a value-creating network unless they can contribute something that is not already present in the network. Powell et al. (1996) argue that a partnering decision depends on each partner's size and position in the "value-chain" and the level of technological sophistication. They further argue that to remain current in a rapidly moving field an organization must be involved in the research process. Passive recipients of new knowledge are less likely to appreciate technological advances or be able to respond rapidly. In industries where knowledge is crucial, companies must be experts in both in-house research and in cooperative research with external partners, such as university scientists, research hospitals, and skilled competitors.

In addition to focusing on their ability to secure access to external knowledge and their ability to assess the value of and assimilate the external knowledge, companies must also consider the organizational economics involved in any relationship. An effective win–win situation for the actors in a network, for example, the research-based institutions and corporate ventures, is to share the value potential created in the network by offering equity in the venture.

6.3. Network capabilities

Companies need to learn to interact and create networks in order to be able to manage the venture base. Seufert et al. (1999) argue that individuals in an organization should be able to recognize personally relevant knowledge within the organization which can be exploited in the organization. The ability to create and participate in a network and to contextualize one's knowledge should be viewed as something that can be learned, but also something that often depends on personal traits.

6.4. Competencies in how to influence the vision and agendas in knowledge-creating networks

An important part of managing the venture base is to take an active part in influencing agendas in the network. Doing this will enhance the content of the venture base as resource allocation and focus are shifted in a desirable direction. In order to achieve such a position, the corporate venture must nevertheless learn where and how to access or structure a network formation and a community for contextualization. Huxham and Vangen (2000) argue that: "Structures thus play an important leadership role because they determine such key factors as who has an influence on shaping a partnership agenda, who has power to act, and what resources are tapped."

They further argue that when the structure of collaboration is part of a system of multiple overlapping partnerships, the influence on the agenda may be even more significant. By taking active part in influencing the agendas in a network, corporations will also have a greater chance of gaining a central position within it.

6.5. Contextualization

In order to shape the venture base during the process of contextualization, there are strong demands on the company to disseminate and negotiate new knowledge to a wide range of stakeholders. These types of stakeholder must hold central positions and originate from a transdisciplinary background. The dissemination and negotiation can occur both through formal and informal processes and events, such as committees, workshops, and seminars and telephone, fax, and e-mail, through which the communications of collaboration take place. Informal processes may take many forms and may be important for a number of reasons. The way in which and the frequency with which members communicate, for example, are obvious components of processes. Similarly, some processes obviously encourage members to share information and develop a common understanding of issues, whereas others hinder active communication (Huxham & Vangen, 2000).

6.6. Invite to discussion at an early stage

A common error in the phases of building a venture base is that the process of contextualization occurs too late in the development. As a consequence, the final business proposal will receive a lower evaluation due to both a lack of quality and a lack of appropriateness. Therefore, corporations must overcome the traditional paradigm of "knowledge hoarding" and create new methods and incentives for knowledge sharing. Even though knowledge sharing is a necessity for the venture base to develop, knowledge-sharing hostility both at individual and organizational levels hampers such development (Husted & Michailova, 2002).

Based on analysis of the characteristics and corporate expectations of corporate venturing as a business development strategy, we conclude that the underlying generation and shaping of ideas should be of central concern

to corporate venture managers. This paper has elaborated on this initial process of corporate venturing and explored how to design and benefit from setting up a venture base. In order to foster innovation from the venture base, it is important to realize that innovation is not created in an individual firm or between firms of homogenous character, but in the interfaces and overlaps between various industries and disciplines. Many corporate venture firms work with a number of preferred partners at a local level and maintain working relationships with a number of international players in the venture capital market. However, the conditions for value creation through the incorporation of truly innovative ideas in new ventures controlled by the firm do not emerge or develop spontaneously. To enable corporate venturing to contribute continuously to value creation in an organization, managers need a much more deliberate and reflexive design of the venture base, supporting value creation by embodying truly innovative ideas in new ventures controlled by the firm.

References

- Albrinck, J., Hornery, J., Kletter, D., & Neilson, G. (2001). Adventures in corporate venturing. *Strategy and Business*, 22: 119–129.
- Arora, A., & Gambardella, A. (1990). Complementarity and external linkages. *The Journal of Industrial Economics*, 38(4): 361–379.
- Biggadyke, R. (1979). The risky business of diversification. *Harvard Business Review*, 57: 103–111.
- Block, Z. (1982). Can corporate venturing succeed? *The Journal of Business Strategy*, 3(2): 21–34.
- Block, Z., & MacMillan, I. C. (1993). *Corporate venturing—Creating new businesses within the firm*. Cambridge, MA: Harvard Business School Press.
- Burgelman, A. R., & Doz, L. Y. (2001). The power of strategic integration. *MIT Sloan Management Review*, 42(3):28–38.
- Burgelman, R. A. (1983). A process model of internal corporate venturing in the diversified major firm. *Administrative Science Quarterly*, 28: 223–244.
- Burgelman, R. A. (1985). Managing the new venture division: Research findings and implications for strategic management. *Strategic Management Journal*, 6(1): 39–54.
- Elfring, T., & Nicolai, F. J. (1997). *Corporate renewal through internal venturing and spin-offs—Perspectives from organisational economics*. Revised Draft. Copenhagen Business School.
- Gibbons, M., Scott, P., Nowotny, H., Limoges, C., Schwartzmann, S., & Trow, M. (1994). *The new production of knowledge—The dynamics of and research in contemporary science societies*. London: Sage Publications.
- Ginsberg, A., & Hay, M. (1994). Confronting the challenges of corporate entrepreneurship: Guidelines for venture managers. *European Management Journal*, 12: 382–389.
- Greene, P., Brush, C., & Hart, M. (1999). The corporate venture champion: A resource based approach to role and process. *Entrepreneurship Theory and Practice*, 23(3): 103–122.
- Gompers, P. A., & Lerner, J. (1999). *The venture capital cycle*. Cambridge, MA: MIT Press.
- Gompers, P., & Lerner, J. (2001). The venture capital revolution. *Journal of Economic Perspectives*, 15(2): 145–169.
- Haddad, M., & Harrison, A. (1993). Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco. *Journal of Development Economics*, 42(1): 51–75.
- Hanan, M. (1976). *Venture management*. New York: McGraw-Hill.
- Husted, K., & Michailova, S. (2002). Diagnosing and fighting knowledge sharing hostility. *Organizational Dynamics*, 31(1): 60–73.
- Huxham, C., & Vangen, S. (2000). Leadership in the shaping and implementation of collaboration agendas: How things happen in a (not quite) joined-up world. *Academy of Management Journal*, 43: 1159–1176.
- Lane, P. J., & Lubatkin, M. H. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, 19(5): 461–477.
- McNally, K. (1997). *Corporate venture capital: Bridging the equity gap in the small business sector*. London: Routledge.
- Munk, B. K., & Vintergaard, C. (in press). Accentuating the role of venture capitalists in systems of innovation. (VEST) *Journal for Science and Technology Studies*, 17(1).
- Nowotny, H., Gibbons, M., & Scott, P. (2001). *Re-thinking science. Knowledge and the public in an age of uncertainty*. Oxford: Polity Press.
- Powell, W. W. (1998). Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review*, 40(3): 228–240.
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1): 116–146.
- Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge: Harvard University Press.

- Schumpeter, J. A. (1950). *Capitalism, socialism, and democracy*. New York: Harper and Brothers.
- Seufert, A., Von Krogh, G., & Bach, A. (1999). Towards knowledge networking. *Journal of Knowledge Management*,
- Tidd, J., Bessant, J., & Pavitt, K. (2001). *Managing innovation: Integrating technological, market and organizational change*. Chichester: Wiley.
- Von Hippel, E. (1977). Successful and failing internal corporate ventures: An empirical analysis. *Industrial Marketing Management*, 6: 163–174.
- 3: 180–1090.
- Simon, M., Houghton, S. M., & Gurney, J. (1999). Succeeding at internal corporate venturing: Roles needed to balance autonomy and control. *Journal of Applied Management Studies*, 8(2): 145–159.
- Thurow, L. C. (1980). *The zero-sum society: Redistribution and the possibilities for economic change*. New York: Basic Books, Perseus Book Group.
- Zahra, S. A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry's technological opportunities. *Academy of Management Journal*, 39(6): 1713–1735.
- Zahra, S. A., & Covin, J. G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, 10(1): 43–59.

3.4 Study IV – Vintergaard (2005)

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OPPORTUNITIES IN CORPORATE VENTURING - ACTORS CREATING PASSAGEWAYS

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This paper develops a conceptual understanding of how corporate venture managers recognize and discover opportunities in a network environment. In an effort to create a better understanding of who is involved in the process, this paper reports on the development path of several entrepreneurial opportunities of the Danish corporate venture capitalist, Danfoss A/S. This paper distinguishes itself from previous research done on entrepreneurial opportunities by creating a holistic and conceptual framework, which broadens and expands the perception of the market participants involved in processes of recognition and discovery. Consequently the paper offers insight into a diversified group of actors who mix and match technological and market capabilities in a constant process of recognition and discovery.

Keywords: Corporate venturing, entrepreneurship, discovery, networks, opportunities, recognition.

Introduction

Based on the current debate on entrepreneurial opportunities this paper uses corporate venture strategies to show how opportunities develop and take shape in the interaction between actors. While this paper argues that opportunity recognition and discovery is a series of events, including many different actors, it develops a conceptual framework for understanding the type of actors involved, one that may prepare corporate venture capitalists to better access new innovative opportunities.

From Austrian economics we know that entrepreneurial opportunities rarely appear prepackaged, ready to be served. Central to Austrian economics in light of entrepreneurship is

what entrepreneurs think, what they do, etc (Hayek, 1945; Kirzner, 1979). Hence it is central in Austrian economics to focus on how knowledge and information is produced and distributed between individuals and consequently how they act. The discovery of new entrepreneurial opportunities becomes a key challenge for individual entrepreneurs in this regard. The source of the opportunities here separates defenders of Austrian economics into those who believe that new opportunities are based on different accesses to existing information (Kirzner, 1973, 1997) and those who believe they are based on new information used to recombine information (Schumpeter, 1934). More research suggests that both types of opportunities can exist in the same market (Shane and Venkataraman, 2000). Schumpeterian opportunities are however more radical and less frequent and will most often be of interest for venture investors.

As information on the market and technology is unevenly distributed, the process of recognizing and discovering entrepreneurial opportunities becomes a collective act involving many actors (Soh, 2003; Hayek, 1945). This makes the search for new investment opportunities a key challenge for corporate venture capitalists, a process which demands interaction with other market participants. In entrepreneurial research, opportunities often refer to entrepreneurs bridging technological innovations with potential commercial markets, suggesting the connection of means and ends (Sarasvathy, Dew, Velamuri and Venkataraman, 2003; Venkataraman, 1997; Shane, 2000). Divergent to this research, others have focused on opportunity recognition and discovery within established firms (Tidd and Taurins, 1999; Leifer et. al., 2000). In light of Austrian economics, this paper builds on these strands, by presenting a coherent framework of the passageway opportunities travels, and consequently the actors who are involved in this process. To frame the analysis, corporate venture capitalists serve as the center of analysis, albeit they are surrounded by many other actors. This strategy has proven successful for many organizations over a broad industry spectrum with, e.g., 3M and The Raychem Corporation as notable success stories (Block and MacMillan 1993).

Conventional companies often experience significant difficulties in managing entrepreneurial opportunities and ideas compared to individual entrepreneurs (King et al., 2003). Some authors have claimed that the best strategy for profitable growth is to develop new ventures (Burgelman, 1984). Correspondingly, technological innovations have been seen to emerge when the resources of small firms are combined with those of large ones (King et. al, 2003). The business development strategy of corporate venturing has helped many companies in their efforts to manage entrepreneurial opportunities. 3M still represent one of the best known examples of how innovation is created within large corporations (Block and MacMillan, 1993). NMP, however, which is part of the Nokia Group, headquartered in Finland, represent a good example of a corporate venture search for technological innovation outside (Keil and Vilkamo, 2003). NMP

engages in close cooperation with leading companies within narrow technological areas, and hence strives to integrate innovation.

Companies pursuing a corporate venturing strategy often possess a combination of strong technological and market knowledge as they scrutinize new entrepreneurial opportunities. This contrasts with traditional venture capitalists that have less market knowledge. Due to corporate venture capitalists' access to information and knowledge, their strategy makes a significant case for analyzing entrepreneurial opportunities, as it helps to develop a broader understanding of recognition and discovery (Soh, 2003). In accord with Austrian economics, this paper posits that different actors perceive opportunities differently depending on time, with whom they interact, etc. In contrast to the traditional perception of opportunities, which focuses on the entrepreneur, this paper also includes other actor groups in the process of discovery and recognition on an equal footing.

Building on the research on opportunities provided by authors such as Sarasvathy, Dew, Velamuri, and Venkataraman (2003), this paper details a theoretical interpretation of how corporate venture capitalists recognize and discover entrepreneurial opportunities³. Opportunity recognition refers to the process of combining existing technologies and markets, whereas discovery describes the process where only one of the variables exists. Recognition and discovery refers to processes that will be referred to as "passageways" in this paper. Understanding these concepts will enhance our understanding of the progressive development of the given opportunity, as it is being shaped in a network environment. This network constitutes many different actors who all take roles in facilitating innovation. Bygrave (1987, 1988) argues that venture capitalists work with a broad network that facilitates the investment project. These networks can be of a very diverse nature and include many different individuals and organisations. Some of the network are build on a few strong ties where as other are more openended and exchangeable.

The passageways describe the development process that an opportunity takes, as it is being recognized and discovered by different actors. The passageways are formed by exchange of information and resources between key actors of which corporate venture capitalists only constitute one group. This paper therefore describes the passageways that have proved powerful for analyzing actors. Where other papers have successfully answered the question of why and what opportunities companies search for (Tidd and Trewhella, 1997), this paper contributes to answer the question of how this unfolds and how is involved.

³ This paper recognizes the concept of "opportunity creation" (Sarasvathy, Dew, Velamuri and Venkataraman, 2003) as one including creation of both means and ends. The concept will however be imbedded into opportunity recognition and discovery.

Initially a review of exciting research on entrepreneurial opportunities will be provided. This will be followed by an examination of corporate venturing as a significant strategy designed to recognize and discover opportunities. The contribution of the paper is presented in a conceptual framework, describing processes and actors. The dynamics and theoretical arguments behind the framework will be illustrated in multiple cases of the passageways that the entrepreneurial opportunities has travelled on their way to the Danish corporate venture capitalist, Danfoss A/S.

Conceptual Background

A review of the perceptions of entrepreneurial opportunities and a theoretical appreciation of the strategy of corporate venturing will demonstrate why this framework is particularly well suited to provide insight on the passageways of recognition and discovery.

Entrepreneurial opportunities

An entrepreneurial opportunity is often used to describe the business idea that the venture initially possesses (Long and McMullan, 1984; Bhave, 1994; Hills et al., 1997). In more recent literature, opportunities have also been studied within existing firms (Stevenson and Jarillo, 1990; Venkataraman, 1997). When reviewing the entrepreneurship and general innovation literature, it becomes evident that the definition of opportunities reveals large deviations (Sane and Venkataraman, 2001; Singh, 2001).

Entrepreneurial opportunities differ from the larger set of other profit opportunities because the former requires the discovery of new means and ends relationships, whereas the latter also involves optimization within existing means/ends relationships (Kirzner, 1997). One opportunity may however imply several different modes of exploitation (Shane and Venkataraman, 2000), being a behavioural phenomenon and an approach to management involving a process (Stevenson and Jarillo, 1990).

Christensen, Madsen and Peterson (1994) offer a definition of opportunities in the business context, where they define an opportunity as a new profit potential through (a) the founding and formation of a new venture, or (b) the significant improvement of an existing venture. This turns profitability and commercial issues into key parameters. Others have argued that while an opportunity to create value is a necessary part of the entrepreneurial process, it is not sufficient to

generate wealth for the entrepreneur (Casson, 1982). The entrepreneur also needs to gain control over the relevant resources before any profits can be realized.

Casson's (1982) definition elaborates on new profit potentials by defining opportunities as situations in which new goods, services, raw materials and organizing methods can be introduced and sold with a profit (Casson, 1982). Shane and Venkataraman (2000) subscribe to Casson's (1982) definition of entrepreneurial opportunities, but extend it to a conceptual element of entrepreneurship. In response to the definition by Shane and Venkataraman (2000), Singh (2001) argues that many opportunities would be jeopardized when analyzed from the perspective of profitability. He argues for the possibility that technological advances and ventures lose their "status" as opportunities if they later turn unprofitable. In this vein, Singh (2001) proposes: "that an entrepreneurial opportunity should be defined as a feasible, profit-seeking, potential venture that provides an innovative new product or service to the market, improves on an existing product/service, or imitates a profitable product/service in a less-than-saturated market (Singh, 2000)". He further argues that by focusing on feasibility and profit seeking, an opportunity can be defined prior to venture founding and profitability (Singh, 2001).

From a corporate venture capitalists perspective, opportunities need to promise a specific technological advance and a significant future commercial potential to earn Schumpeterian rents (Shane and Cable, 2002; Schumpeter, 1950, 1934). This originality and uniqueness is many times found in radical innovations i.e.: "discontinuous events unattainable through incremental adjustments of the pre-existing state of affairs" (Lundgren, 1995:17).

Based on the above review, it becomes evident that entrepreneurial opportunities are analyzed in the light of the entrepreneur as a single individual. This neglects the fact that the process often includes many actors and that it is equally important in established organisations and for venture capital organisations. This view is particularly evident in neoclassical research on entrepreneurship (Kirzner, 1997), leaving little room for understanding how larger organizations manage this task.

Corporate venturing – Strategizing for recognition and discovery

Corporate venturing is a business development strategy by which established companies invest in the creation of innovative ventures to create financial as well as strategic returns (Burgelman, 1983, 1984). Corporate venturing is predominantly seen as a way for large, established companies to seek new ways to be innovative and flexible (Kanter et. al. 1991). This, however, is not the only motivation. In fact, there exists a multitude of related motives for

launching a corporate venture, such as securing growth and responding to competitive pressure (Block and MacMillan, 1993), improving corporate profitability (Zahra and Coving, 1995; McGrath, Venkataraman, and MacMillan 1994; Zahra, 1991), generating strategic renewal (Guth and Ginsberg, 1990). Above all, corporate venturing is seen as a significant strategy to identify new business ideas (Block and McMillan, 1993; Burgelman, 1983; Husted and Vintergaard, 2004).

The majority of literature on corporate venturing stresses that this strategy is tailored for managing new investment opportunities (Rind, 1981). Without entrepreneurial opportunities, corporate venturing will not exist. Burgelman (1984) argues that firms “sooner or later, have to find and exploit opportunities in marginally related, even unrelated areas” (p. 154). Corporate ventures depend on ideas and opportunities as the main input for pursuing a strategy. However, not all ideas are entrepreneurial opportunities, and many opportunities do not fit in corporate venturing (Block and MacMillan, 1993). Hardymon, DeNino and Salter (1983) further claim that one of the keys of success for venture capital investment is the simultaneous cultivation of a steady stream of attractive investment opportunities. Likewise, Winters and Murfin (1988) have found that one of the “most important factors for the strategic success of a corporate program is the creation of a high-quality deal stream.” (p. 208). They also argue that venture capital investment can give the corporation a unique view of development in technologies and businesses of strategic interest. This makes recognition and discovery of opportunities key activities for corporate venture managers (Sykes, 1986).

Corporate venturing literature has also pointed to directions where opportunities may be recognized and discovered. Block and MacMillan (1993), for instance, argue that opportunities “can be found within the firm itself, in the industries, in the markets that it serves, and in the external environment” (p. 99). Likewise, Block (1982) emphasizes the fact that corporate ventures have access to both internal and external opportunities. These opportunities are often referred to as a “window to technology” (Winters and Murfin, 1988; Hardymon, DeNino and Salter, 1983). In fact, the discussion of internal (e.g. Burgelman, 1983; Sweetig, 1981; Tidd and Taurins, 1999; von Hippel, 1977) and external (e.g. Sharma & Chrisman, 1999) corporate venturing is very much grounded in where the entrepreneurial opportunities come from (i.e. the opening of their passageway). Previous venture capital literature, however, has focused on opportunities as they are explicated in business plans, and not on the early development processes as presented in the entrepreneurship literature. The venture capital literature from Burgelman (1983), Burgelman et al. (1986), Burgelman and Syles (1984) however lets us know that opportunities are often recognized thorough a process. In line with Austrian economics, research has also proven that sharing information in a network is key for finding new investment

opportunities (Bygrave, 1987, 1988; Dotzler, 2001). Who and how different actors are involved in this process however remains less examined in the literature.

In corporate venturing, three distinct elements make the strategy especially suited for recognizing and discovering opportunities. First, it is often argued that organizations cannot simultaneously create new opportunities and take care of what they already have without a change of strategy and organizational setup (Drucker, 1974). Perusing corporate venturing is often done with an intention to contain and maintain innovative internal and external processes (Chesbrough, 2000) by means of an organization that is more innovative and flexible than the firm itself (Greene, Brush and Hart, 1999). The semi-autonomous organizational structure, which is the nest for portfolio ventures, is often located within the established company, providing the necessary flexibility for ventures to grow (Block and MacMillan, 1993).

Secondly, investing in new opportunities is a risky business. Both venture capitalists and corporate venture units invest risk-willing capital to create new businesses. They are interested in high risk/high reward investment opportunities (Rind, 1981). The process of recognizing and discovering new opportunities and developing them into novel businesses involves a high level of uncertainty (Gompers and Lerner, 1999). Managing this risk forces venture managers to constantly focus on recognizing and discovering new opportunities.

Lastly the returns on investment in corporate venturing should be partly financial and strategic, contrary to the expected returns from pure venture capital investments (Burgelman, 1983). Hence, it is often an equally important goal to fulfil the strategic objectives of the parent corporation researchers (Leonard-Barton, 1992; Block & Subbanarasimha, 1989; Block, 1982). In 1989, Block and Subbanarasimha conducted a survey among 43 US and 149 Japanese companies which concluded that the most important reasons for companies to initiate corporate venturing activities were of strategic origin (Block and MacMillan, 1993). Having a bilateral goal objective forces extraordinary attention to recognition and discovery, as they need to specify their search for new opportunities.

The literature provides rich evidence that opportunity recognition and discovery are central management issues in corporate venturing. While corporate venturing literature may be most strongly influenced by the need for managing investment opportunity, little covers how recognition and discovery unfolds and especially who is involved. Even though Winters and Murfin (1988) argue that a deeper involvement in the venture capital process may give corporate venture capitalists a better chance for recognition and discovery, it provides only limited knowledge about who it involves.

Passageways Paved by Recognition and Discovery

Venkataraman (1997) claims that one of the most neglected questions in entrepreneurship research is where opportunities come from: why, when and how certain individuals exploit opportunities. This appears to be a function of joint characteristics of the opportunity and the nature of the individual (Shane and Venkataraman, 2000). Understanding these characteristics, however, are of utmost importance if one is to ensure that corporate venture capitalists get more alert and exposed to opportunities (Kirzner, 1973). From Austrian economics we know that, due to asymmetry in information, not every individual or company perceives the same opportunities (Hayek, 1945; Kirzner, 1997; Soh, 2003). Additionally, due to their different cognitive schemes, the process of recognition and discovery will take different approaches and end up with different results (Kirzner, 1973, 1997). This changes the traditional process of recognition and discovery into a series of events, which includes a variety of actors.

Building on these arguments, this paper takes the problem to another level by arguing that opportunities are not a matter of “particular individuals” (the neoclassical interpretation of the entrepreneur), but a combination of individuals (Schumpeter, 1934). It has become known that recognizing and discovering opportunities demands a combination of scientific skills and intellectual capacity that surpasses the capabilities of one individual (Seufert, Krogh and Bach, 1999; Powell et al., 1996). In networks, discovery of the beholder of either the technical or the market side of the opportunities becomes a key challenge for corporate venture capitalists.

In 1997, McNally conducted a survey that indicates that companies should actively seek investment opportunities. He further argues “Potential investees are most commonly identified either through continual scanning for investment opportunities or via intermediaries” (McNally, 1997). Similarly, Burgelman (1987, 1988) argues that investment opportunities are found in business networks. This will lead us to focus on some of the key actors surrounding venture managers in corporate venturing, actors who are involved through iterative process of recognition and discovery of opportunities.

From the research of Singh, Hills and Lumpkin (1999), we know that an idea can develop into an opportunity. This process is inherently a process of creativity which involves different actors who engage in a series of recognitions and discoveries (Sarasvathy, Dew, Velamuri and Venkataraman, 2003). This harmonizes with the Austrian perception of an entrepreneur as an ever-changing actor in the market (Kirzner, 1997). As ideas about technology or markets are exchanged and negotiated between actors, they may become entrepreneurial opportunities. The type of actors that are involved will change, however, as will the passageway of the idea and opportunity.

Passageways and Actors

Even though this paper evolves around corporate venture capitalists, one needs to be aware that e(i)ntrepreneurs and other actors in the market many times are the ones who initially recognize and discover opportunities. From Austrian economics, we know that the opportunities will be shaped and developed in between different actors (Kirzner, 1997). That is, corporate venture capitalists can therefore discover and recognize opportunities from private venture capitalists, individual entrepreneurs and other actors in the market. Likewise, corporate venture capitalists may well discover an unexploited technology from an e(i)ntrepreneur which can be enriched into a commercial product that a private venture capitalist might later recognize. This process often consists of the mixing and matching of technological and commercial capabilities, including a series of recognitions and discoveries.

Many opportunities come from entrepreneurs or present employees (intrepreneurs) (von Hippel, 1977; Sweetig, 1981; Burgelman, 1983; Sharma & Chrisman, 1999). In other situations, opportunities are recognized and discovered directly from other private or corporate venture capitalists through networks (McNally, 1997; Bygrave, 1987, 1988; Dotzler, 2001). Yet supplementary, opportunities can also be based on a broader set of market-based developments, such as university research (Etzkowitz and Leydesdorff, 1997), macro economical tendencies (Block and McMillan, 1993), corporate spinouts (Nicolaou and Birley, 2003), lawyers etc. While acknowledging the wide range of different organizations and actors, which can potentially be involved in recognition and discovery, this paper categorizes these into four distinct groups of actors: corporate venture capitalists, private venture capitalists, e(i)ntrepreneurs and a collective group of researchers, lawyers, bankers etc (all actors in the market).

It becomes evident that the passageways of opportunities are the product of these four different actors groups who recognize and identify opportunities in different ways depending on the situation. While the model below is a simplification of the types of actors involved, it does help us to understand the complexity of the process. More importantly, when framing the passageways, valuable insight is given to the relations between actors. In some incidences, venture capitalists obtain information from entrepreneurs in other cases it from researchers, lawyers, bankers etc. Consequently, the four by four matrix presents 16 different situations for information and resources exchange. Each square represents a unique situation for recognition and discoveries.

Table 1. Recognitions and discoveries of opportunities between actor groups

	Corporate venture capitalists recognizes or discover opportunity from:	Private venture capitalists recognizes or discover opportunity from:	E(i)ntrepreneurs recognizes or discover opportunity from:	Researchers, lawyers, bankers etc. opportunity from:
Corporate venture capitalists.	i) Industry syndicators	v) Industry partners	iv) Industry gap seekers	xiii) Gain seekers
Private venture capitalists	ii) Alliance partners	vi) Venture syndicators	x) Gap seekers	xiv) Gap followers
E(i)ntrepreneurs.	iii) Corporate traditionalists	vii) Traditionalists	xi) Technology seekers	xv) Success spotters
Researchers, researchers, lawyers, bankers etc.	iv) Innovation analyses	viii) Trend analyses	xii) Trend seekers	xvi) Combiners

Each square in the table has been related a synonymous name of an actor. Based on a description of the matrix the reader will also become aware of the different dynamics, which are imbedded in recognition and discovery. Additionally, we find supporting evidence from Austrian economics that actors do in fact perceive opportunities differently depending on with whom they interact –nine different scenarios:

- i) Industry syndicators:** This kind partnering structure happens when two or more corporate venture firms pass on an investment opportunity. This commonly happens when a venture is spun-off. An alternative situation could be where two corporate ventures can benefit from the investment simultaneously. These types of investments are often in high tech opportunities which are mutually beneficial and don't cause a competitive situation. Other reasons could be complementary capabilities and exchange of experience.
- ii) Alliance partners:** An alliance partner network is important, especially for established corporations that wish to work with new and untried markets (Albrinck et al. 2000). McNally (1997) argued, "Co-investments with venture capitalists (parallel investments) are a potentially beneficial way of identifying investment opportunities and also accessing the investment expertise of the venture capitalist" (p. 111). For corporate venture capitalists, private venture capitalists are a good source for accessing investment opportunities as they often have a larger flow of opportunities.
- iii) Corporate traditionalists:** The difference between intreprenurship and entrepreneurship amounts to whether there is talk of an internal or external corporate venture. The opportunity is a result of entrepreneurial action, which has materialized into a business idea or business plan. As early as 1934 Schumpeter recognized the added value of entrepreneurship for society (Schumpeter, 1934). Peter Drucker summarizes it with the following words: "Entrepreneurs see change as the norm and as healthy. Usually they do not bring about the change themselves. But – and this defines entrepreneur and entrepreneurship – the entrepreneur always searches for change, responds to it, and exploits it as an opportunity" (Drucker, 1995).

- iv) Innovation analysts:** It is necessary that corporate venture capitalists be receptive to new developments and impressions in the surrounding market. Hence, they investigate opportunities from a broad range of stakeholder in the market, just like private venture capitalists.
- v) Industry partners:** The situations where private venture capitalists identify opportunities from corporate venture capitalists are most often syndicate investments and venture spin-offs. The syndicate situation is often a matter of using the complementary capabilities from the corporate side and the private investor. The opportunities can both be from entrepreneurs and some that corporate venture capitalists have found elsewhere in the market.
- vi) Venture syndicators:** This relationship often constitutes a syndicate investment situation between two or more venture capitalists in a network (Bygrave, 1987). In order for venture managers to gain access to an opportunity from other private venture managers, there is a reversible commitment to provide these managers with other venture opportunities. A common characteristic of this type of opportunity is that they are presented as venture proposals/ business plans and sometimes even established ventures. Selling an investment to another venture capitalist is also a variant of this relation.
- vii) Traditionalists:** Opportunity recognition and discovery by private venture managers from entrepreneurs is the most commonly perceived form in the literature. It is often proposed that the venture manager will never experience opportunities if an entrepreneur hadn't already been faced with the opportunity. This mode differs from "Corporate traditionalists" by having less easy access to innovations created within the corporate firms.
- viii) Trend analysis's:** Many private venture capitalists also have extended networks bridging organizations with highly diversified backgrounds to secure innovation (Bygrave, 1987; Husted and Vintergaard, 2004). For trend analysis's, the market also constitutes actors differently from entrepreneurs. Some venture managers have become skilled in identifying opportunities from basic research at universities (Etzkowitz and Leydesdorff, 1997). Many universities carry great entrepreneurial potentials, which can be exploited in a commercial manner (Etzkowitz, 2003).
- ix) Industry gap seekers:** Industry gap seekers have very similar characteristic as gap seekers who identify opportunities from private venture capitalists. In this specific case the entrepreneur will discover opportunities which are more firm specific and less market driven. Industry gap seekers often discover opportunities in connection to the products and services already provided by the corporate venture corporation. The opportunities can be complementary to the current product portfolio, but they can also be replacements.

- x) **Gap seekers:** A gap seeker could be an entrepreneur discovering opportunities from a previous investment by a private venture capitalist. In other cases the commercial experience of the venture capitalist might have a positive spillover on the entrepreneur. As Wright and Ennew (1997) argue, “Venture capitalists making investments may invest both in entrepreneurs starting new ventures and those who purchase a venture through a management buy-out or buy-in” (p. 227). They further find that entrepreneurs exiting from one venture also are likely to make use of venture capital again (Wright and Ennew, 1997). These kinds of entrepreneurs (serial) can therefore later be a major asset for many venture capitalists.
- xi) **Technology seekers:** The perception of an opportunity differs depending on the particular entrepreneur (Kirzner, 1979). Some entrepreneurs have a strong technological focus whereas others have a stronger focus on bringing the venture to market. Connecting entrepreneurs of heterogeneous character often leads to more original ideas (Husted and Vintergaard, 2004). It will also lead to opportunities not previously thought of. The pre-organization period as defined by Katz and Gartner (1988) as the stage where the nascent entrepreneur realizes or “sees” (to use Penrose’s (1959) word) a potential opportunity to be exploited. Stevenson, Roberts and Grousbeck (1989) define entrepreneurship as a process by which individuals either on their own or inside organizations pursue opportunities without regard of the resources they currently control.
- xii) **Trend seekers:** According to Cooper (1981), an entrepreneur informally and intuitively perceives an opportunity, based upon some feel for the market (in Teach, Schwartz and Tarpley, 1989). Kirzner (1979) labels this skill, “entrepreneurial alertness”. He defines this concept as “the ability to notice - without search - opportunities that have been hitherto overlooked” (p. 48). Kirzner (1979) stresses the element of surprise. An individual may discover a previously undiscovered opportunity in sheer ignorance (Kirzner, 1997). The initial resource configuration assembled by the entrepreneur will need constant adjustment to respond to new opportunities and threats as they arise in the market/ environment (Penrose, 1959; Teece, Pisano, and Shuen, 1997). While the venture remains young, the entrepreneur may be able to personally monitor environmental trends and developments. However, as the organization grows, opportunity discovery must be delegated to subordinates (Greiner, 1972). It is argued by Yeung (2002) that many entrepreneurs most often use their personal contacts to obtain particular information or knowledge about a potential market opportunity gap
- xiii) **Gain seekers:** Much like “Industry gap seekers”, gain seekers represents a group of actors who discover opportunities from corporate venture capitalists. An example of such

situation could be a university researcher or student who discovers a new opportunity as a consequence of an industry-science relation. Such relation can foster both market and technology opportunities.

- xiv) Gap followers:** One of the most obvious examples of gap followers could be identified during the last venture capital boom. During this period, venture capitalists clearly indicated that they would focus their investments within specific technological areas. This made the market recognize and discover a multitude of opportunities i.e. a process of both recognition and discovery. During this boom many universities also started to streamline their organizations better to meet commercialized standards for their research in, i.e. the entrepreneurial university (Etzkowitz, 2003; Etzkowitz, Schuler and Gulbrandsen, 2000).
- xv) Success spotters:** In the case of success spotters, the market can recognize and discover opportunities from the few successful entrepreneurs. Acknowledging that some entrepreneurs have gained success from their innovation, often times drive others to pursue similar actions. The Austrian view of entrepreneurship suggests that the heterogeneity of beliefs about asset values gives rise to both entrepreneurial opportunity and the discovery of market prices (Casson, 1982, Kirzner, 1979, 1989).
- xvi) Combiners:** This type opportunity recognition and discovery is probably the most commonly known and the most frequently exercised. There is continual interaction in the market and different actors with numerous backgrounds, transfer opportunities. In the market, participants exchange both commercial and technical potential to shape opportunities.

Method and case data

Several empirical examples will describe the actors shaping the passageways of entrepreneurial opportunities and hereby provide the reader with a better understanding of how opportunities develop under a continuous process of recognition and discovery (Glasser and Strauss, 1967; Eisenhardt, 1999). The case company, PMC Porous Media Combustion GmbH (PMC), will function as the main case and therefore illustrate some of the characteristics of the above conceptualisation. In addition two other cases will highlight nuance the framework and add additional perspectives.

Data collection

The case companies are all among Danfoss A/S Corporate Ventures' seven investments. PMC has been followed over a five-year period providing the case with longitudinal characteristics (Bijleveld et al. 1998). The other case has been followed for the same amount of years, but their complete development will not be included. The last empirical data was collected in last quarter of 2003.

The case descriptions have been selected out of a sample of approximately 14 entrepreneurial opportunities, which Danfoss A/S has been involved in. The cases have been selected based on: 1) the degree to which the passageway is illustrative, 2) the comprehensiveness of types of actors involved, and 3) their representation of the other investments (Yin, 1984). More than 100 hours of indepth interviews with top-level venture management provide the basis for the analysis. All interviews have been semi-structured (Eisenhardt, 1999; Glasser and Strauss, 1967). They have been recorded and later transcribed in order to condense central issues of interest and find correspondence to theory (Glasser and Strauss, 1967). In addition to the primary data, secondary sources such as peer review articles, newspaper articles, web pages, internal newsletters, have been used. The author has reviewed confidential material, which has provided further knowledge about the development of Danfoss A/S.

Data analysis and presentation

In order to organize the case, PMC's development path is recorded, starting with its initial development. The central phases in the developments are registered according to its impact on future developments, such as the key actors involved. Hence, the critical incidents in the progress of the case serve as a guideline for the case description. The case reports also on the development path from the time before venture management showed interest in the project. Examples of two other cases (Nanotron Technologies and Ossacur) will be included for further details of the process.

Danfoss A/S was founded in 1933 by Mads Clausen, and it has since developed from a one-person firm to a global corporation with an annual sales turnover in 2001 of 1,930 billion EUR and about 16,600 employees. Danfoss A/S is today Denmark's largest industrial group and belongs to the leaders in research, development and production of mechanical and electronic components for several industrial branches. The first products manufactured by Mads Clausen were valves for refrigeration equipment. Danfoss A/S started manufacturing compressors and radiator thermostats in the 1950s, for which the markets were growing rapidly. In the 1960s and 1970s, Danfoss A/S introduced different types of hydraulic components, electronic frequency

converters and flow meters. The increasing energy prices in the late 1970s made the radiator thermostat a significant growth area. Today, Danfoss A/S is a global market-leader within radiator thermostats, accounting for about 10% of Danfoss's A/S total turnover (Frøslev Christensen, 2002). As a consequence for organizational restructuring and a genuine need for new innovations, Danfoss A/S Corporate Ventures was developed in 1999.

PMC focuses on a specific burner technique, which can be used for central heating. The innovative media combustion technology makes it possible to launch a new class of burners for central heating. Danfoss A/S is currently producing components for central heating burners.

The two other cases are: *Ossacur*, which is a medico project and one of the first investments, Danfoss made. *Ossacur* creates biocompatible surfaces. The second example is *Nanotron Technologies* which is a company that sells advanced wireless technologies. It is the intention of Nanotron Technologies that at one point in time all the product in Danfoss should be able to communicate by wireless means.

In order to illustrate the passageway of PMC from the initial patent to the final venture in Danfoss' A/S portfolio, several key incidents combining recognition and discovery will serve as an illustration: The patented technology for the PMC burner was initially developed at the Institute of Fluid Mechanics at the University of Erlangen, Germany (Lehrstuhl für Strömungsmechanik, Friedrich-Alexander-Universität, Erlangen). This was a technology transfer project. The Institute of Fluid Mechanics carried a series of projects, under the name, Invent. The project housed all the inventions and patents, which had been developed at this institute.

The University of Erlangen discovered that some of the innovation from Invent had commercial potential. The university intended to exploit this potential in a commercial manner, but had difficulties in recognizing the commercial value, due to their limited feel for the market. This is a situation for "Combiners" as described in the present model. The model makes it difficult to determine when the researchers become "entrepreneurs".

Contrary to the case of PMC the development of *Ossacur* was initiated from technologies already present in Danfoss. A venture capital manager, explains how the project started: "We had a surface technology which was developed by Danfoss". It later turned out, however, that the use of the product was being undermined by a superior technology. As a result nobody knew what to do with it. However it was discovered that the surface technology was biocompatible, which made it useable in another context. The question then became: what to do with something, which is biocompatible in a company like Danfoss, which has no knowledge of bio technical products. At a later point a researcher at the Dental College in Aarhus, Denmark showed interest in the biocompatible surface. Moving the project to a typical example of a "Combiners". Contrary to PMC *Ossacur* moved from an intreprenuer to an actor outside of Danfoss.

As argued by a venture manager with reference to Ossacur “This gentleman thought that the technology was brilliant”. Due to the researcher’s professional background he could imagine that the technology might have potential. One could argue that he developed new information to recombine information and therefore developed a Schumpeterian innovation (Schumpeter, 1934).

During PMC’s process of commercial determination, it was the intention to spin the research from Invent out into a portfolio of ventures. Two professors and a PhD student could see the potential of one of these innovations (PMC), mostly driven by a technological affection. As a result of their investment in the project, they were provided with 49% ownership. At this time, the partners included APL GmbH (former owners of the basic patents on porous media combustion technology), Medutri GmbH (a pool of private persons, who have supported PMC GmbH since its establishment) and a Business Angel. Through this first round of financing, the project was given life and was established as a separate entity. At this point in the case one could argue that it had become an example of a “Trend seeker”.

Later in the development process, professional money was needed in order to bring the product to a different level. The entrepreneurs (researchers) started by approaching manufactures of burners, but these were not interested. This would have made the process “Innovation analyses” or a “Trend analyses”. An alternative attempt was made by selling PMC. However, the entrepreneurs were asking a substantial amount for their company. Even though much of the development in the project was more than eight years old, it was difficult for the inventors to put together a business plan for their project.

Very similar, Nanotron Technologies also approached Danfoss with the intention to make them invest, displaying “Corporate traditionalism”. An entrepreneur had developed a wireless technology platform, which was only tested in the laboratory. This platform was robust, i.e., isn’t interfered by other external electronic interference. The sensor could send a receive signals over a long distance while at the same time being very saving. Danfoss was interested as it would make their products wireless through a collective device. One could say that this case represents a relatively direct way to the investor.

As part of the many research-oriented conferences in the field of burners, scientists from Danfoss A/S knew about PMC, but did not believe in the product. A primary reason was a development horizon of PMC, which was too long, and the project was too risky. A venture manager concludes, “*being faced with this early stage technology at a conference couldn’t activate the R&D employees*”. It was believed that their short-term focus prevented them from acknowledging the potentials of the project. In this connection, Danfoss A/S was contacted by PMC in the beginning of December 2002, in connection to a new financing round. The contact

was however made to the business divisions of Danfoss A/S and not the corporate venture unit. One could argue that the conceptual model should include a category for employees and not only entrepreneurs.

As PMC was in need of further financing, a Danish venture capitalist was approached. He did not however have an initial interest, as he could not quite grasp the technology behind the idea. This is a typical barrier for “Traditionalists” in placing their investment. Even though private venture capitalists are being approached they often do not have the technical knowledge needed.

A similar example was present in the case of Nanotron Technologies: As part of the investment process Danfoss also became a broker by opening syndicated investments with two other investors (“Industry partners”). A venture manager describes the difficult task by arguing that “it took a while before the right one’s were found – many were very hesitant about such a new technology, which hadn’t proven its value.” This provides a valuable difference in the investment focus of “Traditionalists” and “Corporate traditionalists”: Whereas private venture capitalists can have a difficult time analysing the technologies and are focused on financial returns, corporate ventures can more easily give up on the financial return for a strategically focused investment.

The Danish venture capitalist in the PMC case had been evaluating the project and contacted the Danfoss A/S heating division, as he knew that they specialized in burner technologies. At this time, a prototype had already been developed. During this evaluation phase, the venture managers and other resource persons from Danfoss A/S visited the company to see PMC’s technology. The first reactions were that the technology was too close to the present core business of Danfoss A/S for it to become part of the corporate venture department, i.e. it should be included in the burner divisions of Danfoss A/S. The project was later brought into the burner division of Danfoss A/S as a separate unit. However, it turned out that PMC belonged to a different time horizon, making it a project for the venture department.

Approximately a year after the investment was made, PMC was placed in the burner division for a second time in order to exploit synergies. A venture manager argues, “*A technology [PMC] which is brought into Danfoss A/S might become interesting in 10 years from now– and that’s the reason why the venture division exists ... We need to make sure that we can later include the investments in the divisions*”. Trying to integrate the projects into the divisions is the new approach. “*Keeping them as separate entities is no longer the way forward*” argues a venture manager. The PMC project is today an integrated part of the heating division. However, “*At this point PMC is still something which gets developed separately – something perceived as blue-sky research*” says a manager responsible for the product. He stresses that “*its very difficult to*

compare the importance of day to day operations with very long-term and risky projects like PMC”.

It has later turned out that there could be a possible technological fit between the burner technology and the technologies for fuel cells. Danfoss A/S had previously made an investment in a venture capital firm that focused on fuel cells: Conduit Ventures. The link between PMC and Conduit is the development of hydrogen, which is needed for running the fuel cells. Helium does not occur alone in the natural environment, but is tied to other atoms. Some of the places where hydrogen occurs is in natural gas and in fluent petrol. It has been proven that this reformation (separation of hydrogen) can be applied in the same media as the one produced by PMC. The technology can be used for preparation of the fuel. In the media the reformation process can happen in a more controllable environment.

Danfoss A/S presently owns 12% of stock of PMC, whereas previous owners and other venture capital companies own the rest. All the other venture capitalists were brought in during the same round as Danfoss A/S, through which Danfoss A/S was able to find one investor. *“It’s very important that the right people are brought in,”* argues a venture manager. The manager further states, *“We know one another from our network... a funding process, however, is a chain of many actions, and takes at least a year to settle”*. In addition, the venture manager argues that *“getting access to the best venture demands that you use your network And this network can only be exploited if you are clear about your business objectives. This is a necessity.... it is important to be included in the international corporate venture networks. This keeps us up to date – and indicates new interment proposals”*. This situation seems to be evident in the situations described by the model.

In the special situation of “Alliance Partners” a venture manager argues as follows, when asked to consider the case of Nanotron Technologies: *“The only reason for inviting other investors’ money is that we feel that there is a tendency to invite other investor to ensure that they will received invitations later...we have a strong interest in gaining access to technologies that fit our line of business - we have a strong interest in signalling the interests that we have to as many fellow investors as possible”*. He further argues that *“one way to be recognised and invited is to have showcases to present – where we can show who we are and what we stand for”*. Nanotron has functioned as such a case – *“we know you because we know Nanotron”* the venture manager argues.

As the cases show, corporate venture capitalists play a central role in recognition and discovery of new investments opportunities. However it is important to acknowledge that opportunity discovery includes how a wide range of actors contribute to the process. While the conceptual framework identifies some of the key actors, the cases display great dynamism but

also reflect some of the barriers to the making of discoveries. While the conceptual model functions as good management tool for categorizing the actors involved in the discovery process it also indicates how to manage the process.

Discussion and Future Research

This paper has made a first attempt to develop a comprehensive framework for the actors involved in recognition and discovery of opportunities in corporate venturing. Corporate venturing has been shown to be an interesting case for exploring entrepreneurial opportunities because of their unique investment strategy. Acknowledging the limitation of the framework, this paper provides first insights to the passageways from which venture capitalists gain access to future ventures. One of the biggest limitations of the framework is found in the limited categories of actors. Whereas entrepreneurial opportunities are discovered between many different actors this analysis only focuses on four distinct types. In future research the categories could be expanded and made more elaborate. In addition, while the framework helps to categorize the different discovery situations it doesn't tell us anything about the typical passageways of opportunities. Reaching a better understanding of these passageways may also prove to be a valuable managerial tool for corporate venture capitalists in their decision making process.

However the article does shed light on the complex passageways which are not carried out by single firms or individuals, but through a symbiosis of actors such as venture capitalists, e(i)ntrepreneurs and the different actors in the market.

The case further illustrates the relation between the burner division and the corporate venture division. This highlights the typical difference between daily operations and future development. Many of the reasons for implementing a corporate venture organisation is exactly because the division is monitored on their day to day achievement, which can cause corporations to lose long-term focus. It is however important to emphasise that the new venture needs to be connected to the divisions in order to ensure knowledge sharing and implementation.

From the case of Ossacur we also see that, opportunities with related technologies are more easily discovered. Due to the fact that Ossacur was technology closely related to the business of Danfoss it becomes easier to make the discoveries even when they find exploration in other field. While the technology was closely related to Danfoss the market was new. The consequences are very much the dilemma of exploration versus exportation of resources.

Future research on the link between corporate venture capitalists and their search for opportunities would provide valuable insights into opportunity recognition and discovery as well as to the managerial talent for mastering this. Both from a supply and a demand side of opportunities, this holistic framework broadens our understanding of who can recognize and discover from whom. Hence it changes the traditional Neoclassical (and to some extent the Austrian) understanding of the entrepreneur as the only initiator and executor of opportunities. Understanding that the passageways of an opportunity can in fact be initiated by venture capitalists and not necessarily by the traditional entrepreneur adds to both venture capital and entrepreneurship research. Untangling the relationship between investor and invitee further challenges the traditional perception of the role of venture capitalists as pure financial resource provider (Munk and Vintergaard, 2004).

While this paper has helped to broaden our understanding of the type of actors involved in discovery of opportunities it also raises the question of which actors to focus on and what initiatives must succeed. As the empirical cases also illustrate, some sources for discovering new opportunities take more effort to develop than others, but the mechanisms for making the discoveries also differ. Opportunity discovery from, for example, university researchers are determined by factors such as: industrial reputation, university/ industry relations, collective research projects etc. Syndication with private venture capitalists is a matter of providing complementary resources, access to future costumers etc. Corporate venture capitalists can discover opportunities from all actor groups; the limitation is often found in the resources and capabilities needed for using all channels. Going back to the example: university based opportunities are often very immature and risk and capital requirements are high. These projects can change in many different directions, but may also provide high strategic and commercial return. Syndications with private investors often carry less risk but the financial upside is also lower. Therefore as this paper suggests a broad portfolio of sources for discovering opportunities and a foundation on which to focus one's attention depending on the overall strategies of the investors.

In addition, it would be highly valuable from a managerial viewpoint for venture capitalists to predict the development path of a potential opportunity, by acknowledging the previous actors who have made recognitions and discoveries. From the cases we see that some recognitions have successful outcome whereas other do not. This accords with Austrian economics. Forecasting the "blind allies" and the "highways" would prove very powerful for both venture capitalists and entrepreneurs. This would lead to a more thorough understanding of the passageways – and possibly a categorization of their different kinds. Such knowledge would enable venture

capitalists to predict the shape of the passageway of an opportunity and, consequently, tell them when to invest.

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References

- Albrinck, J., Hornery, J., Kletter, D and Neilson, G. (2000). Adventures in Corporate Venturing. *Strategy and business*, November.
- Bhave, M.P. (1994). A process model of entrepreneurial venture creation. *Journal of Business Venturing*, 9(3), 223-242.
- Bijleveld, C.C.J., van der Kamp, LiT., Mooijaart. A., van der Kloot. W.A., van der Leeden, R., & van der Burg, E. (1998). *Longitudinal data analysis: Designs models and methods*, London: Sage.
- Block, Z. and MacMillan, I. C. (1993). *Corporate Venturing - Creating New Businesses within the Firm*. Harvard Business School Press, Cambridge, MA.
- Block, Z. and Subbanarasimha, P.N. (1989). *Corporate Venturing: Practices and Performance in the U.S and Japan*, Working Paper. Center of Entrepreneurial Studies, Stern School of Business, New York University.
- Block, Z. (1982). Can Corporate Venturing Succeed? *The Journal of Business Strategy*, 3(2)
- Burgelman, R. A. (1983). A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly*, 28(2), 223-244.
- Burgelman, R. A. (1984). Designs for Corporate Entrepreneurship. *California Management Review*, 26, 154-166
- Burgelman, R. A. and Sayles, L. R. (1986). *Inside Corporate Innovation: Strategy, Structure and Managerial Skills*, Free Press.
- Bygrave, W. D. (1987). Syndicated Investments by Venture Capital Firms: A Networking Perspective. *Journal of Business Venturing*, 2(2), 139-154.
- Bygrave, W. D. (1988). The structure of the investment networks of venture capital firms. *Journal of Business Venturing*, 3(2), 137-157.

- Casson, M. (1982). *The Entrepreneur*, Barnes & Noble, Totowa, N.J.
- Chesbrough, H. W. (2000). Designing corporate ventures in the shadow of private venture capital. *California Management Review*, 42(3), 31 -50
- Cooper, A. C. (1981). Strategic management: New ventures and small business. *Long Range Planning*, 14(5), 39-45.
- Christensen, Madsen and Peterson (1994). Conceptualizing Entrepreneurial Opportunity Identification; In Hills *Marketing and Entrepreneurship: Research Ideas and Opportunities*, Quorum, pp. 61 – 75. 14 s.
- Drucker, P.F. (1995). *Innovation and Entrepreneurship*, Harper Business, New York.
- Drucker, P.F (1974). *Management: Tasks, Responsibilities, Practices*, Harper & Row, New York.
- Etzkowitz, H. and Leydesdorff, L. (1997). *Universities and the Global Knowledge Economy*, Pinter, London & Washington.
- Dotzler, F. (2001). What Do Venture Capitalists Really Do, and Where They Learn to Do It? *Journal of Private Equity*, 5(1), 6-12.
- Eisenhardt, K (1999). Building theories from case study research. *Academy of Management Review*, 14, 532-550.
- Etzkowitz, H. (2003). Research groups as ‘quasi-firms: The invention of the entrepreneurial university. *Research Policy*, 32(1), 109-121.
- Etzkowitz, H., Schuler, E. and Gulbrandsen, M. (2000). The Evolution of the Entrepreneurial University. In Jacobs, M. and Hellström, T (eds.) *The Future of Knowledge Production in the Academy*, Buckingham (UK): Society for Research into Higher Education and Open University Press, 2000, pp. 40-60.
- Frøslev Christensen, J. (2002). Corporate strategy and the management of innovation and technology. *Industrial and corporate change*, 11(2), 263-288.
- Glasser, B. and Strauss, A. (1967). *The discovery of grounded theory. Strategies of qualitative research*, London. Wiedenfeld and Nicholson.
- Gompers, P. A. and Lerner, J. (1999). *The Venture Capital Cycle*. Cambridge, Massachusetts: MIT Press.
- Greene, P.G., Bruch, C.G and Hart, M.M (1999). The corporate venture champion: A resource-based approach to role and process. *Entrepreneurship Theory and Practice*, 23(3), 103-122.

- Greiner, L. (1972). Evolution and Revolution as Organizations Grow. *Harvard Business Review*, 50(4), 37-46.
- Guth, W.D and Ginsberg, A (1990). Guest editors introduction: Corporate entrepreneurship. *Strategic Management Journal*, 11, 5-15.
- Hardymon, G.F., DeNino, M.J. and Salter, M.S. (1983). When Corporate Venture Capital Doesn't Work. *Harvard Business Review*, 61, 114-120.
- Hayek, F. (1945). The Use of Knowledge in Society. *American Economic Review*, XXXV(4), 519-30.
- Hills, G.E., Lumpkin, G.T., Singh, R.P. (1997). Opportunity recognition: perceptions and behaviors of entrepreneurs. *Frontiers of Entrepreneurship Research*. Babson College, Wellesley, MA.
- Husted, K. and Vintergaard, C. (2004). Stimulating innovation through corporate venture bases. *Journal of World Business*, For publication 39(3).
- Kanter, M.R., Richardson, L. North, J and Morgan, E. (1991). Engines of progress: Designing and running entrepreneurial vehicles in established companies, the new venture process at Eastman Kodak, 1983-1989. *Journal of Business Venturing*, 6, 63-82.
- Katz, J.A. and Gartner, W.B., (1988). Properties of emerging organizations. *Academy of Management Review*, 13(3), 429-441.
- Keil, T and Vilkamo, T. (2003). Strategic technology partnering in high-velocity environments – Learning from a case study. *Technovation*, 23, 193-204.
- King, D., Covin, J. and Hegarty, H. (2003). Complementary Resources and the Exploitation of Technological Innovations. *Journal of Management*, 29(4).
- Kirzner, I.M (1979). Producer, Entrepreneur, and the Right to Property. In Blumenfeld (eds), *Perception, Opportunity, and Profit*.
- Kirzner, I.M (1989). *Discovery, Capitalism, and Distributive Justice*. Oxford: Basil Blackwell.
- Kirzner, I.M (1973). *Competition and Entrepreneurship*, Chicago and London, The University of Chicago Press.
- Kirzner, I.M. (1997). Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *Journal of Economic Literature*, 35, 60-85.
- Leonard-Barton, D. (1992). The Factory as a Learning Laboratory. *Sloan Management Review*, 34(1), 23-38.

- Leifer, R., McDermott, C., O'Connor, G., Peters, L., Rice, M. and Veryzer, R (2000). *Radical innovation: How mature companies can outsmart upstarts*. Harvard Business School Publishing.
- Long, W. A. and McMullan, W. E. (1984). Mapping the opportunity identification process. In J. A. Hornaday et al. (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College.
- Lundgren, A. (1995). *Technological Innovation and Network Evolution*, Routledge, London.
- McGrath, R.G., MacMillan, I.C., and Venkataraman, S. (1994). The advantage chain: Antecedents to rents from internal corporate ventures. *Journal of Business Venturing*, 9, 351-369.
- McNally, K. (1997). *Corporate Venture Capital: Bridging the equity gap in the small business sector*, Routledge, London.
- Munk, B. K. and Vintergaard, C. (2004). Accentuating the role of venture capitalists in systems of innovation. (*VEST*) *Journal for Science and Technology Studies*, forthcoming.
- Nicolaou, N. and Birley, S. (2003). Academic networks in a trichotomous categorisation of university spinouts. *Journal of Business Venturing*, 18(3), 333-359.
- Penrose, E (1959). *The theory of the growth of the firm*, Oxford, Oxford University.
- Powell, W., Koput K. W. and Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1), 116-146.
- Rind, K.W. (1981). The Role of Venture Capital in Corporate Development. *Strategic Management Journal*, 2, 169–180.
- Sarasvathy, S. D., Dew, N., Velamuri, R. & Venkataraman, S. (2003). *Three Views of Entrepreneurial Opportunity*, In *International Handbook of Entrepreneurship*, Audretsch and Acs, (eds).
- Schumpeter, J.A. (1934). *The Theory of Economic Development*, Cambridge: Harvard University Press.
- Schumpeter, J.A. (1950). *Capitalism, Socialism, and Democracy*, New York: Harper and Brothers.
- Seufert, A., G. von Krogh, & Bach, A. (1999). Towards knowledge networking. *Journal of knowledge management*, 3(3), 180-1090.

- Shane, S. (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organization Science*, 11(4), 448-70.
- Shane, S. and Cable, D. (2002). Network ties, reputation, and the financing of new ventures. *Management Science*, 48(3), 364-382.
- Shane, S. and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1), 217-226.
- Sharma, P., and Chrisman, J.J. (1999). Reconciling the definitional issues in the field of Corporate Entrepreneurship. *Entrepreneurship Theory and Practice*, 23(3), 11-27.
- Seufert, A., Von Krogh, G and Bach, A. (1999). Towards knowledge networking. *Journal of knowledge management*, 3(3), 180-1090.
- Singh, R. P. (2001). A Comment on Developing the Field of Entrepreneurship Through the Study of Opportunity Recognition and Exploitation. *Academy of Management Review*, 26(1), 10-12.
- Singh, R.P., Hills, G.E., and Lumpkin (1999). 'New Venture Ideas and Entrepreneurial Opportunities: Understanding the Process of Opportunity Recognition', *United States Association for Small Business and Entrepreneurship (USASBE) Conference*, 13th annual national conference.
- Soh, P-H. (2003). The role of Networking Alliances in Information Acquisition and its Implications for New Product Performance, *Journal of Business Venturing*, 18(6), 727-744.
- Stevenson, H.H. and Jarillo, J.C. (1990). A Paradigm of Entrepreneurship: Entrepreneurial Management. *Strategic management journal*, 11, 17-27.
- Stevenson, H. H., Roberts, M. J., & Grousbeck, H. I. (1989). *New Business Ventures and the Entrepreneur*, Homewood, IL: Irwin.
- Sweetig, R. (1981). Internal Venture Management: Analytical Aspects, *Journal of General Management*, 7(1), 34-45.
- Sykes, H.B. (1986). Lessons from a new ventures program. *Harvard Business Review*, 64(3).
- Teece, D J, Pisano, G and Shuen (1997). Firm Capabilities, Resources and Strategy. CCC Working Paper 908, Centre for Research in Management, University of California at Berkeley.
- Teach, R.D., Schwartz, R.G., and Tarpley, F.A. (1989). The recognition and exploitation of opportunity in the software industry: A study of surviving firms. In R.H. Brockhaus, et al. (eds.), *Frontiers of Entrepreneurship Research*. Wellesley, MA: Babson College, pp. 383-397.

Tidd, J. and Trewhella, MJ. (1997). Organizational and technological antecedents for knowledge acquisition and learning. *R&D Management*, 27(4), 359-375

Tidd, J. and Taurins, S. (1999). Learn or Leverage? Strategic Diversification and Organizational Learning Through Corporate Ventures. *Creativity and Innovation Management*, 8(2), 67-153

Venkataraman, S. (1997). 'The distinctive domain of entrepreneurship research: An editor's perspective', in Katz and Brockhous (eds.), *Advances in entrepreneurship, firm emergence, and growth*. Greenwich. CT: JAI Press.

Venkataraman, S., Dew, N. and Velamuri, R. (2001). 'Three Views of Entrepreneurial Opportunity' in Audretsch and Acs (eds.) *International Handbook of Entrepreneurship*, Kluwer Academic Publishers Group, Dordrecht, 2003.

Von Hippel, E. (1977). Successful and failing internal corporate ventures an empirical analysis, *Industrial Marketing Management*, 6, 163-174.

Winters, T. and Murfin M. (1988). Venture Capital Investing for Corporate Development Objectives. *Journal of Business Venturing*, 3, 207-222.

Wright, M., Robbie, K., and Ennew, C (1997). Venture Capitalists and Serial Entrepreneurs. *Journal of Business Venturing*, 12(3), 227-249.

Yeung, H. (2002). Entrepreneurship in International Business: An Institutional Perspective. *Asia Pacific Journal of Management*, 19(1) 29-61

Yin, R. (1984). *Case study research*, Beverly Hills, CA Sage publication.

Zahra, S. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of Business Venturing* 14, 451-478.

Zahra, S., and Covin, J. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, 10, 43-58.

3.5 Study V – Vintergaard and Husted (Submitted)

Corporate venture companies linear and dynamic evaluation strategies for science based venture opportunities

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Abstract

This chapter is concerned with how corporate venture companies can design appropriate evaluation strategies to deal with the ambiguity of science based venture opportunities. We will especially discuss the implications on evaluation strategies when relying on dynamic innovation models instead of a linear model.

Science based venture opportunities are especially difficult to evaluate due to the high level of uncertainty inherent in the research. Not to mention the intermediate nature of the research results. These two aspects make it difficult to translate research outcome into immediate market needs and profitable business ventures. Assessing research based opportunities and their potential value are further challenged by the fact that they are created in overlaps and the interfaces between the different industries and disciplines and, hence, embedded in a dense web of social, economical, contractual, and administrative relationships. Furthermore, exploiting research based opportunities is often very resource demanding which makes it even more critical for corporate venture firms to make the right investment decisions. This chapter addresses

corporate venture investors evaluation strategies through which dynamic and participatory actions can create knowledge which makes them better prepared for decision-making.

Keywords: Corporate venturing, evaluation, innovation models, opportunities, venture base.

Introduction

Over a broad spectrum of industries, corporate venturing has proven to be a successful business development strategy for many organizations with e.g. 3M and Intel among the notable success stories (Block and MacMillan, 1993) and since the early 1990s, corporate venturing has been a widely applied approach to stimulate business development (Block and MacMillan, 1993; Burgelman, 1983; Sharma and Chrisman, 1999; Zahra, 1991).

One of the most challenging tasks for corporate venture organizations is to decide which opportunities to invest resources in. The problems of evaluating venture opportunities is in the literature often assigned to aspects such as: idiosyncratic opportunity recognition (Shane, 2000), risk for opportunistic behavior on the side of the entrepreneur and/or inventor (Amit et al., 1990) and lack of crucial knowledge (Gompers and Lerner, 1999). On top of these generic difficulties off making investment decisions corporate venture investors additionally faces the challenge of satisfying a broad spectrum of expectations towards the venture besides the financial (Greene, Brush and Hard, 1999; Block and MacMillan, 1993; Burgelman, 1983) such as strategic renewal, business intelligence and challenging existing routines and patterns of behavior and similar - often intangible - benefits that can only be quantified with great difficulties.

The literature on venture management suggests different evaluation strategies in order to reduce or cope with these tricky selection conditions. Among the proposed strategies are relying on self-selection by the entrepreneur (Gompers and Lerner, 1999), environmental-selection (Volberda and Lewin, 2003), use of social networks for knowledge transfer and reduction of information asymmetry (Venkataraman, 1997), syndication of investment decisions (Sorenson and Stuart, 2001) and use of checklists and selection criteria (Knight, 1988; MacMillan, Seigel, SubbaNarasimha, 1985).

In search of high returns from venture investments, corporate venture firms are increasingly directing their attention to science based entrepreneurial opportunities (Sung, Gibson and Kang, 2003; Husted and Vintergaard, 2004). Given the innovative nature and high capital demand of

the entrepreneurial opportunities coming from scientific communities, investors expect corresponding high rewards. However, science based entrepreneurial opportunities invokes all the mentioned selection problems and more too. For example the combined effect of high uncertainty and the intermediate nature of research results makes it even more difficult to identify a) which market needs the ventures aims at serving, b) the profitability of serving that market (Chrisman, Timothy and Fraser, 1995) and c) the cost associated with transforming research into marketable product. Evaluating science based entrepreneurial opportunities are further contested by the complexity and multi-disciplinarity in the underlying knowledge production. Moreover the knowledge production will often be dispersed over a number of institutions and organizations each contributing with some input to realizing and shaping the entrepreneurial opportunity.

The paper argues that evaluation strategies applied by corporate venture companies, when evaluating which science based entrepreneurial opportunity to fund, largely reflect their core assumptions about the relations between research and profitable market activities.

In the recent years there has been an occasionally heated discussion in a number of scientific fields such as philosophy, sociology, policy making, management and history of how to best analyses and map innovation (and research) processes. The linear model was developed in the late 40ties and has since then been popular for breaking down the innovation process from basic research, through R&D, and to marketable products. Inherited in the model is a presumption that innovative processes proceed along relatively predictable patterns. A growing body of literature has later criticized the linear model for resting primarily on anecdotal evidence and for being unable to capture the dynamics of science and innovation interaction (Stokes, 1997). Hence the extensive use of the linear model for guiding decisions in science policy, research organization, and the commercialization of research is so questioned. A widespread consequence is that institutions, routines and behaviors embedded in the linear model are taken up for evaluation and reconsideration. A number of alternative models for capturing the dynamics between science and innovation have emerged, e.g. the *triple helix* model that emphasizes the dynamics in the interplay at an institutional level (Etzkowitz and Leydesdorf 1997, 1998), in a similar vein but with an even broader scope Lundwall (1992) and Nelson (1993) suggest that innovative abilities and performance is embedded in social and structural characteristics of national innovation systems. Firm-level innovation models include e.g. the *chain-linked model*, which tries to capture the iterative and mutually shaping element in the interplay between research and innovation processes (Kline, 1985; Kline and Rosenberg, 1986). Sociology of science suggests that research behavior and interaction with society is changing from the classic mode to *Mode 2*

research as a framework for understanding how research processes and researchers interact with society (Gibbons et al., 1994; Nowotny et al., 2001).

The mentioned dynamic innovation models share the common assumption that the direction and outcome of scientific processes often are, and should be, under some influence of other interests than purely scientific ones. In other words, results and opportunities created in science should ideally reflect needs and agendas in the society they are made in. This mode of scientific knowledge production is expected to become: *“more socially accountable and reflexive. It includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localized context”* (Gibbons et al., 1994, p.3). As a consequence of the changes towards new innovation models knowledge production, research agendas and new knowledge are negotiated and shaped in interaction with external stakeholders. Following this perspective new knowledge for innovation and science based ventures are not only tested against interdisciplinary scientific criteria but also confronted and tested in different business contexts and through public debate. In other words, the new knowledge is socially robust (Nowotny et al., 2001).

However, both the literature on how to evaluate science based venture opportunities and the practice in many venture organizations appears to work on the premises of the linear model. Many of the current evaluation strategies seems to be occupied with how to cope with the evaluation of actual opportunities that have dripped out of the research pipeline instead of being concerned with emerging opportunities and tapping into the interactive dynamic between science and innovation processes.

This chapter discusses how dynamic innovation-models influence the evaluation strategies of corporate venturing firms and hence their capacity to discover and evaluate new research based venture opportunities. The authors argue that a new perspective needs to be attributed to what the consequences is of applying a linear versus dynamic perspective to the evaluation process. The chapter also argues that based on choice of innovation model, the corporate venture company will have access to various compensation mechanisms for addressing evaluation difficulties. The discussion is supported with a focus group study of evaluation strategies in Danish corporate venture organizations.

Research method

The present study was conducted as a focus group exercise of 29 senior venture capitalists (investors, senior managers, partners etc). The group was meeting for a one-day discussion on evaluation problematic, to which the participants had been invited or volunteered.

Procedure and analysis

The focus group discussion was intended to be issue driven and theory based. That is the group was asked to find examples of a theoretical construct (evaluation of ventures) thereby elaborating and examining the venture process (see Lyons, 2000). In order to ensure this goal, the group was first introduced to some of the basic problems and issues when evaluating ventures. They were then subdivided into groups of approximately five to six people. The groups discussed a question for one hour, and were then invited to a common focus group meeting around the questions, which was facilitated by one of the authors. The discussed question functioned as an introduction to a broader discussion on evaluation techniques. The focus group discussion was recorded and transcribed into a textual account encompassing the key experiences and views of the group. This document was then distributed to the group for comments and feedback.

Validity of the study

Stratified purposeful sampling was employed ensuring that the group consisted of individuals representative of a number of disciplinary affiliations, work profiles and ages (Lyons, 2000). The group consisted of 26 men (90 per cent) and three women (10 per cent), whereof an equal distribution of directors, partners, senior manager and investors were represented. The original educational distribution of the venture capitalists were as follows: natural science (4), technical science (6), medical science (7), agricultural and veterinary science (3), social science (7), and the humanities (2). Out of the 29 participants, 15 had more than 5 years of experience in the venture capital industry. The spread of disciplinary orientation and task orientation ensures that a diversity of variations had the chance to occur, yet the common academic background facilitates a shared common experience (this is the maximum variation criteria elaborated by Lyons (2000)).

Finally, since the participants volunteered to take part in the study they most likely represented a group of individuals who nurture an interest in venture capital management. However, the purpose of this study was not to describe a representative cross-section of attitudes to venture capital management, but rather to bring out new and useful suggestions and experiences in the

area of evaluating venture opportunities. In this regard, the group represented a sample of individuals, i.e. of persons who had something to say about the topic at hand. This has been shown to be a positive point of departure for focus group discussions (Milward, 2000).

Throughout the discussion in this chapter we will draw upon input from the focus group exercise to illustrate and nuance the points we aim to make.

Theoretical background and grounding

Science based entrepreneurial opportunities

Entrepreneurial opportunities are often used as the label for the business idea a new venture is built on (Long and McMullan, 1984; Bhave, 1994; Hills et al., 1997). The notion of entrepreneurial opportunity is central in entrepreneurship research. Some entrepreneurship researchers even forcefully argue that the field of entrepreneurship is differentiated from other fields of organizational studies such as strategic management by its focus on “...*how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited*” (Shane and Venkataraman, 2000: 218).

Following this line of logic Shane and Venkataraman (2000) further argues that following three sets of research questions are especially central for the entrepreneurship field: a) why, when and how opportunities for the creation of goods and services come into existence; b) why, when and how some people and not others discover and exploit these opportunities; and c) why, when and how different modes of action are used to exploit entrepreneurial opportunities. The study presented in this chapter is mainly focused on the aspect of the second issue that relates to the deliberate choice to pursue and allocate resources to an entrepreneurial opportunity.

While there is shared perception that the focus on studying entrepreneurial opportunities may be the unifying factor for delineating the field of entrepreneurship (Shane and Venkataraman, 2000; Singh, 2001; Zahra and Dess, 2001) the field has not yet reached an agreement on a unifying definition of entrepreneurial opportunities. The first criterion which is generally agreed on, must obviously be that the opportunity do not exist before it is articulated in a form where it can be examined (Singh 2001). A central point of disagreement is to what extent entrepreneurial opportunities can be recognized without having been tested and acted upon. One argument is that many opportunities are not real opportunities in the sense they never lead to revenue generating activities, either because the opportunities are not acted upon for different reasons, implemented wrongly, or simply not supported by the market. Following this line of argument entrepreneurship research should concentrate on studying successfully implemented entrepreneurial opportunities. The arguments against this approach is a) that it is difficult to

define success in a universal manner, some opportunities may never become profitable by traditional measures but create value for its stakeholder in other ways, b) the success or failure of entrepreneurial opportunities is not only depending on the features of the opportunities but also on (and in some cases maybe even mainly) how the opportunity is enacted and exploited (e.g. Zahra and Dess, 2001; Vintergaard, 2005).

Entrepreneurial opportunities are different from other profit seeking opportunities by requiring discovery of new means-ends relationships (Kirzner, 1997) whereas most other opportunities are concerned with optimization with a well-established means-ends relationship. The element of exploration affiliated with entrepreneurial opportunities also contribute to explaining the difficulties of assessing entrepreneurial activities compared with assessing the profitability of other business activities. For the latter it is possible to apply standardized procedures and projections within the established means-end framework which will allow for comparison of different investment opportunities and actions. But since both the consequences of exploiting new opportunities are unknown and the range of means-ends combinations available - although not discovered yet - is also unknown, it is impossible or at least difficult to predict within an existing framework.

Philosophy of opportunities

A further theoretical discussion is concerned with whether entrepreneurial opportunities are created or discovered. One academic strand claims that the opportunities are objective phenomena just waiting to be discovered. As a consequence, opportunities should be analyzed as the product of active entrepreneurs trying to create their own golden opportunities. Differently e.g. Shane and Venkataraman, 2000; and Shane, 2003, work under the assumption that opportunities are not discovered before exploitation, but rather seen as the final result of a creative and social process (e.g. Sarasvathy, 2001; Sarasvathy, 2004; Gartner et al., 2003). This point makes distinct difference between whether entrepreneurs discover opportunities or they actively create opportunities to fit a specific economic and societal context.

Sarasvathy, Dew, Velamuri and Venkataraman (2003) suggest a conceptual framework based on distinction between opportunity recognition, discovery and creation. In this framework they try to “... *model an entrepreneurial opportunity as a function, or a process or set of decisions, respectively*” (p. 142). An opportunity is recognised when an entrepreneur combine existing technologies and markets. In this context “*both sources of supply and demand exist rather obviously, the opportunity for bringing them together has to be recognized and then the match-up between supply and demand has to be implemented either through an existing firm or a new firm*” (p. 145). This view has its origination in neoclassical economies where resource allocation

can lead to efficiency in perfectly competitive markets. Contrary, the process of opportunity discovery describes the process where only one of the variables exists and the other needs to be created (technology or market). The last possible (and less frequent) situation, opportunity creation, is where neither market nor technology exists.

Science based entrepreneurial opportunities

There are several distinct characteristics that makes science based opportunities different from other opportunities, and which also further complicate the evaluation process. The first distinctive element derives from that the sources of science based ventures are more commonly found in the interstices between organizations and research institutions with various perspectives. When focusing on science based venture opportunities it is often emphasized that they are developed in the interfaces and overlap between the different industries and disciplines (Powell, Koput and Smith-Doerr, 1996). Consequently, these opportunities are embedded in a dense web of social, economical, contractual, and administrative relationships, which influence the challenge of assessing the potential value of the opportunity. In these collaborative relationships it is often difficult to agree on who contributes with what and therefore who is the owner of the opportunity. This makes value assessment of the separate components of the science based opportunities a further distinctive factor. The problem often arises when venture opportunities derive from patented natural science which is later supplemented with market and managerial competencies. Since market and managerial knowledge is often brought in late in the process of creating or discovering an opportunity, it can often appear as if these competences receive a disproportional large value distribution. This can create some tension in the group that tries to discover or create an entrepreneurial opportunity. Similar problems can arise when two different natural science disciplines are combined to develop a novel new project.

Furthermore, research results often lead to multiple benefits and application opportunities in different areas (Mowery and Rosenberg, 1989). In an analysis of the development path of a science based entrepreneurial opportunity in a corporate setting, Vintergaard (2005) found that the multiple application potential of research results is reflected in the search pattern for commercial use of the research result. Often this type of venture opportunities travels along very unpredictable patterns and can end up exploiting a very different entrepreneurial prospect than the one it originally believed it should exploit. The uncertainty and ongoing change in the formulation of the means-ends relations, makes evaluation of science based ventures particularly challenging.

Decision conditions for exploiting research based entrepreneurial opportunities

Entrepreneurship normally implies that an opportunity is recognized or discovered and a potential entrepreneur has decided to exploit the opportunity (Shane and Venkataraman, 2000). Already at this stage quite a number of opportunities are aborted and never developed into entrepreneurial activities. Corporate entrepreneurship involves an additional hurdle: besides the decisions and efforts of the entrepreneurial individual or team to exploit an opportunity they have recognized or discovered, then corporate support and corporate decision to exploit the opportunity, is a necessary condition for having achieved corporate venture evaluation. It is mainly the conditions for the corporate decision we address in this section.

The corporate decision has at least three components. First, to clarify whether an opportunity is a real entrepreneurial opportunity, meaning that it can lead to a profitable activity or a false one, meaning it does not offer a new product or service generating an above average profit when introduced to the market. Second, clarifying whether the corporate venture company possesses the resources needed for acting upon the opportunity. Lastly, determine whether the resources are optimally deployed in exploiting the opportunity in question, instead of in another profit generating opportunity. Often these issues are tangled together and imbedded in evaluation conditions which complicate the value assessment.

The most noticeable evaluation conditions concerns are: evaluation consequences, diversity on expectations, idiosyncratic nature of entrepreneurial opportunities, and asymmetric distribution of knowledge about the entrepreneurial opportunity. While each of these condition are relevant for all venture opportunities, their relevance and impact is intensified when evaluating science based opportunities. Below, we elaborate on these specific selection conditions in more details.

The decisions whether or not to invest in a given venture opportunity, is often perceived as crucial because of the brutal selection consequences. Firms face the risk of either wrongly selecting a malign venture or wrongly rejecting a beneficial one (Elfring and Foss 2000). Wrongly chosen projects are not only costly but also prevent the venture organization from using its limited resources on other projects, and possibly even damaging the corporate image of the parent company and the venturing organization. Resource commitment and the following reduced flexibility is especially an issue in relation to exploitation of science based entrepreneurial opportunities since these opportunities are very resource demanding due to the need for maturing the research, new dedicated manufacturing facilities, slow initial market penetration etc. On the other hand, a too restrictive investment policy is often said to lead to loss of opportunities, as these companies will not recognize a golden opportunity when it presents itself. Wrongly rejected projects can also be of serious disadvantage for the firm, especially if the

opportunity is recognized and exploited by competing firms or firms who use the new opportunity to enter the industry of the corporate venturing firm that rejected the project. Especially in high competitive industries where lead-time is a competitive advantage, losing “the winning” idea can have significant consequences.

Besides, within corporate venturing the evaluation is further complicated by the mixed expectation towards the outcome of the venture investment. Corporate venturing is predominantly seen as a mean for large, well-established companies to become innovative and flexible (Greene, Brush and Hart, 1999). It is, however, not the only motivation - in fact, there are a number of related motives for setting up a corporate venture unit. Among those motives are securing growth and responding to competitive pressure (Block and MacMillan, 1993), improving corporate profitability (Zahra, 1996), stimulating strategic renewal (Wielemaker, Elfring, and Volberda, 2000, 2001; Guth and Ginsberg, 1990), fostering innovation and gaining knowledge that may be parlayed into future revenue streams (Venkataraman, MacMillan and McGrath, 1992). Additionally, these mixed expectations towards the benefits created by corporate venturing activities are also reflected in the composition of the investments boards of the corporate venture organizations and hence the decision process (Venkataraman, MacMillan and McGrath, 1992). Finally, it is rather common that corporate venture capitalists make their deals funded on an ad hoc basis (Siegel, Siegel and MacMillan, 1988), and formal approval is needed from corporate management (Block and MacMillan, 1993) resulting in a lack of stability and predictability in how corporate expectations are reflected in the investments decisions.

Next, the ability to recognize entrepreneurial opportunities is dependent on prior knowledge, which is idiosyncratic in nature, and therefore will lead people to perceive opportunities differently (Shane, 2000). At the same time the individual way of perceiving entrepreneurial ideas is crucial for the venturing activities to earn an above average return on the successful investments (Gompers and Lerner, 1999). The venture idea should not be subjected to harsh competition because the opportunity would then become too obvious and therefore lose its commercial upside. Shared beliefs and interpretation of business opportunities among entrepreneurs would reduce competition and thereby the potential of earning entrepreneurial profit (Schumpeter, 1943). But the idiosyncratic nature of entrepreneurial ideas obstructs the evaluation process by increasing the difficulties of the potential investor in recognizing the potential of the proposed idea.

Last, and maybe most important, the relation between the person who is promoting a new business idea (the entrepreneur) and the potential source of funding (the investor) is hampered by asymmetric distribution of knowledge (Amit et al., 1990). The entrepreneur possesses much

more information and knowledge about their business opportunity and themselves than potential investors do. The entrepreneur may exploit the asymmetric distribution of knowledge to his own benefit (Amit et al., 1990) leading to principal agent conflicts (Barnea, Haugen and Senbet, 1981; Eisenhard, 1989; Gompers, 1995). Additionally, entrepreneurs are not very inclined to share all their knowledge with the potential investor before a favorable investment decision. This is due to the fear of a potential investor behaving opportunistic, turning down the entrepreneurs while still trying to exploit the business opportunity himself. The asymmetric distribution of knowledge poses a serious challenge to potential investors, particularly in making the investment decision. Difficulties in sharing the knowledge because of its predominantly tacit nature makes knowledge sharing between the entrepreneur and the venture capitalists even more challenging and can lead the entrepreneur to hoard knowledge unintended. It should however also be stressed that the potential investor in many situations also possesses knowledge which the entrepreneur is not aware, but is relevant for assessing an entrepreneurial opportunity. This is clearly illustrated in the following statement from a Danish investment director:

“Venture capitalists are able to collect more information than the entrepreneurs because of better network relations. Venture capitalists have better opportunities to interview relevant people, confer with related projects in their portfolios, make a market analysis, use consultants etc. In conclusion it is my opinion that venture capitalists have a continuous flow of knowledge that the entrepreneur are less likely to have”. (Jacob Bratting Pedersen, Investment Director, Olicom)

In general the interviewees argue that venture capitalists often have more knowledge of market issues than the entrepreneur whereas they have a more specific understanding of the technological matters. However, there is also a general awareness that markets attract new technology and visa versa.

“... the entrepreneur will always have some information that the venture investor does not and the question is how to let the entrepreneur offer you the relevant insight. The investor often knows more about especially market conditions and probability for a projects' potential due to experience and knowledge from networks. But also when it comes to technological issues investors gets valuable information from co-investors and portfolio entrepreneurs meaning that the investor and the entrepreneur have different but perhaps complementary knowledge. (Søren Schifter, Partner, Novo Ventures, Novo A/S)

Whereas the brutal selection consequences is a contingency factor which investors cannot do much to address, then diverse expectations, the idiosyncratic nature of entrepreneurial potential and information asymmetry are all specific selection conditions which to a certain extent can be addressed by using appropriate evaluation strategies (Knight, 1988, 1994; Zutshi et al., 1999).

Selection strategies

The literature on evaluating investment opportunities in corporate venturing suggests a number of selection strategies for addressing the decision conditions for exploiting the research based entrepreneurial opportunities described earlier in the chapter. These strategies includes use of checklists and evaluation criteria (Knight, 1988, 1994; MacMillan, Seigel, SubbaNarasimha, 1985), use of experts (Block, 1982), self- and environmental-selection (Volberda and Lewin, 2003; Gompers and Lerner, 1999), staging of investment (Sahlman, 1990), syndication of investment decisions (Sorenson and Stuart, 2001) and use of social networks for knowledge transfer and reduction of information asymmetry (Venkataraman, 1997).

In this section we will argue that some of these strategies are more supportive and embedded in the linear innovation model whereas other evaluation strategies are supportive to the interactive and dynamic innovation models. It is characteristic for selection strategies within the linear innovation approach to focus on measurements and to apply a stepwise and progressive decision making approach whereas evaluation strategies supporting the interactive and dynamic innovation models tend to emphasize the investors' ability to test and qualify the knowledge needed for evaluating which opportunity to pursue and which to turn down. Within this framework evaluation is approached as a continuous learning process involving a number of stakeholders with different interests and capacities. This make linear innovation models and evaluation strategies two ends of a means-ends-framework.

The following sections will discuss the different evaluation strategies one by one, their relation to the two innovation models and their impact on the evaluation difficulties and consequences affiliated with science-based entrepreneurial opportunities.

Evaluation criteria

A significant part of the corporate venturing literature suggest to base evaluation on a normative list of investment criteria (Block, 1982; Block and McMillan, 1993; Knight, 1988, 1994, McMillan et al., 1985). This stream of literature recommends that in order to select the "best" entrepreneurial opportunity, corporate venture companies should develop and define both (1)

general criteria (i.e. those which may best reflect potential ventures' fit with the overriding strategy of the corporate venturing initiative) and (2) specific criteria which stems from encompassing various aspects of the general criteria (i.e. criteria relating to the specification of products, markets or technologies). The general criteria should reflect both the specific goals for the venturing activity and the corporate strategic goals of the parent company. The more specific criteria encompass; evidence of consumer needs, capability to satisfy these, competitive advantage, and various financial criteria (Block and Macmillan, 1993). In corporate venturing, it is important that the selection criteria also covers issues such as operational relatedness in terms of the degree to which proposals are related to the core capabilities of the mother organization and expected strategic importance for corporate development (Burgelman, 1984). The criteria are applied to the evaluation of entrepreneurial opportunities matured into business plans.

To complement this matter, the capability of the management team to manage the venture is an important substituting investment criteria (e.g. MacMillan et al., 1985; Hall and Hofer, 1993, Bachher and Guild, 1996). Venture capitalists often prefer to select an investment opportunity that offers a good management team of just reasonable financial and market characteristics (Muzyka, Birley and Leleux, 1996). Shifting the evaluation focus away from the entrepreneurial opportunity to the management team's previous records is an attempt to reduce the effect of information asymmetry and idiosyncratic recognition of entrepreneurial opportunities. Two different interview statements further highlight the importance of the people behind the venture:

“Very often it is about the people and the chemistry [the venture investors' relation to the entrepreneur, red.]. A network can help you get an impression of the entrepreneur”. (Anders Trojel, Director, Corporate Licensing and Business Development LEO Pharma A/S)

“... the best venture investors understand how to develop a company by applying their former experiences and by locating the right people together. First when these conditions are in place it comes to the idea itself. (Søren Schifter, Partner, Novo Ventures, Novo A/S)

The selection strategy that relies on evaluation criteria very obviously support and reinforce the linear innovation models. This approach makes a clear distinction between users and producers of knowledge, and relies on the investor's ability to make a complete and accurate evaluation at a fixed point in time (Kline, 1985). Relying on the use of investment criteria presumes that venture

capitalists follow a natural progression when the science based venture opportunity has already been developed. Implicitly there is also an assumption that investors hold all relevant information for decision-making. Empirical and theoretical observations however argue that venture opportunities rarely develop along predictable paths (Vintergaard, 2005; Kline and Rosenberg, 1986) and thus investment criteria cannot stand alone.

Obviously, working with investment criteria does not solve the information asymmetry problem, but only what to do with the information when first gathered and how to secure representation of different stakeholder interests in the decision making process. Likewise venture managers only have limited time to apply these criteria in the first approaches. One venture manager argues:

Venture capitalists have a large number of projects to assess. In the first round you only spend 30 minutes listening to the entrepreneur. Therefore very few venture capitalists spend time proactively estimating market potential; more often you pick out the most promising 15-20 projects for further studies. (Lars Dybkjaer, Venture Partner, Danisco)

The weakness of relying on selection criteria as the main selection strategy is supported by observations that the selection criteria are more or less identical across the venture industry and national borders (Zutshi et al., 1999) furthermore it is even more difficult to observe any differences in selection criteria between high performing and low performing venture-companies, and between the criteria applied by inexperienced venture manager and the experienced managers (MacMillan and Day, 1987).

Self- and environmental selection

Economists suggest that the problem of information asymmetry can be overcome by applying mechanisms of allocation of contractual rights, staging of capital, and risk shifting, to provide entrepreneurs with strong incentives to self select and disclose more information about their business opportunity and themselves to the potential investor (Gompers and Lerner, 1999). In this case the contract between the entrepreneur and investor shifts the risk of wrongly selection from the investor to the entrepreneur by specifying a number of sanctions to the entrepreneur e.g. loss of shares, if the entrepreneurial opportunity proves to be a false opportunity or a wrongly executed opportunity resulting in a underperforming venture. The premise is that it would be foolish of the entrepreneur to accept these conditions if he is in doubt about the promises of the venture or his own abilities (Sahlman 1990). The self- and environmental selection can be

reinforced in corporate ventures by specifying a limited number of selection criteria and then disseminate these criteria throughout the organization in order to achieve a greater organizational sense of purpose and direction (Block and MacMillan 1993). Transparency in selection criteria stimulate “self-screening” among the potential entrepreneurs in the organization and can, therefore, contribute to reduce the disadvantages of information asymmetry and at the same time lessen the investor’s use of resources spend on identifying and evaluating business ideas.

One of the interviewees argues that there is an alternative approach to obtain information of the entrepreneurial firm called: “Residual due diligence”:

“‘Residual due diligence’ which means that venture investor is committed to the board of the project/company for a negotiated period of time in order to gain a better impression of the company and the entrepreneur. On the one side you have a good opportunity to estimate the potential of the investment. On the other hand you risk ‘falling in love’ with the project and thereby reduce the objectiveness in your assessment”. (Claus Warming, Sportgoods Holding A/S)

The “residual due diligence” approach is however very costly and it also requires that the investor must have serious intention in investing. Otherwise both parties waste time.

Shifting risk to the entrepreneur does not change the underlying linear assumption that selection is taking place when research results have been matured to a level or articulation where they can be subjected to analysis and selection. The advantage is, however, that the investor and the entrepreneur in principle do not need to share beliefs and interpretation of business opportunities in order to exploit the opportunity. However, attempting to deal with information asymmetry by moving risk from the investor to the entrepreneur is not completely waterproof. The main reasons are a) the entrepreneur’s over-optimism about their business opportunity and overconfidence in their own abilities may promote inefficient self-selection (Shane and Cable 2002) and b) if the venture eventually fails the investor still risk losing all the invested capital.

Staged investments

Another strategy to deal with the specific conditions for selection in corporate venturing is by staging the investments (Sahlman, 1990), hence committing fractions of the entire investment on an ad-hoc basis (Gompers, 1995; Sahlman, 1990). The funds will be provided to funding exploiting an entrepreneurial opportunity according to specified milestones. Though a multi-stage structure the venture capitalist will have more control over management and the operation

of the portfolio business (Sahlman, 1990). One advantage of this strategy is that capital is only injected with the same speed as knowledge is disclosed by the entrepreneur to the investor. This knowledge will additionally be validated through action to a certain extent. Additionally, staged investments also enable investors to limit the losses when choosing to invest in the wrong venture and at the same time reduce the risk of wrongly dismissing promising ventures.

Use of experts

Lack of critical knowledge can for example be tackled by employing a venture analysis team for evaluating proposals and producing recommendations for selection (Block, 1982). The team should contain people with market, technical and financial skills combined with empathy and understanding of the venturing process, and outside experts should be used as sources of critique and resources (Block, 1982). From the corporate venture literature we know that investment criteria are part of the selection strategy. However the investment analysis based on the criteria will always reflect the information asymmetry of the investment. Including a broader set of actors as external experts with different backgrounds and perceptions to perform the evaluation will ensure a more diversified and tested set of information on which to deploy the criteria. The experts are either paid on normal market conditions or give the opinion in expectation of return of similar favor in the future. However the use of experts holds the risk of missing novel entrepreneurial opportunities. Experts are trained specialists within a specific knowledge domain and tend to reject variations which are not recognized within their existing domain. The following quotation further highlights the upside and risk of relying on experts:

“...experts can be used in order to reject the worst cases and thereby increase the probability of selecting the right project. The worst nightmare, however, is to reject a coming winner”. (Kristoffer Gandrup, Partner, Keystones)

In other words, by using external experts potential investors may address lacking knowledge and escape the restriction of their own dominant logic, but risk replacing it with an even more firmly established dominant logic within a specific field.

Investment syndication

Syndicated investment is a potentially beneficial way of identifying investment opportunities and also accessing the investment expertise of fellow venture capitalists (McNally, 1997). Investment

syndication is a collaborative investment relationship between two or more venture capitalists. Both corporate venture units and venture capitalists seem to have a preference for funding proposals that comes with referral from fellow venture capitalists (Fried and Hisrich, 1994).

This strategy is a profound way of applying a more interactive and dynamic innovation model to the evaluation process. When a venture capitalist makes an investment in a venture, he also at the same time “certify” the quality of the entrepreneurial opportunity. This serves as an initial approval of the venture, which improves the odds for others to join in. In order for venture capitalist to gain access to investment opportunities from other venture capitalists there is a reversible commitment to provide these with other venture opportunities. One of the interviewees argues:

“.. ‘success creates success’ and in addition creates synergies. This represents the Mattheus effect: High performing investors attracts the best projects and the most compelling co-investors”. (Keld Holm, CEO, Business Research and Communication)

Once a firm begins collaborating, it develops experience in cooperation and a reputation as a partner. Experience will over time help the corporate venturing firm to be more effective in exploiting collaborations. Reputation, on the other hand, proves a fertile ground for both formal partnerships and an expanding array of informal "relationships". This is very important, as a broad range of collaborative efforts provides central connectedness in the network and help generate visibility and over time access to resources.

Syndication is like staged investments a way to reveal information about the entrepreneurial firm. One of the problems with relying on co-investors is however the idiosyncratic nature in perception of the investment opportunity. The consequence for making an investment will change according to the nature of the investor and so will the expectations. However co-investments have proven a valuable way to overcome parts of the asymmetric information embedded in the investment.

Use of social networks

Powell et al. (1996:117) make the point that in high-tech sectors, “... *no single firm has all the internal capabilities necessary for success*”. The locus of innovation in high-tech sectors is, therefore, to be found in networks of learning rather than in individual firms, since the knowledge pool is characterized as both complex and expanding, and the expertise is widely dispersed. For corporate investors, cooperation with the network, therefore, becomes vital since it provides the venturing firm with access to resources, skills and competences from a

broad range of firms, universities etc. and thus provides the venturing firm with complementary knowledge. Organizational theorists suggest that the disadvantages of asymmetric distribution of knowledge can be reduced by using knowledge accessed through social ties for supporting the investment decision (Shane and Cable, 2002; Granovetter, 1973, 1985). Especially investors who invest in high-technology businesses use social ties for creating access to private information about the entrepreneur and his business idea (Shane and Cable, 2002).

It is argued that strong ties to network actors promote knowledge transfer, they however hold search disadvantages (Hansen, 1999). The citation also illustrates that tight network structures require many resources to be maintained:

“It is often costly and takes up resources to collect information from your network. Moreover is it resourceful to maintain a network at a sufficient level [strong ties]. Furthermore it is concerned with risks of becoming a ‘closed club’ that are self-perpetuating if you always confer with the same people. In other words you risk your approach is being narrow-minded. (Susanne Forsingdal, ATP Private Equity Partners)

As indicated direct and strong network ties promotes exchange of knowledge and resources, however weak ties favors knowledge search (Burt, 1992). This is a task that involves managing a system of individual actors. At this point, a sparsely connected network with structural holes between its actors is better at generating competitive advantages for its actors (Burt, 1992). In this connection, one of the interviewees argues:

“When it comes to assessing technological matters it seems logic to involve a narrower circle of people because of the very specific character. About market estimates, however, it is important to spread out your request in the network due to the notion that customers often represent a heterogeneous group and new projects attract a new group of customers”. (Jacob Bratting Pedersen, Investment Director, Olicom)

Repeated partnerships seem to be more important than proximity of firms in the network for stimulating exchange of valuable knowledge (Soh, 2003). The explanation may be as Bouty (2000) points out that sharing valuable knowledge between firms depends on the level of trust among the exchange partners and this trust is developed through past exchanges. Loosely connected networks carries the advantages of cheaper access to information because of the lower maintenance costs (Burt, 1992) but also because indirect ties reduce the cost of human attention in form of time and investment required to gather information (Nahapiet and Ghoshal, 1998).

If firms are to react on windows of opportunities, they have to be participants of the network (Powell et al., 1996; Powell, 1998; Kreiner and Schultz, 1993). Network location is, therefore, central to the corporate venturing firms' competitiveness. Firms more centrally located in investment networks should have more timely access to promising ventures, and companies with collaborative experience should be better at selecting and exploiting them.

Conclusion and discussion

Many of the current evaluation strategies seems to be occupied with how to cope with evaluation of proved opportunities that have dripped out of the research pipeline instead of being concerned with emerging opportunities and tapping into the interactive dynamics between science and innovation processes. The outcome of the above analysis is consequently two different approaches to evaluation. One approach build on linear progressive strategies and the other is build on a more dynamic network and learning perspective. The linear strategies conduct the value assessment when the entrepreneurial opportunity has been developed and articulated into a business plan or an "investor pitch". The dynamic strategies pays more attention to how the investor, through out the development of the entrepreneurial opportunities, extends their knowledge foundation for evaluation.

Each of the different evaluation approaches has significant impact on how the evaluation is carried out and what the consequences are. The below table illustrates the main management differences between the two. Particular attention is paid to what impact the two different tactics have on evaluation of science based opportunities.

Selection problem	Linear evaluation approach	Dynamic evaluation approach
The appearance of the opportunity to be evaluated	Opportunity recognition: Evaluation of proven venture opportunities, when they are presented as an advanced business plan or investor pitch.	Opportunity discovery: Emerging venture opportunities. A market potential or technical discovery has been made, but the final use of opportunity can be difficult to assess.
Relationship to the source of opportunity	There is a strong separation between investor and entrepreneur. This distanced relationship creates a buyer and supplier relationship.	There is a partnership where investors are part of the innovation process. Through out this process the investors make pre-evaluations of value potential.
Cost implication	The cost of evaluating the proposed opportunities is primarily associated with finding answers to investment criteria's/(væk) check lists. Additional resources are used for comparing evaluation with other investors or finding "reliable" evaluators.	Building an evaluation capacity, where most resources are used for building and maintaining both loose and strong ties to network associates. Other costs are used for being part of the development process, many of these are opportunity costs as the process is very time consuming.
Agency problem	Agency problems are solved post the investment decision, by implying sanctions and contractual agreements.	Investors and entrepreneur share ownership early. This develops into a partnership, where the agency problems are less rigorous. The problems that occur are associated with who has contributed the most value, and therefore who should have the largest ownership share.
Use of network	Risk sharing: The network is used to scout for a large quantity of venture opportunities to select from and to find the most compatible co-investors.	Learning: The network is used for learning about venture development and to help predict the future value of the opportunity. The strong and weak tie bindings also facilitates testing/ challenging the new venture.
Competitive resource / main advantage	Prediction: Investors who work along linear models meets a large quantity of projects and build a capacity to predict outcomes of "general" entrepreneurial processes.	Participation: Investors who follow a dynamic approach have better knowledge of the underlying science based opportunity and can better predict and influence the outcome. They also gradually reduce the level of asymmetric information and agency costs.
Shortcoming / main problem	Linear evaluation is based on a presumption that investors at any point in time know how to measure the outcome of the entrepreneurial process. The approach however suffers from lack of knowledge for assessing opportunities. There is also significant chance to oversee the "unpolished diamond".	Investors are pre-committed to the venture and it can be difficult to "kill" bad projects. Too much communication can also lower significant rents, since venture rents come from less than perfect competition. Additionally dynamic involvement is very resource demanding and investors will therefore follow fewer projects.

Table 1. The consequences of linear and dynamic evaluation approaches.

The two fundamentally different approaches to evaluating entrepreneurial opportunities differs in their ability to address the selection conditions, evaluation consequences, diversity on expectations, idiosyncratic nature of entrepreneurial opportunities and asymmetric distribution of knowledge about the entrepreneurial opportunity. The analysis also shows that investors can use a range of different compensation strategies to overcome the shortcomings of their preferred evaluation approach. The table below lists the impact of the two evaluation approaches and how management can try to compensate for unintended consequences.

	Linear evaluation approach	Dynamic evaluation approach
Evaluation consequences	<p>There is a chance of letting too many investments go by, as the investors do not hold the relevant knowledge to recognize potential value.</p> <p>Linear compensation:</p> <ul style="list-style-type: none"> • Develop a broad international network to ensure a high velocity of venture opportunities to choose from. • Focus on a niche market. • Develop strong relationships with competent co-investors 	<p>Investors using dynamic models tend to engage in too many projects and hence spend too much time on each project.</p> <p>Dynamic compensation:</p> <ul style="list-style-type: none"> • Develop well defined criteria of the types of projects that should be engaged in. • Have a clear idea of what you can contribute with to each venture. • Create knowledge loops forward and backward in the value chain. This includes having an exit strategy for ventures that does not live up to the milestones.
Diverse expectation	<p>There will be little knowledge of what expectations the science based opportunity can fulfill.</p> <p>Linear compensation:</p> <ul style="list-style-type: none"> • Be clear of what you are searching for, and create a common understanding in the investment team. • Keep updating your evaluation criteria to meet current needs. Communicate these internal and external. 	<p>Through a long-term process of collaborative arrangement the science based opportunity can be developed to fulfill the expected needs: strategic or financial returns.</p> <p>Dynamic compensation:</p> <ul style="list-style-type: none"> • Be sure to provide entrepreneurial autonomy in the process (organizational, financial, ownership). • Be prepared to terminate projects that do not live up to expectations.
Idiosyncratic	<p>The investors have no common developed history of the ventures development. Hence, investors will have a very different interpretation of the outcome of the venture opportunity.</p> <p>Linear compensation:</p> <ul style="list-style-type: none"> • Create an organized forum where you efficiently can measure the opportunities up against one another. • Create a reporting system so that you can easily learn from your previous investments. 	<p>Through communication with transdisciplinary stakeholders investors develop a common understanding of the possible development path of the opportunities. This can lower the risk, but also the potential Schumpeterian rents.</p> <p>Dynamic compensation:</p> <ul style="list-style-type: none"> • Be selective in which investors you include in the evaluation process. • Ensure that you are the one who have the ownership of the project and the one who determine the exit strategy.
Information asymmetry	<p>There is a high degree of information asymmetry between entrepreneur and investor, due to the buyer / seller relationship.</p> <p>Linear compensation:</p> <ul style="list-style-type: none"> • Rely on opinions from experts and well-known co-investors. • Focus on a specific industry and investment stage. • Enforce tight and well-defined milestones, and observe and evaluate the development. 	<p>Dynamic strategies diminish the information gap between investor and entrepreneur. The collaborative arrangement can however also lower the Schumpeterian rent and make the outcomes too predictable for competing investors.</p> <p>Dynamic compensation:</p> <ul style="list-style-type: none"> • Be sure that you do not share your knowledge with others unintended. • Beware that your unique information is a valuable currency for exchange between other network actors. • Be sure to provide autonomy to the entrepreneur in the development process (organizational, financial, ownership).

Tabel 2. The effects of evaluation approaches on evaluation conditions

The present debate on criteria for evaluation and the evaluation process as such, is both interesting and relevant. Projects on the one hand needs to be genuine innovative and hence associated with a high level of risk in order to hold promises of yielding Schumpeterian rents. On the other hand, a too high level of risk may obstruct the selection by preventing any reliable prediction and hence the meaningful use of any of the criteria put forward. Adding to the difficulties of evaluation, venture managers only in rare cases hold all the needed competence for assessing the quality of the underlying technology and the related product features. Each of these

central elements leads to the belief that what is missing is the underlying knowledge, which can create a foundation for decision-making (and therefore evaluation). The missing stepping stone in preparing for the evaluation process is access to relevant knowledge that will improve the decision-making process. The type of actions needed to develop such knowledge is best obtained by following the guidelines of the dynamic evaluation approaches.

A growing body of innovation literature and practice of venture management stress that the value assessment of new science based opportunities should happen as a process which is proceeding from the beginning from the project. The below quote from a venture manager illustrate this fact.

“Some of Danisco’s most profitable investments are made proactively by searching and choosing projects. By addressing the issue of which areas they see as special potential, entrepreneurs were searched for. An example was in the US where Danisco were in contact with two entrepreneurs and asked them to develop a project Danisco had come across. The process of selecting a project was hereby turned upside down. This ended up with a 300 million \$ company now headed by the two entrepreneurs and yielding Danisco an over normal profit. (Lars Dybkjaer, Venture Partner, Danisco)

In a corporate venture context some argue that the complexity imbedded in the science based ventures can be reviled by participating in the early process of the idea development (Husted and Vintergaard, 2004). Different from the linear strategies which builds on criteria lists, dynamic corporate venture viewpoints argues that venture investors should engage in the very early phases of the venture process (Vintergaard, 2005; Munk and Vintergaard, 2004). Such strategy would facilitate the direction of the venture opportunity, but also lower the asymmetric information. One of the interviewees further illuminated the respect and credibility the investor gain from the entrepreneur when you engage early:

“You can better manage potential cultural barriers when you enter early. These barriers are often costly to solve later on... It does not have to be expensive to test a market potential. Often the entrepreneurs demand a considerable amount of money in order to test the market potential. The point is that when they can present the idea in a flashy powerpoint for the potential investors they can do the same with potential customers. (Jacob Bratting Pedersen, Investment Director, Olicom)

Science based ventures often develop in unforeseeable directions and it can be very difficult to predict the outcome of the process (Kline and Rosenberg, 1986). It has been known that early stage engagement in the venturing process can ensure that the corporate venture investors can influence the development in a desired direction (Vintergaard, 2005). One of the interviewees argues:

“...Some products have multiple uses. How can you make an extreme return yield with products that have an obvious potential for diversity?...”
(Susanne Forsingdal, Partner, ATP Private Equity Partners)

By participating early in the process of testing knowledge for the entrepreneurial process, the outcome of the innovation will also be more socially robust (Gibbons et al., 1994). This will additionally lower the need for transferring risk to the entrepreneur, as a more clear and common goal will be achieved. As a positive effect, early stages involvement also diminishes the asymmetric information embedded in the project, as the corporate venture investor will become more involved in the development. This will in principle also result in better exploitation of the staged investments, as the stages can be better defined and evaluated. Through this process the venture specific information reveals in the development process – lowering the level of asymmetric information and hence also opening for a more qualified use of the linear criteria lists. This changes the venture process from selection to reshaping. In conclusion, adopting a dynamic approach to evaluation will better overcome the evaluation conditions embedded in venture investments, but also reinforce the most commonly used evaluation strategies.

References

- Amit, R., Glosten, L. & Muller, E. (1990). Entrepreneurial ability, venture investments, and risk sharing. *Management Science* 38(10): 1232-1245
- Bachher, J.S. and Guild. P.D. (1996). Financing early stage technology based companies: investment criteria used by investors. *Frontiers of Entrepreneurship Research* 363–376.
- Barnea, A., Haugen, R.A., Senbet, L. W. (1981). Market Imperfections, Agency Problems, and Capital Structure: A Review. *Financial Management*. 10(2): 7-22
- Bhave, M.P. (1994). A process model of entrepreneurial venture creation. *Journal of Business Venturing*, 9(3): 223-242.
- Block, Z. & MacMillan, I. C. (1993). *Corporate Venturing - Creating New Businesses within the Firm*. Cambridge, MA.: Harvard Business School Press.

- Block, Z. (1982). Can Corporate Venturing Succeed? *The Journal of Business Strategy*, 3(2): 21-34.
- Bouty, I. (2000). Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Review*, 43(1): 50-65.
- Brown, J. S. & Duguid, P. (1991). Organizational Learning and Communities-of-practice: Toward a unified view of working, learning, and Innovation, *Organizational Science*, 2(1).
- Burgelman, R. A. (1983). A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly*, 28: 223-244.
- Burgelman, R.A. (1984). Designs for corporate entrepreneurship in established firms. *California Management Review* 26(3): 154-166.
- Burgelman, R.A. (1985). Managing the new venture division: Research findings and implications for strategic management. *Strategic Management Journal*. 6(1): 39-54.
- Burt, R. (1992). The Social Structure of Competition. In *Structural Holes*. Cambridge, MA: Harvard University Press.
- Chrisman J., Timothy H. and Fraser S (1995). Faculty entrepreneurship and economic development: The case of the University of Calgary. *Journal of Business Venturing*. 10(4): 267-281.
- Eisenhard, K.M. (1989). Agency theory: an assessment and review. *Academy of Management Review*. 14(1): 57-74.
- Elfring, T. & Foss N. J. (2000). Competence building -understanding the role of internal venturing and spinoffs. JAI Press, Stamford.
- Etzkowitz, H. and Leydesdorff, L. (1997). *Universities in the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations*. London: Cassell Academic.
- Etzkowitz, H., and Leydesdorff, L. (1998). The Endless Transition: A "Triple Helix" of University-Industry-Government Relations. *Minerva*. 36: 203-8.
- Fried, V. & Hisrich, R. 1994. Toward a model of venture capital investment decision making. *Financial Management* 23(3): 28-37
- Gartner, W., Carter, N., Hills, G. (2003). The Language of Opportunity. In C. Steyaert & D. Hjort (eds.), *New Movements in Entrepreneurship*. Cheltenham, UK: Edward Elgar.
- Gibbons, M., Scott, P., Nowotny, H., Limoges, C., Schwartzmann, S., & Trow, M. (1994). *The new production of knowledge – the dynamics of and research in contemporary science societies*. London: Sage publications.
- Gompers, P. A. & Lerner, J. (1999). *The Venture Capital Cycle*. Cambridge, Massachusetts: MIT Press.

- Gompers, P. A. (1995). Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance*. 50(5): 1461-1489.
- Granovetter, M. S. (1973). The Strength of Weak Ties. *American Journal of Sociology* 78:1360-1380
- Granovetter, M. S. (1985). Economic action and social structure: The problem of embeddedness. *Am. J. Sociology* 91: 481:510
- Greene, P.G., Bruch, C.G and Hart, M.M (1999). The corporate venture champion: A resource-based approach to role and process. *Entrepreneurship Theory and Practice*, 23(3): 103-122.
- Guth, W.D. & Ginsberg, A. (1990). Guest editor's introduction: Corporate entrepreneurship. *Strategic Management Journal* 11: 5-15.
- Hall, J., & Hofer, C.W. (1993). Venture Capitalists' Decision Criteria in New Venture Evaluation. *Journal of Business Venturing*. 8: 25-42.
- Hansen, M. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organizational sub-units. *Administrative Science Quarterly*, Vol. 44, p. 82-111.
- Hills, G.E., Lumpkin, G.T., Singh, R.P. (1997). Opportunity recognition: perceptions and behaviors of entrepreneurs. *Frontiers of Entrepreneurship Research*. Babson College, Wellesley, MA.
- Husted, K & Vintergaard, C. (2004). 'Stimulating innovation through corporate venture bases'. Forthcoming in *Journal of World Business*. 39(3).
- Kirzner, I.M. (1997). Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach. *Journal of Economic Literature*. 35: 60-85.
- Kline, S. (1985). Innovation is not a linear process. *Research management*. XXVIII(4): 36-45.
- Kline, S.J. and Rosenberg, N. (1986). An Overview of Innovation. in Landau, R. & Rosenberg, N. (eds.), Washington D.C. National Academy Press.
- Knight, R.M., (1988). Criteria Used by Venture Capitalists. *Journal of small business and entrepreneurship*. 1(1)
- Knight, R.M., (1994). Criteria Used by Venture Capitalists: A Cross Cultural Analysis. *International Small Business Journal*. 13(1).
- Kreiner, K. and M. Schultz (1993). Informal collaboration in R&D - the formation of networks across organizations. *Organization studies*. 14(2): 189-209.
- Long, W. A. and McMullan, W. E. (1984). Mapping the opportunity identification process. In J. A. Hornaday et al. (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College.
- Lundvall, B.A. (1992). National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning. London: Pinter.

- Lyons, K.L. (2000). Using patterns to capture tacit knowledge and enhance knowledge transfer in virtual team. In *Knowledge Management and Virtual Organizations*, (Malhotra, Y. , Ed.), pp 125-43. Idea Group Publishing, Heshey, PA
- MacMillan, I., & Day, D.L. (1987). Corporate ventures into industrial markets: Dynamics of aggressive entry. *Journal of Business Venturing*. 2(1): 29-40.
- MacMillan, I.C., Seigel, R., and Subba Narasimha, P.N. (1985). Criteria used by venture capitalist to evaluate new venture proposals. *Journal of Business Venturing*, 1: 119- 128.
- McNally, K. (1997). *Corporate Venture Capital: Bridging the equity gap in the small business sector*. London: Routledge.
- Milward, L.J. (2000). "Focus groups", in Breakwell, G.M., Hammond S. and Fife-Schaw, C. (Eds.) *Research Methods in Psychology* 2nd Ed., London, Sage Publications, pp. 303-324.
- Mowery, D. C., & N. Rosenberg. (1989). *Technology and the Pursuit of Economic Growth*. Cambridge: Cambridge University Press.
- Muzyka, D., Birley, S., & Leleux, B. (1996). Trade-offs in the investment decisions of European venture capitalists. *Journal of Business Venturing*.
- Nahapiet, J. & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review* 23(2): 242-266
- Nelson, R. R. (1993). *National Systems of Innovation : A Comparative Study*. Oxford: Oxford University, Press.
- Nowotny, H., Gibbons M. & Scott, P (2001). *Re-thinking science. Knowledge and the public in an age of uncertainty*. Oxford: Polity Press.
- Powell, W. W. (1998). Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review*, 40(3): 228-240.
- Powell, W. W., Koput K. W. & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1): 116-146.
- Sahlman, W. (1990). The structure and governance of venture capital organizations. *Journal of Financial Economics*. 27: 473-521
- Saravathy, S., Dew, N. Velamuri, R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In Z. Acs & D. Audretsch (eds), *Handbook of Entrepreneurship* (p 141-160). Boston, MA: Kluwer.

- Sarasvathy S. (2004). Constructing Corridors to Economic Primitives: Entrepreneurial Opportunities as Demand-Side Artifacts. In J. Butler (ed.), *Opportunity Identification and Entrepreneurial Behavior* (291-312). Greenwich CN: Information Age Publishing.
- Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2): 243-288.
- Schumpeter, Joseph A. (1943) *Capitalism, Socialism and Democracy*, London: Allen and Unwin.
- Seufert, A., Von Krogh, G & Bach, A. (1999). Towards knowledge networking. *Journal of knowledge management*, 3: 180-1090.
- Shane S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*. 11(4): 448-469.
- Shane, S. & Cable, D. (2002). Network Ties, Reputation, and the Financing of New Ventures. *Management Science*. 48, 3, p. 364-381.
- Shane, S. (2003). *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*. Aldershot, UK: Edward Elgar.
- Shane, S. and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*. 25(1): 217-226.
- Sharma, and Chrisman (1999). Toward a reconciliation of the definitional issues in the field of Corporate Entrepreneurship. *Entrepreneurship theory and practice*.
- Siegel, R., Siegel, E. & MacMillan, I.C. 1988. corporate venture capitalists: Autonomy, obstacles and performance. *Journal of Business Venturing* 3(3): 233-247.
- Singh, R. (2001). A comment on developing the field of entrepreneurship through the study of opportunity recognition and exploitation. *Academy of Management Review*. 26(1): 10–12.
- Soh, P. (2003). The role of Networking alliances in information acquisition and its implications for new product performance. *Journal of Business Venturing* 18: 727-744
- Sorenson, O. & Stuart, T.E. (2001). Syndication Networks and the Spatial Distribution of Venture Capital Investments. *The American Journal of Sociology*. 106(6): 1546-88
- Stokes, Donald E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, D.C.: Brookings Institution Press.
- Sung, T.K., Gibson, D.V., & Kang, B. S. (2003). Characteristics of technology transfer in business ventures: the case of Daejeon, Korea. *Technological Forecasting and Social Change*. 70: 447-466.
- Venkataraman, S. (1997). The distinctive domain of entrepreneurship research. *Adv. Entrepreneurship Res.*, Firm Emergence Growth. 3: 119-138.

- Venkataraman, S., MacMillan, I.C. & McGrath, R.G. (1992). Progress in research on corporate venturing. In Sexton, D.L. *The State of the Art of Entrepreneurship*. Boston: PWS-KENT.
- Vintergaard, C. (2005). Opportunities in Corporate Venturing – Actors Creating Passageways. *International Journal of Innovation Management (IJIM)*. 9(1): 215-239.
- Volberda, H. W. & Lewin, A. Y. (2003) 'Guest Editors' introduction. Co-evolution dynamics within and between firms: from evolution to co-evolution' *Journal of Management Studies*. 40, 8, 2111-2136
- Wielemaker, M.W., T. Elfring, T., and H.W. Volberda (2000) "Strategic Renewal in Large European Firms: investigating viable trajectories of change", *Organization Development Journal*, Vol. 18, No. 4, pp. 49-68.
- Wielemaker, M.W., T. Elfring,, and H.W. Volberda (2001). How Well-Established Firms Prepare for the New Economy: an Empirical Study on the development of New Economy Initiatives. *International Studies of Management and Organization*. 31(1): 7-29.
- Zahra, S. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of Business Venturing*. 14: 451-478.
- Zahra, S.A, and Dess, G. G. (2001). Entrepreneurship as a field of research: Encouraging. *Academy of Management Review*. 26(1)
- Zahra, S.A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry technological opportunities. *Academy of Management Journal*, 39(6): 1713-1735.
- Zutshi RK, Tan WL, Allampalli DG, Gibbons PG. (1999). Singapore venture capitalists (VCs) investment valuation criteria: A re-examination. *Small Business Economics* 13: 9-26.

4. GENERAL DISCUSSION AND CONCLUSION

While the dynamics of the early phases of the venture process has been the overarching theme of this thesis. Trying to condense and convey a single message out of the collective studies can be a challenge. This is especially true in light of the grounded methodology used for developing the content of this thesis: an approach that focuses on progressive and emergent knowledge production and implies that the very object of my research is constantly evolving. Also, since my own knowledge of the academic field of the early phases of corporate venturing and its theoretical and empirical arguments has been under continuous development, the reader will quite properly also experience a change in the style of the arguments from my early work to the later studies. This development has made the later work more analytical and more detailed. This chapter will draw some comprehensive conclusions from the work presented here – a supplement to the individual conclusions in the studies. While this section continues to draw on the work of other authors, it primarily strives to survey and summarize the work already presented in this thesis.

This thesis makes two main contributions to the current literature on corporate venturing: First it argues that the literature lacks sufficient attention to the early phases of the venturing process. Secondly, it stresses overemphasises on a linear way of thinking that often can be misleading. Other corners of the scientific community (which is often included in the innovation process) and the community of corporate venture firms have a different approach to the development and evaluation of innovations. Since corporate ventures are highly dependent on science-based innovations, an alternative corporate venture process is called for. Being part of this new approach requires a complementary interpretation of the way corporate venture firms operate and a particular attention to the early phases of the process. This thesis accordingly proposes several new dimensions for a non-linear and proactive approach to developing new venture ideas, discovering opportunities and preparing for evaluation. This creates a collective contribution that encompasses arguments about both the phases in the venture process and their interconnection. One may argue that what is unique about the early phases is not only that this is the first part of the venture process, but also that here resources are at one and the same time brought together and evaluated. Leaving this phase unattended will neglect the complexity of managing a corporate venture, but also leave out valuable information to the later stages.

The thesis has presented arguments that contribute to a more interactive model where each of the individual activities in the process does not necessarily follow in a fixed chronological order (Cloutier and Boehlje, 2002). As argued by Kline and Rosenberg (1986):

“In the linear model, there are no feedbacks from sales figures or from individual users. But all of these forms of feedback are essential to evaluation of performance, to formulation of the next steps forward, and to assessment of competitive position” (p. 286)

In this process Christensen and Lundvall (2004), argues that different academic perspectives can be brought in. Such an approach contributes to the way fellow authors and corporate venture firms see the business model. While the corporate venture model keeps many of the dimensions that have been derived from previous findings, this thesis adds new perspectives; in particular, it shows how knowledge is created in networks to facilitate the dynamism involved in the process. This has led to the construction of a new dynamic model, which draws on the main conclusions from the studies included in this thesis.

4.1 A new dynamic model

The focus of this thesis has been on a new and more dynamic corporate venture model, which focuses on the early stages of the venture process. It is dynamic in the sense that it approaches corporate venturing from a non-linear, knowledge creating and network perspective. My work has particularly contributed to existing literature by focusing on the need for rethinking the way in which new innovative ventures are developed, discovered and evaluated in the context of corporate venturing. While each of the different activities of the traditional process and pipeline model for corporate venturing are to some extent still relevant, it is argued that the tasks should be analysed in a more interconnected way (Wright and Robbie, 1998). Particularly the thesis has highlighted the relevant interconnectedness in the venture process which is driven by mechanisms through which knowledge is transferred, but also by which new knowledge, and learning, is created and tested.

Different from much previous literature on corporate venturing I have approached the task from a knowledge management and network perspective so the model below highlights and concludes on some of the overall dimensions of this new approach. Using these theoretical perspectives fills some of the current gaps in the literature as focus is more on learning and interactivity and less on planning of events. The below early stage knowledge creation model for corporate venturing retains the familiar corporate venture activities (e.g. Burgelman et al., 1996), but they are connected and analysed differently. In this model the previously known dimensions of

corporate venturing are supplemented with the early stage focus and the interactivity and dynamics of the process. Hence the progression is supplemented with interactive dimensions.

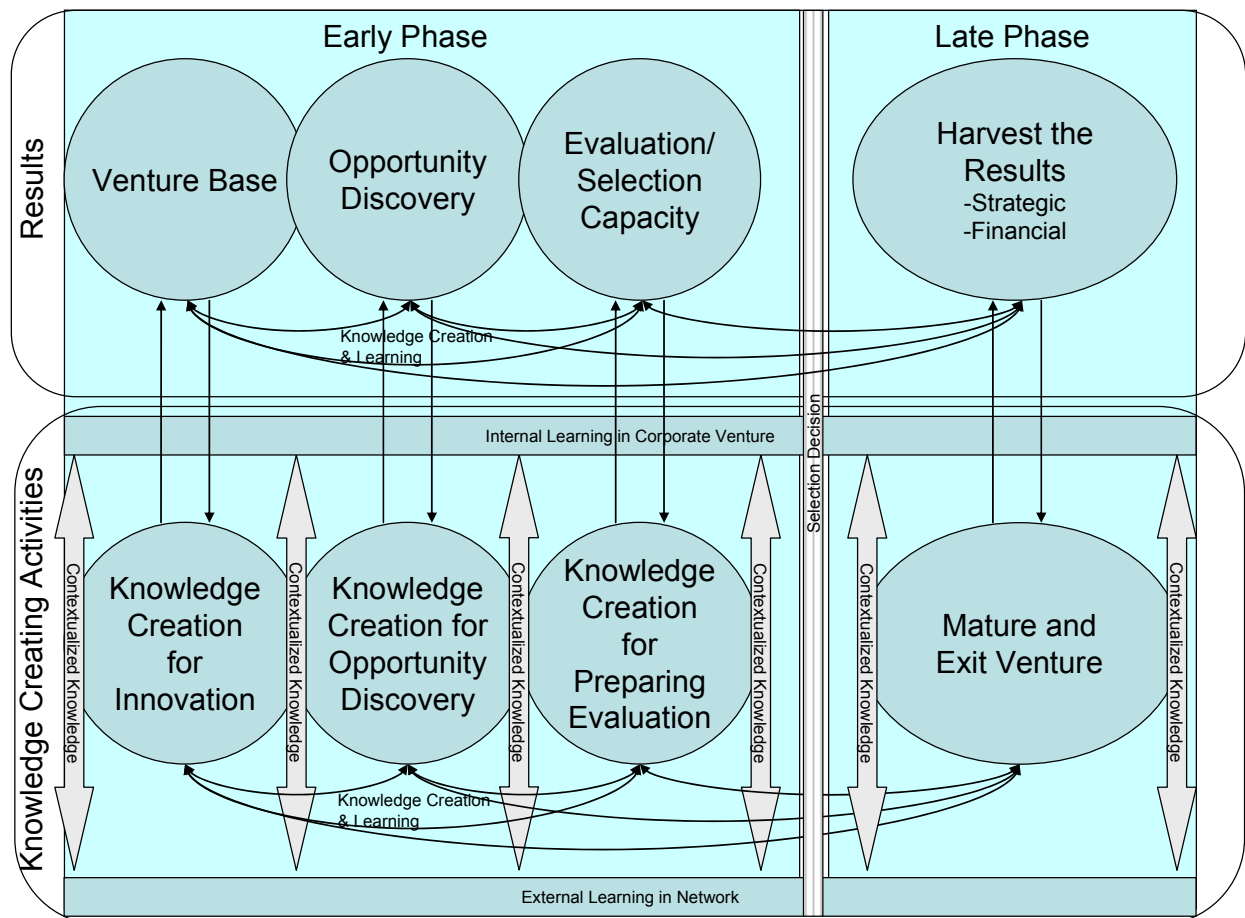


Figure 3. The early stage knowledge creation model for corporate venturing

The model illustrates how the corporate venture's venture base, its ability to make discoveries and prepare an investment evaluation is highly dependent on the kind of knowledge from which activities and results are created. The model makes the distinction between activities and results, a distinction previously made by Burgelman et al. (1996: 3). In contrast to e.g. Burgelman, however, the activities in this model are driven by the knowledge creation and learning processes which leads to the results in the model. The outcome and quality of the results will naturally depend on the internal and external knowledge creating activities. However, the results will also have a significant impact on future knowledge creating activities. Based on the above model there are three distinct elements of the knowledge creating activities that in particular needs further explanation:

- Knowledge creation and learning between activities
- Network: Internal and external learning
- Contextualized knowledge

4.1.1 Knowledge creation and learning between activities

In the above model one process does not necessarily lead chronologically to the next (Burgelman et al. 1996; Reynolds and Miller, 1992). Therefore, while the model creates an awareness of which distinct critical activities are called for when managing the early stages of the venturing process, it also illustrates that they are not always logically connected as on a “conveyer belt” from basic science to new prosperous ventures from which results can be harvested. The new model includes a dynamic and interactive approach where knowledge of each phase in the early stage requires knowledge of past and future tasks. As argued by Kline and Rosenberg (1986):

“We have already seen that innovation is neither smooth nor linear, nor often well-behaved. Rather, it is complex, variegated, and hard to measure...” (p. 285-286)

In contrast to the model of innovation offered by Burgelman et al. (1996), the early stage knowledge creation model for corporate venturing pays particular attention to the knowledge creation and learning that takes place between the various activities. There are a number of reasons why knowledge creation in corporate venturing is a key element. Firstly, this approach pays more attention to how knowledge is created and hence what drives the ventures forward, than it does to mapping the development. Secondly, focus on knowledge creation reveals valuable information about potential value of the venture. Analysing each of the activities in the venture process is still relevant, but greater awareness of the underlying knowledge creation and learning, which takes place between activities and results when reaching backward and forward in the innovation process, is still needed. As an example, Study V (Vintergaard and Husted, Submitted) argues that corporate ventures cannot prepare for making an investment evaluation, unless they have some knowledge of the underlying science based opportunities (from the venture base). During such a process the investor strives to gain as much information as possible of what has lead to the science based opportunity in order to make a qualified investment evaluation. During this process the investor gains better insight into the technology, the market, the customers etc., but also minimizes information and knowledge asymmetry to the entrepreneur. While it may not seem logical that investors need to focus their attention on the prerequisites for new venture formation, the fact is that investors do need this knowledge in order to prepare for a valid evaluation. If investors do not hold such knowledge themselves, they need at least to have a network of people who do, and from whom they can learn. Study V

further illustrates the fact that a corporate venture investor's capacity to evaluate science based opportunities can only be developed if knowledge of the venture base is included in the process. Likewise, Study III (Husted and Vintergaard, 2004) stresses that the venture base can only develop robust and innovative knowledge for new venture opportunities if the knowledge is tested against market powers. New products and services need to be produced as entrepreneurs have a broader knowledge of market conditions and knowledge about what investors are looking for, i.e., an awareness of the later activities in the process. In a similar vein, Husted and Vintergaard (2004) argue that especially investors pursuing corporate venture strategies can influence the characteristics and quality of new venture ideas. During this process corporate ventures need to look forward in the process in order to anticipate future demand. As will be explicated later, proactive venture evaluation requires a combination of internal and external knowledge, and demands negotiation (contextualization) between them. Such knowledge is developed through interaction with a diversified set of actors. In Study I (Munk and Vintergaard, 2004) develop a 2*2 matrix from which they argue for how venture investors could be more known in society and also how their role and capabilities could be more actively deployed in managing innovation.

Additionally, Vintergaard (2005) (Study IV) makes the argument that discovery of entrepreneurial opportunities demand that the corporate venture firm go back to the initial phases of the process, to understand what developmental signs to look for. More specifically, the study argues that the development process of new venture opportunities is not always straightforward and progressive but can take many different routes and end up with many different results. A subject for later studies could be to see whether these routes can be categorized. While recent research has argued that innovations travels and develops according to unforeseeable patterns (e.g. Kline and Rosenberg, 1986; Burgelman et al., 1996) it could be of great advantage if investors could predict these, or at least know of some of the potential outcomes.

The early stage knowledge creation model for corporate venturing illustrates that sometimes the steps in the process are left out or acquire their relevance only later in the process. Put differently, we can say that, while the model illustrates a possible progression of the venture, it does not argue that there will always be one. Most opportunities will never develop very far (Reynolds and Miller, 1992), still less will be evaluated by venture investors and only a very few will end up as a venture firm exited through a trade sale or an IPO. A further complicating matter is the value that is created in one part of the activities does not necessarily develop in the way that it was initially expected. Kline and Rosenberg (1986) stress in this connection that:

“There is a further critical aspect of the innovation process that it is not illuminated by the black-box approach. That is, innovations will often

generate benefits far from where from the industries in which the originated. It turns out to be extraordinary difficult to ‘map’ the costs and benefits of many innovations within any single framework of industrial classification” (p. 280)

As an example, the value that was once perceived in the venture base may very well find a different use. Study IV (Vintergaard, 2005) illustrates this point well: The development process of an opportunity is very difficult to anticipate. Ideas go through many stages before their actual value is appreciated by the investor and capitalised upon. Following this argument Kline and Rosenberg (1986) makes a further point that:

“In an ideal world of omniscient technical people, one would get the design of the innovation workable and optimized the first time. In the real world of inadequate information, high uncertainty, and fallible people, nothing like this happens. Shortcomings and failures are part of the learning process that creates innovation of every kind. Innovation accordingly demands feedback, and effective innovation demands rapid, accurate feedback with appropriate follow-on actions. Radical, or revolutionary, innovation prospers best when provided with multiple sources of informational input” (p. 286)

The kinds of input that influence the development process derives from the knowledge created both within the corporate venture, in its network and more importantly between the two (Zahra and Nielsen, 2002).

Seen from a management standpoint, the dynamic realities of the venture process naturally complicate predictions of future outcomes for corporate investors. As illustrated in many of the studies of this thesis, venture opportunities can easily change when influenced by internal forces or exogenous shocks. In order to turn this reality into a competitive advantage, venture managers will have a difficult time applying a “wait and see” approach. A passive investor strategy will have to accept the natural progression of the venture. Such an approach brings several difficulties, as venture investments have to yield both financial and strategic returns. A more active approach to the investment process, however, can turn the dynamic nature of the venture development to their advantage. In contrast to the previous innovation models, this one helps venture managers to see the investment process in a holistic manner and as a process that can be changed. Through active involvement (like it was mentioned in Study I), venture investors can influence the direction of the venture and more easily target strategic intents. To gain these advantages the corporate venture will develop organisational routines which can follow and

monitor the development of the venture. This requires a constant evaluation of previous developments and a well-defined intention of a future direction. From a knowledge creation and network perspective, corporate venture investors can facilitate this unforeseeable process through active involvement in the innovation process, milestone/monitors system which can detect the direction of the venture, and strong and weak network ties to key stakeholder that can influence the innovation process.

This thesis has based its arguments on a qualitative methodology. This approach has functioned well for describing the early phase dynamics, but not the impact of its activities. A task left for future studies could be to measure the significant of the results of this thesis. A quantitative analysis like this could help to provide answers to questions such as: How much and when should investors influence the direction of new venture opportunities? What kind of network ties should investors make use of in the different phases of the venture process? To what degree can venture investors predict the direction and outcome of future venture opportunities? Such quantitative studies could be designed using longitudinal data from venture investors and their investment opportunities. The analysis could include the correlation between venture opportunity development and the activities undertaken by the investor.

The present thesis is limited to focus on the early phases of the process. The later phases are also illustrated in the model, though they are not included in the analysis. It is clear, however, that this part of the process could benefit from including a dynamic dimension where forward and backward loops are included – a task left to future studies. From my interview with venture managers I have become aware that, already before the investment is made, investors are very focused on the exit options of a given investment. If there are no significant possibilities for predicting a profitable exit through a trade sale, an IPO, or something of that order, then the investments will not be made. Similar results show that:

“...many business owners fail miserably at devising exit strategies, which include selling the company, going public or passing the business to a family member. That's not because the strategies are too complicated. They're just overlooked... Exit strategies are critical and should guide what you do on a day-to-day basis...” (Dillon, 1997: 1)

There are other examples of how the late stages could also benefit from a new analytical approach. Particular attention should be paid to how investors should balance their influence of the venture in a desired direction.

4.1.2 Networks: Internal and external learning

As illustrated in the early stage model for corporate venturing, the knowledge and learning that takes place to stimulate the venture activities are a result of combined knowledge both from within the corporate venture and its network (Zahra and Nielsen, 2002). As argued by Christensen (1992):

“...the direction of search [for knowledge] is determined by the existing knowledge base in the firm and by exogenous stimuli e.g. from competition or other environmental influences” (p. 84)

As the later section will illustrate, it is in this intersection of knowledge contextualisation that most of the learning takes place.

In networks, research results and leading edge knowledge are exchanged. Both types can also function as steppingstones for new knowledge creation (Mønsted, 2003). The ability to network has been well argued for in small innovative firms, a capacity that not all large firms possess (Mønsted, 2003, 2004). Small firms in the start-up process are forced to network because of a lack of resources, whereas many established firms can rely on their own resources. As illustrated in Study II (Jørgensen and Vintergaard, 2006), however, many large firms use networks as a window to opportunities. As indicated earlier in this thesis, knowledge production and innovative processes depend on network formations regardless of the size of the firm. Powell et al. (1996) makes the point that in high-tech sectors:

“...no single firm has all the internal capabilities necessary for success”
(p. 117)

The locus of innovation in knowledge intensive sectors is, therefore, to be found in networks of learning rather than in individual firms.

Husted and Vintergaard (2004) (Study III) argues that building a solid and valuable foundation for new venture opportunities (i.e. the venture base) comes from collaboration in networks, which are both a ticket to the network and a vehicle for rapid and early communication of news about opportunities and obstacles (Frederiksen, Hemlin and Husted, 2005). Kreiner and Schultz (1993) see networking as an intensification of information and knowledge sharing with the purpose of discovering and generating new ideas. Cooperation with the network, therefore, becomes vital since it provides the corporate venture firm with access to resources, skills and competences from a broad range of firms, universities etc. and thus provides firms with complementary knowledge. Collaborative research and development function as an eye-opener for accessing ideas and knowledge from a variety of sources.

Within networks, knowledge can be presented and tested in a community of interaction constituted by actors from many different disciplines. This makes the results of research more socially robust (Nowotny et al., 2001). However, these new structures and processes can make it difficult for people and firms to identify and specify their individual contribution. This raises new problems for corporate ventures as property rights to the venture, for example, become less easy to determine. While this thesis argues for the potential benefits of creating knowledge in networks, it leaves these potential challenges for future studies.

When addressing the early phases of the venture process, management will, as indicated above, benefit from working with both relational and structural embeddedness. These network conditions provide the foundation for venture investors to adapt, coordinate, and safeguard exchanges effectively (Jørgensen and Vintergaard, 2006). Relational embeddedness characterises relationships to other network partners, and the corporate venture will have to learn what can be gained from both strong and weak tie binding. Likewise, venture investors also have to manage structural embeddedness (the positional perspectives). Structural embeddedness emphasizes the informational value of the structural position a corporate venture company can occupy in the network (Gulati, 1998). If corporate venture managers place themselves between two or more unconnected actors it will offer a very powerful position to set agendas for future developments (cf. Burt's (1992) argument on structural holes). This position, for example, can be found between the entrepreneur and a co-investor.

4.1.3 Contextualized knowledge

It is argued in several of the studies in this thesis, as well as in the literature review, that knowledge creation in the early phases of the venture process has to take place within a broader audience - one that is heterogeneous and transdisciplinary (Gibbons et al., 1994). This collaborative arrangement is often referred to as Mode 2 research (Nowotny et al., 2001), Triple Helix (Ernø-Kjølhede, 2001; Ernø-Kjølhede, Husted, Mønsted and Wenneberg, 2003; Leydesdorff and Etzkowitz, 1996, 1998) etc. As illustrated in the “early stage knowledge creation model for corporate venturing”, negotiation and contextualization of knowledge takes place in each of the activities and between the corporate venture and its external network.

Interaction with the external network and the built-in process of contextualization can help the corporate venture to avoid getting caught up in its own dominant logic. This dominant logic filters out ideas and behaviours that do not match the corporate venture's understanding of its business and makes it hard for new ideas to survive. Burgelman et al. (1996) declares that the only way to make unfitted ideas survive is by having some level of “strategic dissonance”.

However the transformation process that runs from one strategic intention to another can be very difficult.

Firm-specific resources can be thought of as the strengths and weaknesses of particular companies, and can be of both a tangible and an intangible nature (Wernerfelt, 1995). When companies form a network, it is exactly these strengths and weaknesses they seek to combine, to foster resource synergy and to test their knowledge. Combining supplementary and hitherto only tenuously related knowledge bases is considered to be particularly valuable in contextualising knowledge and ideas for creativity and innovation (Powell et al., 1998). Collaboration with firms assessing complementary resources could provide an opportunity for the corporate venture to compensate for weaknesses in their existing resources, and accordingly allow the corporate venturing firm to combine the resources of network partners with their own resource sets, thereby creating an enhanced resource base for contextualisation.

An important element of working with contextualized and negotiated knowledge production is early involvement in the development process. This argument was stressed in most of the studies of this thesis. From the corporate venture literature and Vintergaard and Husted (Submitted) we know that investment criteria are part of the evaluation strategy. However, an investment analysis based on the criteria alone will always reflect the information asymmetry of the investment. Instead, the inclusion of a broader set of actors with different backgrounds and perceptions to make the evaluation will make it more cohesive. This will additionally reduce the need to transfer risk to the entrepreneur as a clearer and more common goal will be achieved. This will also result in better exploitation of the staged investments, as the stages can better be defined and evaluated.

Through the contextualisation process, venture-specific information will be revealed and hereby lower the level of asymmetric information. This changes the venture process from selection to reshaping. In Study IV (Vintergaard, 2005) it is claimed that only participation in the core collaborative arrangements will lead the corporate venture to be competitive. An important, but rarely noted discussion in this thesis concerns the specific capabilities that are needed for assigning meaning to the different knowledge resources from the network. An area for future studies could be how contextualisation can be systematically organized and how knowledge can subsequently can be condensed into strategic action.

From a management standpoint, working with the early phases (and most likely also the later phases) demands a broader understanding of how knowledge is created and tested. In the early stages, contextualization is illustrated by vertical processes between the corporate venture organization and its external network. Nowotny et al. (2001) argues that a space (an *agora*) has

to be created where issues concerning venture ideas and their potential outcome can be debated. Investors can greatly benefit from addressing relational and structural embeddedness when developing this space for contextualisation. For this to happen it is important that the corporate venture firms develop a reputation in the market as it will also enable them to receive more knowledge for innovation, more venture proposals, make them better prepared for evaluation, and provide them with a central point in the network for contextualizing knowledge. Thus it is important that the corporate venture becomes the preferred partner in the network of entrepreneurs, but also in the broader network of related venture investors, universities, innovation centres etc. Under these structures investors have to develop a conscious understanding of how to test knowledge of the venture's future development opportunities and their own capacity to manage these.

By bringing together the arguments of this thesis in this chapter I hope it has contributed to a more profound focus on the early phases of the venture process and also added important dynamic dimension to the process. This contributions have uncovered important insight to how new venture opportunities are created, discovered and evaluated. Equally important, arguments have been made that the development process to undertake these actives is driven by learning process backward and forward in the value chain and in between a variety of actors. Such insight makes the venture process less easy to describe. It does however create a valuable foundation for developing management tools and future theories.

As the above conclusion show, this thesis has developed new components of a corporate venture model. However, much work is still needed in the field and there are still many areas that require further attention. Sir Isaac Newton has often been quoted for saying:

“If I have been able to see further, it was only because I stood on the shoulders of giants”⁴.

Likewise the contribution of this thesis has only gained its momentum because of previous researcher's insightful work. However the thesis contributes new and insightful provisional theories to the field and open up for new and future discussions. Hopefully the arguments presented will also serves as a source of inspiration for future authors.

⁴ A quotation from Sir Issac Newton's letter to Robert Hooke (February 5, 1676).

5. REFERENCES

- Ackoff (1983). An interactive view of rationality. *Journal of Opr. Res. Soc.* 34.
- Ahuja, G. (2000). The Duality of Collaboration. *Strategic Management Journal* 21: 317–343.
- Albrinck, J., Hornery, J., Kletter, D. and Neilson, G. (2000). Adventures in Corporate Venturing. *Strategy and business*.
- Albrinck, J., Hornery, J., Kletter, D., and Neilson, G. (2001). Adventures in Corporate Venturing. *Strategy+Business*, 22: 119-129.
- Aldrich, H. (1979). *Organizations and Environments*. Englewood Cliffs, NJ: Prentice-Hall.
- Aldrich, H. (1999). *Organizations Evolving*. London: Sage Publications.
- Amit, R., Glosten, L. and Muller, E. (1990). Entrepreneurial ability, venture investments, and risk sharing. *Management Science* 38(10): 1232-1245
- Anderson J.C, Håkansson H and Johanson J (1994). Dyadic Business Relationships within a Business Network Context. *Journal of Marketing* 58: 1-15.
- Ansoff, I.H. (1965). *An Analytical Approach to Business Policy for Growth and Expansion*. New York, McGraw-Hill.
- Arora, A. and Gambardella, A. (1990). Complementarity and external linkages. *The Journal of Industrial Economics*, 38(4): 361-379.
- Arrow (1973). The Theory of Discrimination. In Ashenfelter and Rees, eds., *Discrimination in Labor Markets*. Princeton: Princeton University Press, pp. 3-33.
- Arrow K. (1974). General Economic Equilibrium: Purpose, Analytic Techniques, Collective Choice. *American Economic Review*, 64, (3), 253-272.
- Bach, A., Seufert, A., and Von Krogh, G. (1999). Towards knowledge networking. *Journal of knowledge management*. 3: 180-1090.
- Bachher, J.S. and Guild. P.D. (1996). Financing early stage technology based companies: investment criteria used by investors. *Frontiers of Entrepreneurship Research*. 363–376.
- Balakrishnan, S. and Wernerfelt, B. (1986). Technical Change, Competition and Vertical Integration. *Strategic Management Journal*. 7: 347-359.
- Balboa M. & Marti, J. (2000). Determinants of Private Equity Fundraising in Western Europe. Working Paper, European Financial Management Association, Spain.
- Barley, S.R., Freeman, J. and Hybels, R.C. (1992). Strategic alliances in commercial biotechnology. In N. Nohria and R. Eccles (eds.), *Networks and Organizations: Structure, Form and Action*: 311-347. Boston: Harvard Business School Press
- Barnea, A., Haugen, R.A., Senbet, L. W. (1981). Market Imperfections, Agency Problems, and Capital Structure: A Review. *Financial Management*. 10(2): 7-22
- Barney J (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management* 17(1): 99–120.
- Bavelas, A. (1948). A metemathical model for group structure. *Applied Anthropology*. 7: 16-30.
- Berlin M. (1998). That thing venture capitalists do. *Business Review*. Philadelphia, PA: Federal Reserve Bank of Philadelphia (Can be retrieved from <http://www.phil.frb.org/files/br/brj98mb.pdf>).
- Bhave, M.P. (1994). A process model of entrepreneurial venture creation. *Journal of Business Venturing*, 9(3): 223-242.
- Biggadyke, R. (1979). The Risky Business of Diversification. *Harvard Business Review*. 57: 103-111.
- Bijleveld, C.C.J., van der Kamp, LiT., Mooijaart, A., van der Kloot, W.A., van der Leeden, R., & van der Burg, E. (1998). Longitudinal data analysis: Designs models and methods. London: Sage.
- Birley, S. (1984). Finding the new firm. *Proceedings of the Academy of Management*: 64-68.
- Birley, S. and MacMillan, I. (1995). *International entrepreneurship*. Routledge, London.
- Black S. and Gilson R. (1998). Venture capital and the structure of capital markets: banks versus stock markets. *Journal of Financial Economics*. 47: 234-277.
- Blau, P.M. (1968) The Hierarchy of Authority in Organizations. *American Journal of Sociology* 73: 453-67.
- Block, Z and MacMillan, I. (1995). Growing concern: Milestones for successful venture planning. *Harvard Business Review*.
- Block, Z. (1982). Can Corporate Venturing Succeed? *Journal of Business Strategy*. 3(2): 21-34.
- Block, Z. and MacMillan, I. C. (1993). *Corporate Venturing - Creating New Businesses within the Firm*. Cambridge, MA.: Harvard Business School Press.
- Block, Z. and Subbanarasimha, P.N. (1989). *Corporate Venturing: Practices and Performance in the U.S and Japan*, Working Paper, Center of Entrepreneurial Studies, Stern School of Business, New York University.
- Bobrowski, S. (2000). *Oracle 8i for Linux Starter Kit*. Berkeley, CA: McGraw-Hill.
- Bouty, I. (2000). Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Review*, 43(1): 50-65.
- Brazeal, DV (1993). Organizing for internally developed corporate ventures. *Journal of Business Venturing*. 8(1): 75-90
- Bresser, K.F. (1989). Kollektive Unternehmensstrategien. *Zeitschrift für Betriebswirtschaft*. 59: 545-564.

- Brown, J. S. and Duguid, P. (1991). Organizational Learning and Communities-of-practice: Toward a unified view of working, learning, and Innovation. *Organizational Science*, 2(1).
- Brudenell, I. (1997). A grounded theory of protecting recovery during transition to motherhood. *American Journal of drug and Alcohol Abuse*.
- Bunders, Broerse and Zweekhorst (1999). The Triple Helix Enriched with the User Perspective: a View from Bangladesh. Chicago, Illinois : Technology Transfer Society. 24 (2/3): 235-246.
- Burgelman, A. R. and Doz, L. Y. (2001). The Power of Strategic Integration. *MIT Sloan Management Review*. 42(3): 28-38.
- Burgelman, R., Madique, M. and Wheelwright, S. (1996). *Strategic Management of Technology, Innovation*. 2nd ed, Chicago: Irwin.
- Burgelman, R.A. (1983). A Process Model of Internal Corporate Venturing in the Diversified Major Firm. *Administrative Science Quarterly*. 28: 223-244.
- Burgelman, R.A. (1984). Designs for Corporate Entrepreneurship. *California Management Review*. 26: 154-166
- Burgelman, R.A. (1985). Managing the new venture division: Research findings and implications for strategic management. *Strategic Management Journal*. 6(1): 39-54.
- Burgelman, R.A. (1996). A Process Model of Strategic Business Exit: Implications for an Evolutionary Perspective on Strategy, *Strategic Management Journal*, 17(Summer Special Issue): 193-214.
- Burgelman, R.A. and Grove, A.S. (1996). Strategic Dissonance. *California Management Review*. 38(2): 8-28
- Burgelman, R.A. and Sayles, L. R. (1986). *Inside Corporate Innovation: Strategy, Structure and Managerial Skills*. Free Press.
- Burt, R. (1980). Autonomy in a social topology. *American Journal of Sociology*. 85: 892-925.
- Burt, R. (1992). The Social Structure of Competition. In: Nohria N, Eccles G. E (eds) *Networks and Organisations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 57-91.
- Bush, V; science adviser to President Roosevelt. (July 1945). As we may think. *The Atlantic Monthly*, 176(1): 101-108.
- Bygrave, W.D. and Hofer, C.W. (1991) Theorizing about entrepreneurship. *Entrepreneurship Theory and Practice*. (16)2: 13-22.
- Bygrave, W.D. (1987). Syndicated Investments by Venture Capital Firms: A Networking Perspective. *Journal of Business Venturing*. 2(2): 139-154.
- Bygrave, W.D. (1988). The structure of the investment networks of venture capital firms. *Journal of Business Venturing*. 3(2): 137-157.
- Bygrave, W.D. and Timmons, J. (1992). *Venture Capital at the Crossroad*. Harvard Business School Press, Boston.
- Bygrave, W.D. and Zacharakis, A. (2004) *The Portable MBA in Entrepreneurship*. 3rd edition.
- Byron, D. L. (1994). How internal venture groups innovate. *Research Technology Management* 37(2): 38-42.
- Callahan J. and Muegge S. (2003). Venture Capitalist's Role in Innovation: Issues, Research and Stakeholder Interests. In L.V.Shavinina (Ed), *The International Handbook on Innovation*, Elsevier Science.
- Carlile, P.R. and Reberntisch, E.S. (2003). Into the black box: the knowledge transformation cycle. *Management Science*. 49(9): 1180-1195.
- Carlsson B., Jacobsson S., Holmén M. and Rickne A. (2002). Innovation Systems : Analytical and methodological issues. *Research Policy*, 31, 233-245.
- Casson, M. (1982). *The Entrepreneur*. Barnes & Noble, Totowa, N.J.
- Casson, M. (1997). Institutional Economics and Business History: A Way Forward? *Business History*. 39(4): 151-171.
- Charmaz, K. (1983). The grounded theory method: An explication and interpretation. In R. M. Emerson (Ed.), *Contemporary field research* (pp. 109-126). Boston: Little, Brown and Company.
- Charney A. and Libecap G. (2000). The economic contribution of entrepreneurship education: An evaluation with an established program. *Advances in the Study of Entrepreneurship, Innovation, & Economic Growth*. 12: 1-45
- Chesbrough, H.W. (2000). Designing corporate ventures in the shadow of private venture capital. *California Management Review*. 42(3): 31 -50
- Chesbrough, H.W. (2002). *Making Sense of Venture Capital*. Harvard Business Review, March.
- Chiesa, V. (2001). *R & D Strategy and Organisation: Managing Technical Change in Dynamic Contexts*, London: Imperial College Press.
- Chrisman J., Timothy H. and Fraser S (1995). Faculty entrepreneurship and economic development: The case of the University of Calgary. *Journal of Business Venturing*. 10(4): 267-281.
- Chrisman, J., Hynes, T. and S Fraser. (1995). Faculty entrepreneurship and economic development: The case of the University of Calgary. *Journal of Business Venturing*. 10: 267-81.
- Christensen, J.L. (1992). The role of finance in industrial innovation – Aspects of financial systems. Ph.d. dissertation Aalborg University.
- Christensen, J.L. (1998). Private investors bidrag til innovation. Erhvervs Udviklings Rådet. DISKO-projectet.
- Christensen, J.L. (2000). Effekter af venture kapital på innovation og vækst. Erhvervsministeriet.
- Christensen, J.L. and Lundvall, B. (2004). *Product Innovation, Interactive Learning and Economic Performance*. Research on technological innovation, management and policy. Vol. 8. Elsevier.

- Christensen, J.L., Gregersen, B. and Rogaczewska, A. P. (1999). Vidensinstitutioner. DISKO-Projektet: Rapport nr. 8. Erhvervsfremme Styrelsen. Erhvervsministeriet.
- Christensen, Madsen and Peterson (1994). Conceptualizing Entrepreneurial Opportunity Identification. In Hills Marketing and Entrepreneurship: Research Ideas and Opportunities, Quorum, pp. 61-75.
- Clardy, A. (1997). Studying Your Workforce. Thousand Oaks, Sage.
- Clark, B. (1995). Places of Inquiry – Research and advanced education in modern universities. Univ. California Press, Berkeley, CA.
- Clark, K.B. and Fujimoto, T. (1989). Lead Time in Automobile Product Development: Explaining the Japanese Advantage. *Journal of Engineering and Technology Management*. 6: 25-58.
- Cloutier, LM. and Boehlje, M. (2002). Innovation management under uncertainty: A system dynamics model of R&D investments in biotechnology. In Morecroft et al. (eds). *Systems Perspectives on Resources, Capabilities, and Management Processes*. Amsterdam: Pergamon.
- Coase, R. (1937). The nature of the firm. *Economica N.S.*, 4, 386-405.
- Coehoorn, C. (1995). The Dutch Innovation Centers. Implementation of Technology or Facilitation of small enterprises (dissertation).
- Cohen, W.M. and Levinthal, D.A. (1990). Absorptive Capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*. 35.
- Coleman, J. S., Katz, E. and Menzel, H. (1966). *Medical Innovation: A Diffusion Study*, Indianapolis, The Bobbs-Merrill Company, Inc.
- Collins, H. (1985). *Changing order: Replication and induction in scientific practice*. London: Sage Publications.
- Cook, K., Emerson, M.R., Gillmore, and Yamagishi (1983). The Distribution of Power in Exchange Networks: Theory and Empirical Results. *American Journal of Sociology*. 89: 275–305.
- Cook, K.S. and Emerson R.M. (1978). Power, Equity, and Commitment in Exchange Networks. *American Sociological Review*. 43: 721–739.
- Cooke, P. (1996). The new wave of regional innovation networks: analysis, characteristics and strategy. *Small Business Economics*. 8: 159-171.
- Cooke, P. (1998). Introduction: Origins of the Concept. in *Regional Innovations Systems*. Braczyk, Cooke and Heidenreich (eds.). London: UCL Press.
- Cooke, P. (2002). Biotechnology clusters as regional, sectoral innovation systems. *International Regional Science Review*, 25, (1), 8-37.
- Cooper, A. C. (1981). Strategic management: New ventures and small business. *Long Range Planning*: 14(5), 39-45.
- Cooper, R. G. (1993). *Winning at New Products*. 2nd edition. Reading, MA: Addison-Wesley.
- Cooper, R.G. (1990). Stage-Gate Systems: A New Tool for Managing New Products. *Business Horizons*. 33(3): 4454.
- Cross R., Prusak L. and Parker A. (2002). *Where Work Happens: The Care and Feeding of Informal Networks in Organizations*. Institute for knowledge-based organizations, IBM.
- Dahl M.S. & Pedersen C.Ø.R. (2002). *Informal Networks in a Dynamic Regional Cluster*. Paper for the Druid Academy Winter Ph.D. Conference 2002 on Industry Evolution, 17-19 January 2002.
- Dahmer, B. (1995). The Internet and you. *Training & Development*, Alexandria; 49(6).
- Damodaran, A. (2002). *Investment Valuation: Tools and Techniques for Determining the Value of Any Asset*. Wiley. 2nd Edition.
- Day, D. (1994). Raising radicals: different processes for championing innovative corporate ventures. *Organization Science*. 5: 148-72.
- DeLorme and Reid, (1999). *Moviegoers Experiences and Interpretations of Brands in Films*
- Dillon, P. (1997). Make a clean getaway with exit strategies - Planning ensures liquidity before selling, going public or passing the business on. *Orlando Business Journal*.
- Dobbin F.R. & Dowl T. (1997). How policy shapes competition: Early railroad foundings in Massachusetts. *Administrative Science Quarterly*, 42, 501-29.
- Dotzler, F. (2001). What Do Venture Capitalists Really Do, and Where They Learn to Do It? *Journal of Private Equity*, 5(1):6-12.
- Dougherty, D. (1995). Managing your core incompetencies for corporate venturing. *Entrepreneurship Theory and Practice* (Spring): 113-135.
- Drucker, P.F (1974). *Management: Tasks, Responsibilities, Practices*, Harper & Row, New York.
- Drucker, P.F. (1974). *The Practice of management*. New York: Harper & Row.
- Drucker, P.F. (1986). *Innovation by Design-Modern Office Technology*. Cleveland.
- Drucker, P.F. (1995). *Innovation and Entrepreneurship*. Harper Business. New York.
- Dyer J. H, Singh H (1998) The Relational View: Cooperative Strategy and Sources of Interorganisational Competitive Advantage. *The Academy of Management Review*. 23:660–679.
- Eckhardt, J. and Shane, S. (2003). Opportunities and Entrepreneurship. *Journal of Management*. 29: 333-349.
- Edquist C. (ed.) (1997). *Systems of innovation: Technologies, Institutions and Organizations*. London: Pinter/Cassell.

- Edquist C. and Johnson B. (1997). Institutions and organizations in systems of innovation, in C. Edquist (ed.), *Systems of innovation: Technologies, Institutions and Organizations*. London and Washington: Pinter/Cassell Academic.
- Edquist C. and McKelvey M. (Eds.) (2000). *Systems of innovation: Growth, Competitiveness and Employment*. An Elgar Reference Collection (two volumes), Cheltenham: Edward Elgar.
- Edquist C., (1997). Systems of innovation approaches – their emergence and characteristics in Edquist, C. (ed.) *Systems of innovation: Technologies, Institutions and Organizations*. London: Pinter/Cassell.
- Eisenhardt, K.M. (1989). Agency theory: an assessment and review. *Academy of Management Review*. 14(1): 57-74.
- Eisenhardt, K. (1999). Building theories from case study research. *Academy of Management Review*. 14: 532-550.
- Elango B., Fried V.H., Hisrich R.D. and Poloncheck A. (1995). How venture capital firms differ. *Journal of Business Venturing*, 19, 157-179.
- Elfring, T. & Foss N. J. (2000). *Competence building -understanding the role of internal venturing and spinoffs*. JAI Press, Stamford.
- Elfring, T. and Foss J.N. (1997). *Corporate Renewal through Internal Venturing and Spin-offs – Perspectives from Organisational Economics*. Revised Draft. Copenhagen Business School.
- Eliasson G. (2000). Industrial policy, competence blocs and the role of science in economic development. *Evolutionary Economics*, 10, 217-241.
- Ernø-Kjølhede, E. (2001). *Managing collaborative research in the European “Triple Helix”*, PhD-thesis. MPP
- Ernø-Kjølhede, E. Husted, K., Mønsted, M. and Wenneberg, S. (2003). Managing university research in the triple helix. *Science and Public Policy*. 28(1): 33-39.
- Ettlie, J.E. (2000). *Managing Technological Innovation*. New York: John Wiley & Sons, Inc.
- Etzkowitz H., Guldbrandsen M. and Levitt J. (2001). *Public Venture Capital: Sources of Government Funding for Technology Entrepreneurs*. New York: Aspen/Kluwer.
- Etzkowitz, H. (1998). The norms of entrepreneurial science: cognitive effects of the new university-industry linkages. *Research policy*. 27: 823-833.
- Etzkowitz, H. (2002). *MIT and the Rise of Entrepreneurial Science*. London: Routledge.
- Etzkowitz, H. (2003). Research groups as ‘quasi-firms: The invention of the entrepreneurial university. *Research Policy*. 32(1):109-121.
- Etzkowitz, H. (2005). The renewal of venture capital: Toward a counter-cyclical model. *Technology Analysis and Strategic Management*. 17(1): 73-87.
- Etzkowitz, H. and Leydesdorff, L. (1997). *Universities in the Global Knowledge Economy: A Triple Helix of University-Industry-Government Relations*. London: Cassell Academic.
- Etzkowitz, H., and Leydesdorff, L. (1998). The Endless Transition: A "Triple Helix" of University-Industry-Government Relations. *Minerva*, 36: 203-8.
- Etzkowitz, H., Schuler, E. and Gulbrandsen, M. (2000). The Evolution of the Entrepreneurial University. In Jacobs, M. and Hellström, T (eds.) *The Future of Knowledge Production in the Academy*, Buckingham (UK): Society for Research into Higher Education and Open University Press. pp. 40-60.
- Evan D. and Jovanovic B. (1989). An estimated model of entrepreneurial choice under liquidity constraints. *Journal of Political Economy*. 97(4):808-827.
- EVCA (2004a) *Corporate Venturing European Activity Update*.
- EVCA (2004b) *Annual Survey of Pan-European Private Equity and Venture Capital Activity*.
- Faulkner, R. R., and Anderson, A. B. (1987). Short-Term Projects and Emergent Careers: Evidence from Hollywood. *American Journal of Sociology*. 92(4): 879-909.
- Fenn G.W. and Liang N. (1998). New resources and new ideas: Private equity for small businesses. *Journal of Banking and Finance*, 22: 1077-1084.
- Fernandez (2004). On an iteration method for eigenvalue problems. *Journal of. Phys. A: Math. Gen.* 37: 6173-6180.
- Floyd, S.W. and Wooldridge, B. (1999). Knowledge creation and social networks in corporate entrepreneurship: The renewal of organizational capability. *Entrepreneurship Theory and Practice*, 23(3): 123–143
- Foo, M.D., Wong, P.K. and Ong A. (2005). Do others think you have a viable business idea? Team diversity and judges’ evaluation of ideas in a business plan competition. *Journal of Business Venturing*
- Ford D, Håkansson H and Johanson J (1986) How Do Companies Interact? In: Ford D (ed) *Understanding Business Markets*. The Dryden Press, pp 55–67.
- Foss, N.J. (1994). *The Austrian School and Modern Economics*. Handelshøjskolens Forlag.
- Foss, N.J. and Kline, P. G. (2002). *Entrepreneurship and the Firm – Austrian Perspectives on Economic Organization*. Edward Elgar Publishing.
- Frederiksen, F., Hemlin, S. and Husted, K. (2004). The role of knowledge management in R&D: a survey of Danish R&D leaders’ perceptions and beliefs. *International Journal of Technology Management*. 28(7/8).
- Freeman J. (1999). Venture Capital as an Economy of Time. In Roger Th., Lenders A.J. and Gabbay S.M. (Ed.), *Corporate Social Capital and Liability*. Kluwer Academic Publishers, Dordrecht.
- Freeman, C. (1976). *The Economics of Industrial Innovation*, London: Penguin Books.
- Freeman, C. (1988). Japan: a new national system of innovation?, in Giovanni Dosi, Chris Freeman, Richard R. Nelson, Gerald Silverberg and Luc Soete (eds.), *Technical Change and Economic Theory*. London: Pinter.
- Freeman, L.C. (1977). A set of measures of centrality based on betweenness. *Sociometry*. 40: 35-41.

- Fried, V.H. and Hisrich, R. D. (1994). Toward a model of venture capital investment decision making. *Financial Management*, 23(3): 28-37.
- Frøsløv C.J. (2002). Corporate strategy and the management of innovation and technology. *Industrial and corporate change*, 11(2): 263-288.
- Galbraith, J.R. (1982). Designing the Innovating Organization. *Organizational Dynamics*. Winter 5-25.
- Gambardella, A. (1995). *Science and Innovation: The US Pharmaceutical Industry During the 1980s*. Cambridge: Cambridge University Press.
- Gartner, W., Carter, N. and Hills, G. (2003). The Language of Opportunity. In C. Steyaert & D. Hjort (eds.), *New Movements in Entrepreneurship*. Cheltenham, UK: Edward Elgar.
- Garud, R. and Kumaraswamy, A. (1993). Changing Competitive Dynamics in Network Industries: An Exploration of Sun Microsystems' Open Systems Strategy". *Strategic Management Journal*. 14: 351-369.
- Garud, R., Rattan, N.P. and Baruch, S.Z. (1997). *Technological Innovation. Oversights and Foresights*. Cambridge University Press.
- Gerlach, M.L. (1992). *Alliance Capitalism: The Social Organization of Japanese Business*. Berkeley, California: University of California Press.
- Gibbons, M., Scott, P., Nowotny, H., Limoges, C., Schwartzmann, S., and Trow, M. (1994). *The new production of knowledge – the dynamics of and research in contemporary science societies*. London: Sage Publications.
- Gifford, S. (1997). Limited attention to the role of the venture capitalist. *Journal of Business Venturing*.
- Ginsberg, A. & Hay, M. (1994). Confronting the challenges of corporate entrepreneurship: Guidelines for venture managers. *European Management Journal*. 12: 382-389.
- Ginsberg, A. (2001). Blue chip entrepreneurs: Corporate venturing and creative destruction, *STERNbusiness*. Fall/Winter 12-17.
- Glasser, B.G. (1978). *Theoretical sensitivity: advances in the methodology of grounded theory*. Mill Valley, Ca: Sociology Press.
- Glasser, B.G. (1992). *Basics of grounded theory analysis: emergence vs. forcing*. Mill Valley, Ca. Sociology Press.
- Glasser, B.G. (1998). *Doing Grounded Theory: Issues and Discussions*. Sociology Press, Mill Valley, Calif.
- Glasser, B.G. and Strauss, A. (1967). *The discovery of grounded theory. Strategies of qualitative research*, London. Wiedenfeld and Nicholson.
- Gompers, P.A. (1996). Grandstanding in Venture Capital Industry. *Journal of Financial Economics* 42: 133-156.
- Gompers, P.A. and Lerner, J. (1998). What Drives Venture Capital Fundraising? *Brookings Papers on Economic Activity: Microeconomics*, 49-192.
- Gompers, P.A. and Lerner, J. (1999). *The Venture Capital Cycle*. Cambridge, Massachusetts: MIT Press.
- Gompers, P.A. and Lerner, J. (2001). The Venture Capital Revolution. *Journal of Economic Perspectives*. 15(2): 145-169.
- Gompers, P.A. (1995). Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance*. 50(5): 1461-1489.
- Goodman, M. and Goodman (1976). Some management issues in temporary systems: a study of professional development and manpower – the theatre cases. *Administrative Science Quarterly*. 21: 94-501
- Gorman, M. and Sahlman, W.A. (1989). What Do Venture Capitalists Do? *Journal of Business Venturing* 4: 231–248.
- Granovetter, M.S. (1973). The Strength of Weak Ties. *American Journal of Sociology* 78:1360-1380
- Granovetter, M.S. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology* 91: 481-510.
- Granovetter, M.S. (1992). Problems of Explanation in Economic Sociology. In: Nohria N, Eccles G. E (eds) *Networks and Organisations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 25-56.
- Grant, M.R. (2000). Shift in the world economy – the drivers of knowledge management. In Despres, C. and Daniele C. *Knowledge horizons -the present and the promise of knowledge management*. Butterworth-Heinemann, Boston.
- Grant, R.B. (1991). A Resource Based Theory of the Competitive Advantage: Implications for Strategy Formulation. *California Management Review*. 33(3).
- Greene, P.G., Bruch, C.G and Hart, M.M (1999). The corporate venture champion: A resource-based approach to role and process. *Entrepreneurship Theory and Practice*, 23(3): 103-122.
- Greiner, L. (1972). Evolution and Revolution as Organizations Grow. *Harvard Business Review*, 50(4): 37-46.
- Griliches, Z. (1992). The search for R&D spillovers. *Scandinavian Journal of Economics*, 94, Supplement 29-47.
- Gulati, R. (1998). Alliances and networks. *Strategic Management Journal*. 19: 293-317.
- Gulati, R., Nohria N and Zaheer A (2000). Strategic Networks. *Strategic Management Journal*. 21: 203–215.
- Guth, W.D. and Ginsberg, A. (1990). Guest editor's introduction: Corporate entrepreneurship. *Strategic Management Journal* 11: 5-15.
- Haddad, M. and Harrison, A. (1993). Are there positive spillovers from direct foreign investment? Evidence from panel data for Morocco. *Journal of Development Economics*, 42(1): 51-75.
- Hage, J. and Hollingsworth R. (2000). A Strategy for the Analyses of Idea Innovation Networks and Institutions. *Organization Studies*. 21(5): 971-1004

- Håkansson, H. and Johanson, J. (1993). The network as a Governance Structure: Interfirm Cooperation beyond Markets and Hierarchies. In: Grabher G (ed) *The embedded Firm*. Routledge, London, pp 35-51.
- Håkansson, H. and Snehota, I. (1997A). No business is an Island: The Network Concept of Business Strategy. In: Ford D (ed) *Understanding Business Markets*. Thomson Learning, 2002, 3rd edn, pp 150-161.
- Håkansson, H. and Snehota, I. (1997B). Analysing Business Relationships. In: Ford D (ed) *Understanding Business Markets*. The Dryden Press, 2 edn, pp 151-175.
- Hall, J., and Hofer, C.W. (1993). Venture Capitalists' Decision Criteria in New Venture Evaluation. *Journal of Business Venturing*. 8: 25-42.
- Hambrick D.C (1993). Some Tests of the Effectiveness and Functional Attributes of Miles and Snow's Strategic Types. *The Academy of Management Journal*. 26: 5-26.
- Hamel, G. and Prahalad, C. K (1996). The Core Competence of the Corporation. In: Goold M, Sommers K. L (eds) *Managing the Multibusiness Company – strategic issues for diversified groups*. Routledge, London, pp 218-239.
- Hannan, M. (1976). *Venture management – a game plan for corporate growth and diversification*. McGraw-Hill Book Company
- Hannan, M.T. and Freeman, J. (1977). The population ecology of organizations. *American Journal of Sociology*. 82: 929-964.
- Hannan, M.T. and Freeman, J. (1984). Structural inertia and organizational change. *American Sociological Review*. 49: 149-164.
- Hansen, E.L. and Bird, B. J. (1997). The Stages Model of High-Tech venture founding. *Tried but True? Entrepreneurship Theory and Practice*. 22(4): 111-122.
- Hansen, M. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organizational sub-units. *Administrative Science Quarterly*, 44: 82-111.
- Harding, R. (2000). Venture capital and regional development: Towards a venture capital system. *Venture Capital*, 2(4): 287.
- Hardymon, G.F., DeNino, M.J. and Salter, M.S. (1983). When Corporate Venture Capital Doesn't Work. *Harvard Business Review*. 61: 114-120.
- Harrison, R.T. and Mason, C.M. (1993). Finance for the growing business: the role of informal investment, *National Westminster Bank Quarterly Review*, May:17-29.
- Harrison, R.T. and Mason, C.M. (1996). *Informal Venture Capital: Evaluating the Impact of Business Introduction Services*. Woodhead-Faulkner: Hemel Hempstead.
- Harvey, J., Pettigrew, A. and Ferlie, E. (2002). The Determinants of Research Group. *Journal of Management Studies*. 39(6): 747-774.
- Hayek, F. (1945). The Use of Knowledge in Society. *American Economic Review*, XXXV(4): 519-30.
- Helfat, C.E. and Teece D.J. (1987). Vertical integration and risk reduction. *Journal of Law, Economics, and Organization*. 3: 47-67.
- Hellmann T. (1997). Venture Capital: A challenge for Commercial Banks. *Journal of Private Equity*. 1(1):49-55.
- Hellmann T. and Puri, M. (2000). The interaction between Product Market and Financing Strategy: The role of Venture Capital". *Review of Financial Studies*. 13(4).
- Hellström, C. and Hellström, T. (2002). Highways, Alleys and By-lanes -Charting the Pathways for Ideas and Innovation in Organizations. *Creativity and Innovation Management*. 11(2): 107-114.
- Helström, T., Jacob, M. and Wenneberg, S.B.R (2003). The "discipline" of post-academic science - Reconstructing the paradigmatic foundations of a virtual research institute. *Science and public policy*. 30(4): 251-260.
- Henderson, R.M., and Clark K.B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*. 35: 9-30.
- Hesterly, W.S. and Zenger T.R. (1993). The myth of monolithic economics: fundamental assumptions and the use of economic models in policy and strategy research. *Organization Science* 4(3): 496-510.
- Hills, G.E., Lumpkin, G.T., Singh, R.P. (1997). Opportunity recognition: perceptions and behaviors of entrepreneurs. *Frontiers of Entrepreneurship Research*. Babson College, Wellesley, MA.
- Holm, D.B, Eriksson, K. and Johanson, J. (1996). Business Networks and Cooperation in International Business Relationships. *Journal of International Business Strategies*. 27: 1033-1053.
- Hornsby, J. S., Kuratko, D. F. and Zahra S.A. (2001). Middle managers perception of the internal environment of corporate entrepreneurship: assessing a measurement scale. *Journal of Business Venturing*.
- Hougaard, S. and Bjerre M. (2002). *Strategic Relationships Marketing*. Samfundslitteratur.
- Huffman, D. and Quigley, J. (2002). The role of the university in attracting high tech entrepreneurship: a Silicon Valley tale. *The Annals of Regional Science*. 36(3): 403-419.
- Husted, K. and Michailova, S. (2002). Diagnosing and fighting knowledge sharing hostility. *Organizational Dynamics*. 31(1): 60-73.
- Husted, K. and Vintergaard, C. (2004). Stimulating innovation through corporate venture bases. *Journal of World Business*. 39(3): 296-306
- Huxham, C. and Vangen, S. (2000). Leadership in the shaping and implementation of collaboration agendas: How things happen in a (not quite) joined-up world. *Academy of Management Journal*. 43: 1159-1176.

- Ibarra, H. (1992). Structural Alignments, Individual Strategies, and Managerial Action: Elements Toward a Network Theory of Getting Things Done. In: Nohria N, Eccles G. E (eds) *Networks and Organisations: Structure, Form and Action*. Harvard Business School Press, Boston, pp 165-188.
- Imai, Nonaka and Takeuchi (1985). *Managing the new product development process: How Japanese companies learn and unlearn*. In R. Hayes, K. Clark, and P. Lorenz (eds.), *The Uneasy Alliance: Managing the Productivity-Technology Dilemma*: 337-375. Boston: Harvard Business School Press.
- Isaksson, A., Cornelius, B., Landström, H. and Junghagen, S. (2004). Institutional theory and contracting in venture capital: the Swedish experience. *Venture Capital*. 6(1): 47-71.
- Jaffe, A.B. (1996). *Economic Analysis of Research Spillovers: Implications for the Advanced Technology Program*. Washington, D.C.: U.S. Department of Commerce, National Institute of Standards and Technology, Advanced Technology Program.
- Jarillo, J.C. (1988). On Strategic Networks. *Strategic Management Journal*. 9: 31-41.
- Jeng, L.A. and Wells, P.C. (2000). The determinants of venture capital funding: evidence across countries. *Journal of Corporate Finance*.
- Jensen, N. W. and Vintergaard, C. (2002). *Vækstfremmende faktorer for den danske venturekapitalbranche*. MPP working paper
- Johannisson, B. (1990). Economies of Overview—Guiding the External Growth of Small Firms. *International Small Business Journal* 9(1): 32–44.
- Johanson J, and Associates (1994). *Internationalisation, Relationships and Networks*. Uppsala University.
- Johanson J, and Mattsson L. G (1994). *Interorganisational Relations in Industrial System*. In: Johanson J, and Associates (eds) *Internationalisation, Relationships and Networks*. Uppsala University, pp 171-181.
- Jones, C., Hesterly, W.S., and Borgatti, S.P. (1997). A general theory of network governance: Exchange conditions and social mechanisms. *Academy of Management Review*. 22(4): 911.
- Jørgensen, H. and Vintergaard, C. (2006). *Connecting Company Strategy and Network Identity*. In: *Managing Dynamic Networks Organisational Perspectives of Technology Enabled Inter-Firm Collaboration*. Klein S. and Poulymenakou A. (eds.) Heidelberg: Springer.
- Kanter, M.R., Richardson, L. North, J and Morgan, E. (1991). Engines of progress: Designing and running entrepreneurial vehicles in established companies, the new venture process at Eastman Kodak, 1983-1989. *Journal of Business Venturing*, 6, 63-82.
- Karaömerlioglu D. and Jacobsson S. (1999). The Swedish Venture Capital Industry – an Infant, Adolescence or Grown-up? *Venture Capital*, 2, (1), 61-88.
- Katz, J.A. and Gartner, W.B., (1988). Properties of emerging organizations. *Academy of Management Review*, 13(3): 429-441.
- Keil, T. (2000). *External corporate venturing: Cognition, speed, and capability development*. Helsinki University of technology, Helsinki.
- Keil, T. (2002). *External corporate venturing: Strategic renewal in rapidly changing industries*. Quorum Books, UK
- Keil, T. (2004). *Building External Corporate Venturing Capability*. *Journal of Management Studies*. 41(5): 799-825.
- Keil, T. and Vilkamo, T. (2003). *Strategic technology partnering in high-velocity environments – Learning from a case study*. *Technovation*. 23: 193-204.
- Kenney M. and Richard F. (2000). *Venture Capital in Silicon Valley: Fuelling New Firm Formation*. In Martin Kenny (Ed.), *Understanding Silicon Valley: Anatomy of an Entrepreneurial Region*. Stanford University Press.
- King R.G. and Levine R. (1993). Finance and Growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108: 717-737.
- King, D., Covin, J. and Hegarty, H. (2003). Complementary Resources and the Exploitation of Technological Innovations. *Journal of Management*, 29(4).
- Kirzner, I.M (1973). *Competition and Entrepreneurship*, Chicago and London, The University of Chicago Press.
- Kirzner, I.M (1979). *Producer, Entrepreneur, and the Right to Property*. In Blumenfeld (eds), *Perception, Opportunity, and Profit*.
- Kirzner, I.M (1989). *Discovery, Capitalism, and Distributive Justice*. Oxford: Basil Blackwell.
- Kirzner, I.M. (1997). *Entrepreneurial Discovery and the Competitive Market Process: An Austrian Approach*. *Journal of Economic Literature*. 35: 60-85.
- Kline, S.J. (1985). Innovation is not a linear process. *Research management*. XXVIII(4): 36-45.
- Kline, S.J. and Rosenberg, N. (1986). *An Overview of Innovation*. in Landau, R. & Rosenberg, N. (eds.), Washington D.C. National Academy Press.
- Knight, R.M., (1988). *Criteria Used by Venture Capitalists*. *Journal of small business and entrepreneurship*. 1(1)
- Knight, R.M., (1994). *Criteria Used by Venture Capitalists: A Cross Cultural Analysis*. *International Small Business Journal*. 13(1).
- Kortum S. and Lerner J. (2000). Assessing the Contribution of Venture Capital to Innovation. *RAND Journal of Economics*, 31, (4), 674-692.
- Kreiner, K. and M. Schultz (1993). *Informal collaboration in R&D - the formation of networks across organizations*. *Organization studies*. 14(2): 189-209.
- Lane, P.J. and Lubatkin, M.H. (1998). *Relative Absorptive Capacity and Interorganizational Learning*. *Strategic Management Journal*. 19(5): 461-477.

- Leifer, R., McDermott, C., O'Connor, G., Peters, L., Rice, M. and Veryzer, R (2000). *Radical innovation: How mature companies can outsmart upstarts*. Harvard Business School Publishing.
- Leydesdorff, L. and Etzkowitz, H. (1996). Emergence of a Triple Helix of University-Industry-Government Relations. *Science and Public Policy*. 23: 279-286.
- Leydesdorff, L. and Etzkowitz, H. (1998). The Triple Helix as a model for innovation studies. *Science and Public Policy*. 25(3): 195-203.
- Leydesdorff, L. and Meyer, M. (2003). The Triple Helix of University-Industry-Government Relations. *Special Issue of Scientometrics*, 58(2): 191-203.
- Liles P.R. (1974). *New Business Ventures & the Entrepreneur*. Richard D Irwin Inc
- Long, W. A. and McMullan, W. E. (1984). Mapping the opportunity identification process. In J. A. Hornaday et al. (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, MA: Babson College.
- Lundgren, A. (1995). *Technological Innovation and Network Evolution*, Routledge, London.
- Lundvall B-Å and Johnson B. (2002). National Systems of production, innovation and competence building. *Research Policy*, 31, 213-231.
- Lundvall B-Å. (2000). Innovation Policy and knowledge management in the learning economy – the interplay between firm strategies and national systems of competence building and innovation, Mimeo, Department of Business Studies, Aalborg University.
- Lundvall, B.Å. (1988). Innovation as an interactive process: from user-producer interaction to the national system of innovation. in G. Dosi et al. (eds.) (1988): 349-369.
- Lundvall, B.Å. (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*. London: Pinter.
- Lyons, K.L. (2000). Using patterns to capture tacit knowledge and enhance knowledge transfer in virtual team. In *Knowledge Management and Virtual Organizations*, (Malhotra, Y. , Ed.), pp 125-43. Idea Group Publishing, Heshy, PA
- MacMillan, I., and Day, D.L. (1987). Corporate ventures into industrial markets: Dynamics of aggressive entry. *Journal of Business Venturing*. 2(1): 29-40.
- MacMillan, I.C., Block, Z. and Narashimha, P.N.S. (1986). Corporate venturing: alternatives, obstacles encountered, and experience effects. *Journal of Business Venturing* 1:177–191.
- MacMillan, I.C., Seigel, R., and Subba Narasimha, P.N. (1985). Criteria used by venture capitalist to evaluate new venture proposals. *Journal of Business Venturing*, 1: 119-128.
- Malerba F. (2002). Sectoral systems of innovation and production. *Research Policy*; 31(2): 247-264.
- Maletz, M. C., and Nohria, N. (2001). *Managing in the Whitespace*. Harvard Business Review.
- Marcus, H. and Zajonc, R.B. (1985). *The Cognitive Perspective in Social Psychology*. Random House, New York.
- Mariotti, S. and Cainarca, G. (1986). The evolution of transaction governance in the textile-clothing industry. *Journal of Economic Behavior and Organization*. 7: 351-374.
- Markides C. (1998). Strategic Innovation in Established Companies, *Sloan Management Review*. 39(3): 31–42.
- Martin, B.R. and Etzkowitz, H. (2000). The origin and evolution of the university species. *VEST Swedish Journal for Science and Technology Studies*. 13: 9-34
- Martin, P.Y., and Turner, B.A. (1986). Grounded theory and organizational research. *The Journal of Applied Behavioral Science*. 22(2): 141-157.
- Mason C.M. & Harrison R.T. (1992). Strategies for Expanding the Informal Venture Capital Market. *International Small Business Journal*, 11, (4), 23-38.
- Mason, O. J. and Strauss, K. (2004) Testicular cancer: passage through the help-seeking process for a Cohort of U.K. Men. *International Journal of Men's Health*.
- Massey, D., Quintas, P. and Wield D. (1992). *High-Tech Fantasies*, Routledge, New York, NY,
- Mattson, L.G (1986). A “Markets-as-Networks” Perspective. In: Pettegrew A (ed) *The Management of Strategic Change*. Basil Blackwell, Oxford, pp 234–256.
- Maula, M. (2001) *Coporate venture capital and the value-added for technology-based new firms*. Doctoral dissertation. Helsinki University of Technology.
- Maula, M. and Murray, G. (2000). Corporate venture capital and the exercise of the options to acquire.
- McGrath R. G. and MacMillan I. (2000). *The Entrepreneurial Mindset*. Harvard Business School Press.
- McGrath, R.G., MacMillan, I.C., and Venkataraman, S. (1994). The advantage chain: Antecedents to rents from internal corporate ventures. *Journal of Business Venturing*, 9: 351-369.
- McNally, K. (1997). *Corporate Venture Capital: Bridging the equity gap in the small business sector*, Routledge, London.
- Mehta, M.D. (2002). Nanoscience and Nanotechnology: Assessing the Nature of Innovation in these Fields. *Bulletin of Science, Technology & Society*. 22(4): 269-273.
- Michalski, R.S. (2003). *Attributional Calculus: A Representation System and Logic for Natural Induction*. Reports of the Machine Learning and Inference Laboratory, MLI 03-01, George Mason University.
- Miles, M.P., and Covin, J.G. (2002). Exploring the practice of corporate venturing: Some common forms and their organizational implications. *Entrepreneurship Theory and Practice*. 26(3): 21-40.
- Miles, R.E. and Snow, C.C. (1978). *Organizational strategy, structure and process*. McGraw-Hill Book Company, New York.

- Miles, R.E. and Snow, C.C. (1984). Fit, Failure and the Hall of Fame. *California Management Review* XXVI: 10–28.
- Miles, R.E. and Snow, C.C. (1992). Causes of Failure in Network Organisations. *California Management Review* 34: 53-72.
- Milliken, E.J. (1987). Three types of perceived uncertainty about the environment: State, effect, and response uncertainty. *Academy of Management Review*. 12(1): 133-143.
- Milward, L.J. (2000). "Focus groups", in Breakwell, G.M., Hammond S. and Fife-Schaw, C. (Eds.) *Research Methods in Psychology* 2nd Ed., London, Sage Publications, pp. 303-324.
- Mintzberg, H. (1998). Covert Leadership: Notes on Managing Professionals. *Harvard Business Review*. November-December: 140–147.
- Mønsted, M. (2002). Management and creation of meaning. Paper for the LOK conference in Kolding. December 2nd-3rd
- Mønsted, M. (2003). Strategic Networking in Small High Tech Firms. *Samfundslitteratur*, København.
- Mønsted, M. (2004). Complex project management in small high tech firms - Small firms as learning models? Paper presented at RENT XVIII Conference, 24-26. Copenhagen Business School
- Morgan, R., Strong, C. and McGuinness, T. (2000). Prospector strategy & competitive attributes – a multiattribute analysis of strategy. Research Paper No. 01-12.
- Mowery, D.C., and Rosenberg, N. (1979). The Influence of Market Demand Upon Innovation: A Critical Review of Some Empirical Studies. *Research Policy*. 8: 102-153.
- Munk, B. K and Vintergaard, C. (2004). Accentuating the role of venture capitalists in systems of innovation. (VEST) *Journal for Science and Technology Studies*, 1-2(17): 41-65
- Muzyka, D., Birley, S., and Leleux, B. (1996). Trade-offs in the investment decisions of European venture capitalists. *Journal of Business Venturing*.
- Myers S and Marquis D.G. (1969). Successful Industrial Innovations, National Science Foundation, NSF, 69-17
- Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital, and the organizational advantage. *Academy of Management Review* 23(2): 242-266
- Namiki, N. (1989). The impact of competitive strategy on export sales performance: an exploratory study. *The Mid-Atlantic Journal of Business*, 25: 21-37.
- Nelson R.R. and Winter S.G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, Mass: Harvard University Press.
- Nelson, R. R. (1993). *National Systems of Innovation: A Comparative Study*. Oxford: Oxford University, Press.
- Nelson, R.R. (1988). Institutions supporting technical change in the United States. In Giovanni Dosi, Chris Freeman, Richard R. Nelson, Gerald Silverberg and Luc Soete (eds.), *Technical Change and Economic Theory*. London: Pinter.
- Newell, S. and Swan, J. (2000). Trust and inter-organizational networking. *Human Relations*. 53(10): 1287-1328.
- Newton, J. and Johnson, G. (1998). Bridging the gap between intended and unintended change: The role of managerial sensemaking. Wiley, London.
- Nicolaou, N. and Birley, S. (2003). Academic networks in a trichotomous categorisation of university spinouts. *Journal of Business Venturing*, 18(3): 333-359.
- Nilsson A. (2001). Biotechnology Firms in Sweden, *Small Business Economics*, 17, 93-103.
- Niosi J. (2000). Canada's national system of innovation. Montreal: McGill-Queen's University Press.
- Nohria, N. (1992). Is a Network Perspective a Useful Way of Studying Organizations? In *Networks and Organizations*, eds. N Nohria and RG Eccles. Boston: Harvard Business School Press.
- Nowotny, H., Gibbons M. and Scott, P (2001). Re-thinking science. Knowledge and the public in an age of uncertainty. Oxford: Polity Press.
- Nygaard, C. (2000). Strategizing kontekstuel virksomhedsteori. *Samfundslitteratur*, Copenhagen.
- Nystrom, P.C. and Starbuck, W. (1984). To Avoid Organizational Crises Unlearn. *Organizational Dynamics*.
- O'Conner, G.C. and Rice M. P. (2001). Opportunity recognition and breakthrough innovation in large established firms. *California Management Review*, 43(2): 95-116.
- Oughton, C., Landabaso M. & Morgan K. (2001). The Regional Innovation Paradox: Innovation Policy and Industrial Policy. *Journal of Technology Transfer*, 27.
- Pedersen, J. and Vintergaard, C. (2001). Det danske venture kapital marked – en oversigt anno 2000. Working paper, Copenhagen Business School.
- Penrose, E (1959). *The theory of the growth of the firm*, Oxford, Oxford University.
- Perlow (1998). Finding time, stopping the frenzy. *Business & Health*
- Porter, M. (1980). *Competitive Advantage*. The Free Press, NY.
- Powell, W. (1990). Neither market nor hierarchy: Network Forms of organisation. *Research in Organizational Behavior*. 12: 295-336.
- Powell, W. and Brantley, P. (1992). Competitive cooperation in biotechnology: Learning through networks? in *Networks and organizations*. N. Nohria and R. Eccles (eds.), 366-394. Boston, MA: Harvard Business Press.
- Powell, W. and Owen-Smith, J. (1998). Universities and the Market for Intellectual Property in the Life Sciences. *Journal of Policy Analysis and Management*. 17: 253-277.

- Powell, W. and Owen-Smith, J. (2002). The New World of Knowledge Production in the Life Sciences. Pp. 107-30 in S. Brint (ed.) *The Future of the City of the Intellect: The Changing American University*. Stanford, CA: Stanford University Press.
- Powell, W. (1998). Learning from collaboration: Knowledge and networks in the biotechnology and pharmaceutical industries. *California Management Review*, 40(3): 228-240.
- Powell, W., Koput K. W. & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1): 116-146.
- Powers, J. and McDougall, P. (2004). University start-up formation and technology licensing with firms that go public: a resource-based view of academic entrepreneurship. *Journal of Business Venturing*.
- Prahalad, C.K. and Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*.
- Reynolds, P. and Miller, B. (1992). New firm gestation: Conception, birth, and implications for research. *Journal of Business Venturing*, 7(5): 405-417.
- Rind, K.W. (1981). The Role of Venture Capital in Corporate Development. *Strategic Management Journal*, 2: 169-180.
- Ritter T (1999). The Networking Company – Antecedents for Coping with Relationships and Networking Effectively. *Industrial Marketing Management* 28: 467-479.
- Roberts, E.B. (1978). *Cities of Peasants*. London: Edward Arnold.
- Roberts, E.B. (1988). Managing invention and innovation. *Research-Technology Management*, January-February: 11-29.
- Robertson, P. L. and Langlois, R.N. (1995). Innovation, networks, and vertical integration, *Research Policy*. Elsevier, vol. 24(4), pages 543-562.
- Rowley, T., Behrens, D., Krackhardt, D., (2000). Redundant Governance Structures: an Analysis of Structural and Relational Embeddedness in the Steel and Semiconductor Industries. *Strategic Management Journal*, 21: 369-386.
- Ruhnka and Young, (1987). A venture capital model of the development of new ventures. *Journal of Business Venturing*, 2(2).
- Sahlman, W. (1990). The structure and governance of venture capital organizations. *Journal of Financial Economics*, 27: 473-521
- Saravathy, S., Dew, N. Velamuri, R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In Z. Acs & D. Audretsch (eds), *Handbook of Entrepreneurship* (p 141-160). Boston, MA: Kluwer.
- Sarasvathy S. (2004). Constructing Corridors to Economic Primitives: Entrepreneurial Opportunities as Demand-Side Artifacts. In J. Butler (ed.), *Opportunity Identification and Entrepreneurial Behavior* (291-312). Greenwich CN: Information Age Publishing.
- Sarasvathy, S. D. (2001). Causation and Effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2): 243-288.
- Saxenian A. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Harvard University Press.
- Schertler A. (2002). Under What Conditions Do Venture Capital Markets Emerge? Kiel Institute for World Economics. Working Paper 1119.
- Schoser C. (1999). The Institutions defining national systems of innovation: a new taxonomy to analyse the impact of globalisation. *Institut für Allgemeine Wirtschaftsforschung, Universität Freiburg im Breisgau*. Discussion Papers; No. 20.
- Schumpeter, J.A. (1934). *The Theory of Economic Development*. Cambridge: Harvard University Press.
- Schumpeter, J.A. (1943). *Capitalism, Socialism and Democracy*, London: Allen and Unwin.
- Schumpeter, J.A. (1950). *Capitalism, Socialism, and Democracy*, New York: Harper and Brothers.
- Schuyt, R., Melford, M. and Peeters Vrancken, F. (2000). *Europe Ventures Forth*. Strategy and business, www.strategy-business.com
- Schuyt, T.N.M. (Ed) (2001). *Geven in Nederland 2001: Giften, Legaten, Sponsoring en Vrijwilligerswerk*. Houten/Dieghem: Bohn Stafleu van Loghum.
- Schwarz, M. and J. Nandhakumar (2002). Conceptualising the evolution of strategic ideas. *British Journal of Management*, 13(1): 67-82.
- Seufert, A., von Krogh and Bach, A. (1999). Towards knowledge networking. *Journal of knowledge management*, 3(3):180-1090.
- Shane S. (1996). Hybrid Organizational Arrangements and their Implications for Firm Growth and Survival: A Study of New Franchisers. *Academy of Management Journal*, 39(1): 216-234.
- Shane S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11(4): 448-469.
- Shane, S. (2003). *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*. Aldershot, UK: Edward Elgar.
- Shane, S. and Cable, D. (2002). Network ties, reputation, and the financing of new ventures. *Management Science*, 48(3): 364-382.
- Shane, S. and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review*, 25(1): 217-226.

- Sharma, P., and Chrisman, J.J. (1999). Reconciling the definitional issues in the field of Corporate Entrepreneurship. *Entrepreneurship Theory and Practice*. 23(3): 11-27.
- Shepherd, D.A, and Zacharakis, A. (2002). Venture capitalists' expertise: A call for research into decision aids and cognitive feedback. *Journal of Business Venturing*. 17: 1-20.
- Shepherd, D.A. Zacharakis, A. and Baron R. (2003). VCs' decision processes: Evidence suggesting more experience may not always be better. *Journal of Business Venturing*. 18(3): 381-01.
- Shortell S.M, Zajac E. J (1990). Perceptual and archival measures of Miles and Snow's strategic types: a comprehensive assessment of reliability and validity. *Academy of Management Journal* 33: 817-832.
- Siegel, R., Siegel, E. and MacMillan, I.C. (1988). corporate venture capitalists: Autonomy, obstacles and performance. *Journal of Business Venturing* 3(3): 233-247.
- Simon, M., Houghton, S. M, & Gurney, J. (1999). Succeeding at Internal Corporate Venturing: Roles Needed to Balance Autonomy and Control. *Journal of Applied Management Studies*. 8(2): 145-159.
- Singh, R. P. (2001). A Comment on Developing the Field of Entrepreneurship Through the Study of Opportunity Recognition and Exploitation. *Academy of Management Review*. 26(1): 10-12.
- Singh, R.P., Hills, G.E., and Lumpkin (1999). New Venture Ideas and Entrepreneurial Opportunities: Understanding the Process of Opportunity Recognition'. United States Association for Small Business and Entrepreneurship (USASBE) Conference, 13th annual national conference.
- Soh, P-H. (2003). The role of Networking Alliances in Information Acquisition and its Implications for New Product Performance. *Journal of Business Venturing*. 18(6): 727-744.
- Sorenson, O. & Stuart, T.E. (2001). Syndication Networks and the Spatial Distribution of Venture Capital Investments. *The American Journal of Sociology*. 106(6): 1546-88
- Stasch F. S. (1994). Evaluating New Venture Ideas: Considerations from the New Product Development Process. In Gerald E. Hills (ed.), *Marketing and Entrepreneurship Research Ideas and Opportunities*. Quorum Books, Westport, Conn.
- Steiner, GA (1979). *Strategic Planning*. New York Free Press
- Stevenson, H. H., Roberts, M. J., and Grousbeck, H. I. (1989). *New Business Ventures and the Entrepreneur*, Homewood, IL: Irwin.
- Stevenson, H.H. and Jarillo, J.C. (1990). A Paradigm of Entrepreneurship: Entrepreneurial Management. *Strategic management journal*, 11: 17-27.
- Stokes, Donald E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, D.C.: Brookings Institution Press.
- Strauss, A. and Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Sage: 270.
- Strauss, A., and Corbin, J. (1998). *Basics of qualitative research: Grounded theory techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage.
- Sung, T.K., Gibson, D.V. and Kang, B. S. (2003). Characteristics of technology transfer in business ventures: the case of Daejeon, Korea. *Technological Forecasting and Social Change*. 70: 447-466.
- Sweetig, R. (1981). Internal Venture Management: Analytical Aspects, *Journal of General Management*, 7(1): 34-45.
- Sweeting, R.C. (1991). UK Venture Capital Funds and the Funding of new Technology-Based Businesses: Process and Relationships. *Journal of Management Studies*. 28(6): 601-623.
- Sykes, H.B. (1986). Lessons from a new ventures program. *Harvard Business Review*. 64(3).
- Teach, R.D., Schwartz, R.G., and Tarpley, F.A. (1989). The recognition and exploitation of opportunity in the software industry: A study of surviving firms. In R.H. Brockhaus, et al. (eds.), *Frontiers of Entrepreneurship Research*. Wellesley, MA: Babson College, pp. 383-397.
- Teece, Pisano, and Shuen (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal*. 18(7).
- Thorelli H. B. (1986). Networks: Between Markets and Hierarchies. *Strategic Management Journal*. 7(1): 37-51.
- Thornton P.H. (1999). The Sociology of Entrepreneurship. *Annual Review of Sociology*. 25: 19-46.
- Thurrow, L. C. (1980). *The Zero-Sum Society: Redistribution and the Possibilities for Economic Change*. New York: Basic Books, Perseus Book Group.
- Tidd, J. and Taurins, S. (1999). Learn or Leverage? Strategic Diversification and Organizational Learning Through Corporate Ventures. *Creativity and Innovation Management*. 8(2): 67-153.
- Tidd, J. and Trewhella, MJ. (1997). Organizational and technological antecedents for knowledge acquisition and learning. *R&D Management*. 27(4): 359-375
- Tidd, J., Bessant, J. & Pavitt, K. (2001). *Managing innovation: integrating technological, market and organizational change*. Chichester: Wiley.
- Timmons J.A. and Bygrave W.D. (1986). Venture Capital's Role in Financing Innovation for economic Growth. *Journal of Business Venturing*. 1: 161-176.
- Timmons, J. (1999). *New Venture Creation*. 5th Edition, Boston, MA: Irwin McGraw-Hill.
- Timmons, M.B. (1991). Engineering Aspects of Intensive Aquaculture: Proceedings (351 pp), NRAES-49. Riley Robb Hall, Cornell University.

- Torres, A.M. and Murray J.A (2002). Diversity, marketing practice and organisational evolution: Implications for the management of productive evolution. *Journal of Change Management*.
- Touminen, M. (1997). Marketing Capability and Marketing Orientation in Strategy Interface. *Helsinginkauppakorkeakoulum*.
- Tushman, M.L (1997). Winning Through Innovation. *Strategy and Leadership*, July-Aug: 14-19.
- Tyebjee, T. and Bruno, A.V. (1981). Venture capital decision making: preliminary results from three empirical studies. *Frontiers of Entrepreneurship Research*, Babson College, Wellesley, Mass.
- Tyebjee and Bruno (1984). A model of venture capitalists activities. *Management Science*. 30(9).
- Vækstfonden (2003). Det danske marked for venturekapital og private equity. Vækstfonden. (can be retrived from: http://www.vf.dk/download_media.asp?media_id=1445)
- Vækstfonden (2004). Det danske marked for venturekapital og private equity.
- Van de Ven, Andrew H., Delbecq, A., and Koenig R. (1976). Determinants of coordination modes within organizations. *American Sociological Review*. 41: 322-338.
- Van Kersbergen K. and van Waarden F. (2001). Shifts in Governanc: Problems of Legitimacy and Accountability. The Hague: Social Science Research Council.
- Venkatamaran, S., MacMillan, I.C, and McGrath, R.G. (1992). Progress in research on corporate venturing. In D.L. Sexton & J.D. Kasarda (Eds.), *The state of the art of entrepreneurship*, pp. 487-519. Boston: PWS-Kent.
- Venkataraman, S. (1997). The distinctive domain of entrepreneurship research: An editor's perspective, in Katz and Brockhous (eds.), *Advances in entrepreneurship, firm emergence, and growth*. Greenwich. CT: JAI Press.
- Venkataraman, S., Dew, N. and Velamuri, R. (2001). Three Views of Entrepreneurial Opportunity. In Audretsch and Acs (eds.) *International Handbook of Entrepreneurship*, Kluwer Academic Publishers Group, Dordrecht, 2003.
- Venkataraman, S., MacMillan, I.C. & McGrath, R.G. (1992). Progress in research on corporate venturing. In Sexton, D.L. *The State of the Art of Entrepreneurship*. Boston: PWS-KENT.
- Vintergaard, C. (2005) Opportunities in Corporate Venturing – Actors Creating Passageways. *International Journal of Innovation Management (IJIM)* 9(1): 215-239.
- Vintergaard, C. and Husted, K. (Submitted). Corporate Venture Companies Linear and Dynamic Evaluation Strategies for Science Based Venture Opportunities. In: *Handbook of Corporate Entrepreneurship* by Shaker Zahra. Elger.
- Volberda, H.W. and Lewin, A.Y. (2003). Guest Editors introduction. Co-evolution dynamics within and between firms: from evolution to co-evolution. *Journal of Management Studies*. 40(8): 2111-2136.
- Von Hippel, E. (1977). Successful and failing internal corporate ventures an empirical analysis. *Industrial Marketing Management*. 6:163-174.
- Von Hippel, Eric (1988). *The Sources of Innovation*. New York: Oxford University Press
- Waldstrøm C. (2001). *Informal Networks in Organizations – A literature review*. DDL Working Paper No. 2, Aarhus Business School.
- Weick, K.E. (2001). *Making sense of the organization*. Blackwell Publishers, Oxford.
- Weingart, P. (1997). From 'finalization' to 'Mode 2': old wine in new bottles?. *Social Science Information*, 36: 591-613.
- Wernerfelt, B. (1984) A Resource-based View of the Firm. *Strategic Management Journal* 5: 171– 80.
- White, H.C. (1981). Where do markets come from? *American Journal of Sociology*, 87, 517-47.
- Wholey, D.R., Christianson J.B. & Sanchez S. (1993). Professional reorganization: The effect of physician and corporate interests on the formation of health maintenance organizations. *American Journal of Sociology*, 99, 175-211.
- Wilemaker, M.W., Elfring, T., and Volberda, H.W. (2000). Strategic Renewal in Large European Firms: investigating viable trajectories of change. *Organization Development Journal*. 18(4): 49-68.
- Wilemaker, M.W., Elfring, T. and H.W. Volberda (2001). How Well-Established Firms Prepare for the New Economy: an Empirical Study on the development of New Economy Initiatives. *International Studies of Management and Organization*. 31(1): 7-29.
- Wilks, N. (2000). A breakdown of disciplines. *Professional Engineering*, Bury St. Edmunds, 13(8): 59-60.
- Williamson, O. (1986). *Economic Organization: Firms, Markets and Policy Control*. New York University Press, NY.
- Williamson, O. E. (1983). Credible commitments: Using hostages to support exchange. *The American Economic Review*. 73:519-540
- Williamson, O.E. (1994). Transaction cost economics and organization theory. In N.J. Smelser and R. Swedberg (eds.) *The Handbook of Economic Sociology: 77-107*. Princeton, NJ: Princeton University Press.
- Williamson. O.E., (1975). *Markets and Hierarchies*. New York: Free Press
- Williamson. O.E., (1985). *The Economic Institutions of Capitalism*. New York: Free Press
- Williamson. O.E., (1991). Strategizing, Economizing, and Economic Organizations. *Strategic Management Journal*. 12, Special Issue.
- Winters, T. and Murfin M. (1988). Venture Capital Investing for Corporate Development Objectives. *Journal of Business Venturing*, 3: 207-222.
- Wright, M. and Lockett, A. (2003). The Structure and Management of Alliances: Syndication in the Venture Capital Industry. *Journal of Management Studies*. 40(8): 2073-2104.

- Wright, M., Robbie, K., and Ennew, C (1997). Venture Capitalists and Serial Entrepreneurs. *Journal of Business Venturing*, 12(3): 227-249.
- Wright, R. and Robbie (1998). Venture capital and private equity: a review and synthesis. *Journal of business finance and accounting*. 25(5) & (6)
- Yeung, H. (2002). Entrepreneurship in International Business: An Institutional Perspective. *Asia Pacific Journal of Management*, 19(1): 29–61
- Yin, R. (1984). Case study research. Beverly Hills, CA Sage publication.
- Zacharakis, A.L., Meyer, G. and DeCastro, J. (1999). Differing perceptions of new venture failure: A matched exploratory study of venture capitalists and entrepreneurs. *Journal of Small Business Management*, 37(3): 1-14.
- Zahra, S.A. (1991). Predictors and financial outcomes of corporate entrepreneurship: An exploratory study. *Journal of Business Venturing*. 14: 451-478.
- Zahra, S.A. (1996). Governance, ownership, and corporate entrepreneurship: The moderating impact of industry's technological opportunities. *Academy of Management Journal*, 39(6): 1713-1735.
- Zahra, S.A. and Covin, J.G. (1995). Contextual influences on the corporate entrepreneurship-performance relationship: A longitudinal analysis. *Journal of Business Venturing*, 10(1): 43-59.
- Zahra, S.A and Dess, G.G. (2001). Entrepreneurship as a field of research: Encouraging. *Academy of Management Review*. 26(1)
- Zahra, S.A, Pearce, JA, II. (1990) Research Evidence on the Miles-Snow Typology. *Journal of Management*, 16: 751-768.
- Zahra, S.A. and Nielsen, A.P. (2002). Sources of capabilities, integration and technology commercialization. *Strategic Management Journal*, 23(5): 377.
- Zahra, S.A., Nielsen, A.P. and Bogner W. (1999). Corporate Entrepreneurship, Knowledge, and Competence Development. *Entrepreneurship: Theory and Practice*. 23(3): 169-189.
- Ziman, J. (1991). Public Understanding of Science. *Science, Technology & Human Values* 16(1(Winter)): 99-105.
- Zutshi, RK, Tan WL, Allampalli DG, and Gibbons PG. (1999). Singapore venture capitalists (VCs) investment valuation criteria: A re-examination. *Small Business Economics* 13: 9-26.

6. EXHIBITS

6.1 *Exhibit: Complementary studies*

Accompanying the 5 core studies of this thesis I have written several working papers, managerial/ policy studies, book contributions etc. during the thesis period but which are not included as a core part of this thesis. The separate, but interconnected studies are:

Working papers:

- Jensen, N. W. and Vintergaard, C. (2002): "Vækstfremmende faktorer for den danske venturekapitalbranche". MPP working paper
- Pedersen, J. and Vintergaard, C. (2001): "Det danske venture kapital marked - en oversigt anno 2000". MPP working paper

Accepted work in progress:

- Isaksson, Vintergaard, Ezkowitz and Klofsten "*Supporting entrepreneurship and innovation: The venture capital process*" Book published by the SNS - *Centre for Business and Policy Studies*.
- Vintergaard, C. (2005). "En ny bølge af ledelsesmæssige udfordringer i corporate venturing" *Ledelse og Erhvervsøkonomi*".

Managerial/ policy publications:

- Nielsen, A. P & Vintergaard, C. (2006). "Venture kapital – mere end blot kapital" Submission to the GEM report
- Vintergaard, C. (2006) "Kortlægning af Danske Universiteters Uddannelsesstilbud Indenfor Entrepreneurship – Version 2". Published by The Danish Venture Capital Association.
- Vintergaard, C. (2004) "Kortlægning af Danske Universiteters Uddannelsesstilbud Indenfor Entrepreneurship". Published by The Danish Venture Capital Association.
- Vintergaard, C. (2004) "Iværksætter-Danmark". *Civiløkonomen* 12, december, 2004.
- Vintergaard, C. (2001) "Corporate Venturing - en strategi for virksomheder under konstant forandring" Published by Copenhagen Business School and Schrøder • Lucas & Partnere – Virksomhedsmæglere og kapitalformidling.

6.2 Co-author statements

Study I

Munk, B. K and Vintergaard, C. (2004). Accentuating the role of venture capitalists in systems of innovation. (*VEST*) *Journal for Science and Technology Studies*. 1-2(17): 65.



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Copenhagen, July 11th, 2005

Co-author statement

The paper: "Accentuating the role of venture capitalists in systems of innovation" in *Journal for Science and Technology Studies (VEST)* 1-2(17) is the result of the cooperation between Kasper Birkeholm Munk and Christian Vintergaard.


Munk has focused his attention on the arguments around the innovation system and Vintergaard has contributed mostly to issues of venture capital management. Munk and Vintergaard have equally contributed to the chapter.

Kasper Birkeholm Munk

Christian Vintergaard

Study II.

Jørgensen, H. and Vintergaard, C. (2006). *Connecting Company Strategy and Network Identity*. In: *Managing Dynamic Networks Organisational Perspectives of Technology Enabled Inter-Firm Collaboration*. Poulmenakou A. and Klein S. (eds.) Heidelberg: Springer.



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The book chapter: “Connecting Company Strategy and Network Identity”. In *Managing Dynamic Networks*. Poulmenakou A. and Klein S. (eds.) Heidelberg: Springer (2005) is the result of the cooperation between Heidi Jørgensen and Christian Vintergaard. Jørgensen and Vintergaard have equally contributed to the chapter.



Heidi Jørgensen



Christian Vintergaard

Study III.

Husted, K and Vintergaard, C. (2004). Stimulating innovation through corporate venture bases. *Journal of World Business*. 39(3): 296-306.

Copenhagen, October 21, 2003



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Co-author statement

The paper "Stimulating innovation through corporate venture bases" forthcoming in *Journal of World Business*, Vol. 39, No. 3. is the result of the cooperation between Kenneth Husted and Christian Vintergaard. The authors have contributed equally to the paper.

A blue ink signature of Kenneth Husted, written in a cursive style.



Kenneth Husted

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Christian Vintergård

Study V.

Vintergaard, C. and Husted, K. (Submitted). Corporate Venture Companies Linear and Dynamic Evaluation Strategies for Science Based Venture Opportunities. In: Handbook of Corporate Entrepreneurship by Shaker Zahra. Elger.

 <p>Copenhagen Business School HANDELSHØJSKOLEN</p>	Copenhagen, September 23 rd , 2005
Co-author statement	Department of Management, Politics and Philosophy
The book chapter: “Corporate Venture Companies Linear and Dynamic Evaluation Strategies for Science Based Venture Opportunities”. In Handbook of Corporate Entrepreneurship by Shaker Zahra. Elger. is the result of the cooperation between Christian Vintergaard and Kenneth Husted.	Blaagaardsgade 23 B DK-2200 Copenhagen N Denmark
Vintergaard is the first and Husted the second author. References should be made: Vintergaard and Husted.	
Vintergaard has contributed with insight to corporate ventures evaluation process and strategies. Husted has contributed insight to knowledge production in networks. Together they have shaped and condensed the arguments presented.	
Christian Vintergaard	 Kenneth Husted

6.3 *Danish abstract*

Dette værk er indgivet til Ph.D. bedømmelse under Forskerskolen i Viden og Ledelse ved Institut for Ledelse, Politik og Filosofi ved Copenhagen Business School som en del af opfyldelse af kravene for at opnå graden Ph.D. Målet med denne afhandling er, at fremsætte en kombination af nye teoretisk perspektiver og ledelsesmetoder, som tilsammen vil give et bedre indblik i de tidlige stadier af corporate venturing. Dette vil inkludere nye perspektiver på corporate venturing, eftersom afhandlingen videreudvikler akademiske og praktiske værktøjer for beslutningsprocesser.

Afhandling bidrager med to overordnede tilføjelser til den nuværende litteratur om corporate venture. For det første, sætter den fokus på de vigtige, men oversete, tidlige faser ved venture processen. Dette indebærer de forhold, nødvendige for udvikling af nye innovative venture muligheder (venture basen), opdagelse af investeringsmuligheder og endelig forberedelse til evaluering af investeringsmuligheder. Venture basen er de karakteristika og forhold der for et firma og dets miljø kan udgøre ressourcer til opstart af nye ventures. Grundet ventures innovative natur bliver det, at opdage entreprenelle muligheder en hovedudfordring der involverer en diversificeret gruppe af aktører. Den tidlige fase inkluderer også specifikke videnskabelige handlinger der skal udføres for at kunne evaluere de mange investeringsmuligheder.

For det andet bibringer afhandlingen nye perspektiver til hvorledes aktiviteterne i de tidlige faser er forbundet i værdikæden. I modsætning til tidligere litteratur, hvor venture processer præsenteres som lineære og forudsigelige, demonstrerer dette værk, at en mere dynamisk tilgang er tiltrængt, en tilgang der er særlig fokuseret på hvordan vidensprocesser og læringsfremmende aktiviteter driver venture processen, lige fra udviklingen af nye ideer til deres betydning evalueres.

Disse bidrag trækker på teoretiske perspektiver fra den nuværende corporate venture litteratur (såsom Block and MacMillan, 1993; Burgelman, 1984, 1996; Chesbrough, 2000; Zahra, 1991) og komplementerende litteratur der tilvejebringer et netværk og videns perspektiv (såsom Gibbons et al. 1994; Kline and Rosenberg, 1986; Powell et al., 1996). Disse perspektiver er særligt gennemslagskraftige i deres argumentation om innovations processer og evolutionær udvikling. De bringer også ny indsigt om den type læringsproces som corporate ventures er en del af når de udvikler og evaluerer nye venture muligheder.

I modsætning til en traditionel monografisk Ph.D. afhandling, så præsenterer denne afhandling sine resultater i fem (5) uafhængige men forbundne undersøgelser, udgivet i internationale peer-reviewed tidsskrifter og bog kapitler. Udover disse studier så indeholder afhandlingen også en teoretisk introduktion og metode, en litteratur gennemgang og en konklusion.

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