THESIS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Developing Entrepreneurial Behavior

Facilitating Nascent Entrepreneurship at the University

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Division of Management of Organizational Renewal and Entrepreneurship

Department of Technology Management and Economics

CHALMERS UNIVERSITY OF TECHNOLOGY

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Abstract

Can nascent entrepreneurs learn how to behave so as to achieve their ambition of creating new ventures? This thesis explores how the development of entrepreneurial behavior can be facilitated through investigating nascent entrepreneurship taking place at the university. The focus is on the influence of environmental factors and the processes involved as a new opportunity-based venture is created need to be considered when addressing entrepreneurial behavior development.

The university is chosen to be an appropriate empirical setting as it is capable of facilitating activity resulting in the creation of new opportunity-based, high-growth potential ventures. An action research approach is used to study an intrinsic case, which is then compared to other environments in order to understand how behavior development is facilitated. A systems perspective allows for study of entrepreneurial behavior through contributions from different levels of analysis in a micro-aggregate mix, from the individual to society. Social Learning Theory, additional learning theories, and Positioning Theory are used to investigate how behaviors are developed and confirmed or rejected during interaction between the nascent entrepreneur and the role-set.

Nascent entrepreneurs are hampered by liability of newness and lack of social networks. They benefit from training and support that facilitates establishing legitimacy as entrepreneur, and reducing uncertainty and ambiguity, thereby preparing for and making decisions as a new venture is created. Both structural and social components of environmental factors facilitate behavior development, as policies or norms are discussed and negotiated with a role-set. Learning through interaction with the role-set also facilitates hypothesis testing and feedback loops, allowing the nascent entrepreneur to take pre-emptive action, and reduce uncertainty and ambiguity. Nascent entrepreneurs can train in future business activities, while in the process of emergence, in order to develop behaviors for an entrepreneurial career.

Keywords: entrepreneurial behavior, nascent, venture creation, university, interaction, facilitation, pre-emptive action, self-efficacy, entrepreneurial education.

To my role-set

&

In memory of Professor Natalie Taylor

Appended papers
This thesis is based on the following papers, referred to by Roman numerals in the text.

Paper I

Lundqvist, M. A. and Williams Middleton, K. (2010). Legitimizing entrepreneurial activity at the university, initially presented at the 5th Triple Helix conference '*The Capitalization of Knowledge'* in Turin, 18-21 May. Submitted to *Research Policy*.

Paper II

Lundqvist, M. A. and Williams Middleton, K. (2008). Sustainable Wealth Creation beyond Shareholder Value. In: Wankel, C. and Stoner, J. A. F. (eds.) *Innovative Approaches to Global Sustainability.* New York: Palgrave MacMillan. p. 39-62.

Paper III

Ollila, S. and Williams-Middleton, K. (2010). The venture creation approach: integrating entrepreneurial education and incubation at the university, forthcoming in a special issue of *International Journal of Entrepreneurship and Innovation Management.*

Paper IV

Williams Middleton, K. (2010). Entrepreneurial positioning, initially presented at 30th Institute for Small Business & Entrepreneurship conference *'International Entrepreneurship'* in Glasgow, 7-9 November. Submitted to the *International Journal of Entrepreneurial Behaviour and Research*.

Paper V

Lundqvist, M. A. and Williams Middleton, K. L. (2010). Promises of societal entrepreneurship: Sweden and beyond, *Journal of Enterprising Communities*, Vol. 4(1), p. 24-36.

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Karen Williams Middleton
Göteborg, November 15, 2010

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ABBREVIATIONS

Bayh-Dole (Act)	U.S. University and Small Business Patent Procedures Act of 1980
CAUSEE	Comprehensive Australian Study of Entrepreneurial Emergence
Chalmers	Chalmers University of Technology
CSE	Chalmers School of Entrepreneurship
CSU	Colorado State University
CTT	Center for Technology Transfer (at the University of Pennsylvania)
EECL	Engines and Energy Conversions Laboratory
GIBBS	Gothenburg International Bioscience Business School
IP	Intellectual property
PSED	(U.S.) Panel Study of Entrepreneurial Dynamics
Teachers exemption	Swedish Law (SFS 1949:345 § 1-10)
TTO	Technology transfer office
VCS	venture creation subunit

1 INTRODUCTION

Individuals embarking on an entrepreneurial journey for the first time are faced with quickly adapting to situations without knowing the 'rules of the game', or more importantly, knowing how to change the rules in order to suit their endeavors. These individuals, defined as nascent entrepreneurs, lack awareness of the ripple effects that policies, norms, markets and numerous other factors can have on their intended actions. Learning how to 'play the game' means learning how to effectively react and even stimulate the ripples in order to not only survive, but thrive in creating a new venture. This begs the question: is the only way to learn how to play through the 'school of hard-knocks' (i.e. real life) where the consequence may be never being able to play the game again? Or can nascent entrepreneurs learn how to behave so as to achieve their ambition of creating new ventures. This thesis explores how the development of entrepreneurial behavior can be facilitated through investigating nascent entrepreneurship taking place at the university.

1.1 A FOCUS ON ACTION

Facilitation of entrepreneurial behavior development requires understanding what entrepreneurial behavior is and how it is developed. This presents a major challenge because behavior that leads to entrepreneurship is not well understood (Aldrich, 1999). A common approach used to research entrepreneurial behavior investigates those intending to take on the role of entrepreneur (for example Shook et al., 2003). The field of entrepreneurship therefore has had a strong association between the phenomenon of entrepreneurship and the individual, with focus on the traits and characteristics of the individual, rather than the surrounding context (Aldrich and Wiedenmayer, 1993). This is illustrated through the 'hero' status often associated to 'the entrepreneur' (Leibenstein, 1987, Schoonhoven and Romanelli, 2001). However, despite extensive investigations into the make-up of individuals in order to identify them as entrepreneurs (see for example Brandstätter, 1997, Kets de Vries, 1977, Rauch and Frese, 2007), researchers still have limited understanding of what leads an individual to become an entrepreneur (Markman et al., 2002). A review of literature regarding research on the characteristics of the entrepreneur found no compelling difference between individuals beyond cognition (Busenitz and Barney, 1997). Based on this, in this thesis I chose to instead focus on how the environment, with which the entrepreneur interacts, can facilitate development of entrepreneurial behavior.

Some researchers, such as William Gartner (1988), argue that the entrepreneurial process is of core interest and research should study the actions taken by individuals engaged in entrepreneurship instead of the individuals themselves. Gartner's behavioral approach is a valuable alternative to a trait approach:

> the "*behavioral approach views the creation of an organization as a contextual event, the outcome of many influences.* (p 22) …"*If we are to understand the phenomenon of entrepreneurship in order to encourage its growth, then we need to focus on the process by which new organizations are created. This may seem like a simple refinement of focus (i.e. look at what the entrepreneur does, not who the entrepreneur is), but it is actually a rather thoroughgoing change in our orientation*" (p 27).

Thus, in order to investigate how entrepreneurial behavior development can be facilitated, I start with the description of entrepreneurial behavior given by Gartner and Carter, stating that it is "an individual level phenomenon, which occurs over time (is a process), and results in an organization as the primary outcome of these activities" (2003, p 196). Entrepreneurial behavior is seen as an individual phenomenon, in contrast to an understanding of the behavior of a firm, involving discrete units of actions which can be observed (Bird and Schjoedt, 2009). It is behavior related to entrepreneurship seen as a process of emergence (Bhave, 1994, Gartner et al., 1992, Reynolds and Miller, 1992), the outcome of which is the creation of a new venture (Gartner, 1988). Thus, entrepreneurial behavior is behavior of individuals engaging in a process of creating new ventures, where the process includes units of actions which can be observed by others. The process of creating new ventures involves a combination of actions including, for example, identifying an opportunity, securing funding, developing technology and determining a legal form, among others (Baron, 2002). Sets of actions found to be important to the creation of a new firm, such as implementing a productive process, establishing firm presence and creating organizational and financial structures (Reynolds, 2007), can thus be initially proposed as potential entrepreneurial behaviors.

1.2 Entrepreneurial Behavior Development

In their description of entrepreneurial behavior, Gartner and Carter include that it is a process that occurs over time. In this thesis, I claim that it is by going through the process that the individual develops entrepreneurial behavior. Of the two main theoretical approaches to entrepreneurship: Discovery Theory (Shane, 2003) and Creation Theory (Casson, 1982, Gartner, 1985), this thesis takes a Creation Theory approach. Creation Theory has three main assumptions. The first is that an opportunity is subjective. Related to this, the second assumption is that individuals (entrepreneurs) create the opportunities (as opposed to recognizing them). These individuals are not necessarily unique, particularly before going through the creation process. Finally, while going through the process, these individuals bear uncertainty, which is the third assumption. Uncertainty means that not only are the probabilities of outcomes unknown, but the outcomes themselves are not known or knowable. The entrepreneurs, believing in an opportunity, test it with potential customers or in the marketplace, getting feedback or reacting to responses, and then progressing to the next testing phase until the opportunity is successful in the marketplace (Alvarez and Barney, 2007).

Linking to Creation Theory, entrepreneurial behavior is seen here as the combination of actions, carried out by the entrepreneur, which continue to adjust and define the opportunity and position it as acceptable to the market, such that a new venture is the primary outcome. The individual exhibiting the entrepreneurial behavior by the end of the process did not necessarily have such behavior to start. Instead, going through the process develops the behavior considered entrepreneurial. The developed behavior then creates the perception of a differentiation between those deemed entrepreneurs and those deemed not to be, such that the differences are the result, or the effect, and not the cause of the entrepreneurship (Sarasvathy, 2001).

However, the process through which the entrepreneur goes when creating the new venture does not take place in a vacuum. Bruyat and Julien (2001) categorize four key dimensions influencing entrepreneurship – individual, environment, resources and process. These dimensions also impact behavior. The influence of the process on behavior has been described above. In this thesis, actors, objects, infrastructure, procedures, various types of resources, etc. are collectively defined as environment[1]. Next I will show how the individual and environment (thus including resources) are developing behavior.

1.2.1 Behavior as a Function of Individual and Environment

Behavior can be seen as a function of individual and environment (Ekehammar, 1974, Heider, 1958, Lewin, 1951, Sansone et al., 2004). Behavior is also considered as socially observable human action influenced by individual processes of cognition, decision and intention (Bird and Schjoedt, 2009). Action cannot take place unless it is carried out by someone. This thesis takes the premise that entrepreneurial behavior is individual action developing through the nascent entrepreneur's interaction with her environment, where environment is understood to include not only structural components and infrastructure, but social components, including human resources and social networks as well (Aldrich and Martinez, 2001, Chell, 1985, Mazzarol et al., 1999).

As a part of Social Learning Theory (1977), Albert Bandura argues that human behavior is developed in relation to one's environment (see Figure 1), in combination with personal variables, through observational learning (1977) and reciprocal determinism (1978). An individual's actions can affect her environment and her environment can affect her behavior, including the way in which she chooses to change the environment, and how those changes impact her reactions. It is in such a way that the individual's environment, including environmental factors, can shape self-efficacy (Bandura, 1982); the way in which decisions are made based upon expectations when interacting with the environment.

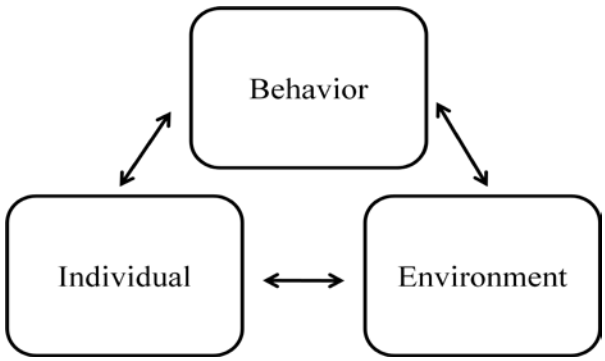


Figure 1. Behavior as a function of individual and environment

[1] Environment, in dictionary terms, is "the totality of circumstances surrounding an organism or group of organisms, especially: a. the combination of external physical conditions that affect and influence the growth, development, and survival of organisms; and b. the complex of social and cultural conditions affecting the nature of an individual or community". (American Heritage, 2006). William Bygrave's (1989) conceptual model of the entrepreneurial process shows resources as categorized under environment.

1.2.2 Behavior which is Opportunity-based and has High-growth Potential

In order to understand how entrepreneurial behavior development can be facilitated, I explore influences of the environment with which the nascent entrepreneur is interacting, within a specified setting (discussed further in Chapter 2). Bird and Schjoedt (2009) argue that entrepreneurial behavior research requires specification in order to understand how actions can be predicted and controlled (changed) towards achieving desired entrepreneurial outcomes. Thus, in this thesis I specify the new venture created as that which is opportunity-based and considered to have high-growth potential (Siegel et al., 1993, Timmons, 1986).

Baumol (1993) summarizes two main trends of entrepreneurship as firm-organizing and innovative[2]. The first is mainly described as repetition of what has been proven to work before, only presented in a new format, where the latter is described as driven by the 'innovative changer of the economy' who is alert to seize upon new opportunities. I relate the latter description, innovative, with Stevenson and Jarillo's definition (1990) of entrepreneurship as pursuit of an opportunity, and thus rather refer to this as opportunity-based entrepreneurship. In relation to description of new firms, Timmons (1999), presents a set of criteria used by venture capitalists for evaluation (p. 86-95), where ventures in the process of being formed are considered to be high-growth potential when they exhibit, among other things, novel offerings that change the way people live and work and have potential proprietary protection. Technology-based entrepreneurship (Hsu, 2008, Roberts, 1990) is often associated with high-growth potential, as the intellectual property (IP) upon which the technology is based is often protected through patent or other IP rights. Technology-based ventures are subsequently seen as opportunity-based.

Developing firm-organizing knowledge and behavior is considered viable through education and experiential learning, as principles from emerging and proven models and methods can be discussed, tested, and analyzed (Baumol, 1993). But to respond to society's fundamental reliance and desire of entrepreneurship which will generate wealth and welfare, what we are really seeking is behavior that allows for the capturing of that which was not there before. This is behavior which transforms ideas into something to which the rest of us can build a tangible association, to the point that we not only perceive value, but are willing to illustrate this through transactions. Therefore, the entrepreneurial behavior explored in this thesis is that which results in opportunity-based firms showing high-growth potential. Thus, using the general framework of Social Learning Theory presented in Figure 1, in this thesis, I specify entrepreneurial behavior as a phenomenon related to an individual acting (and being

[2] William Baumol (1993), taking an economic perspective, outlined two main scientific trends when attempting to define entrepreneurship, personified through the entrepreneur, building from the 'grandfathers' of the field: Say, Cantillon, and Schumpeter. In basic terms, Jean Baptiste Say (Say, 2007 [1863]) defines the entrepreneur as the assembler of capital, knowledge and labor in order to launch, and potentially develop, new business. Joseph Schumpeter (1942), again in basic terms, defines the entrepreneur as an exceptional being who changes the economy by means of an innovation – a process most commonly recognized as Schumpeter's "creative destruction". Richard Cantillon has been interpreted as both supporting Say's 'creator of business' definition (Baumol, 1993), or Schumpeter's 'innovative changer of the economy' definition (Bruyat and Julien, 2001). The two categories of firm-organizing and opportunity-based also broadly align with the general descriptions emerging from more than a decade of Global Entrepreneurial Monitor (GEM) studies. These studies have, since 1999, investigated the phenomenon of entrepreneurship on a country-wide scale and recognized two main stimuli for entrepreneurial action taken by individuals: necessity and opportunity (Reynolds, et al., 2005).

observed) in an environment of opportunity-based high-growth potential new venture creation. This is conceptually presented in Figure 2.

The thesis focuses on how the development of entrepreneurial behavior can be facilitated. This requires synthesis of learning theories, such as "learn-as-you-go" (Collins and Moore, 1970, Gartner, 1985) and learning by doing (Cope and Watts, 2000) skill development and learning spaces (Kolb and Kolb, 2005) in relation to education and training structures. As facilitation is the provision of facilities, learning and development is considered in relation to environmental factors.

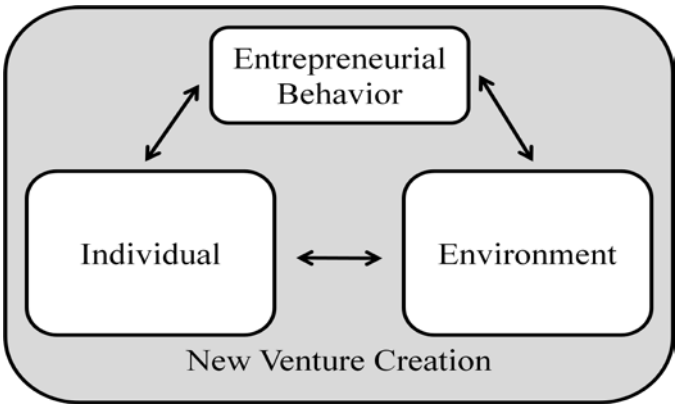


Figure 2. Social Learning Theory adapted to entrepreneurship

1.3 Purpose and Research Questions

The purpose of this thesis is to understand how the development of entrepreneurial behavior can be facilitated. The thesis explores entrepreneurial behavior development from a systems perspective, described in Chapter 4, which recognizes relationships between interdependent parts and their impact on interactions.

Building upon a view of behavior as developed in relation to both the individual and her environment and through a process of creating a new venture, facilitation of entrepreneurial behavior development is explored through three specific research questions:

RQ1 Which behaviors are developed as part of the process of creating a new venture?

RQ2 How can factors of the environment facilitate the development of entrepreneurial behavior?

RQ3 How can interaction between the individual and her environment facilitate the development of entrepreneurial behavior?

1.4 Composition

In this thesis, I mainly use five terms to demarcate my research into entrepreneurial behavior development and facilitation – nascent, venture creation, opportunity-based, high-growth potential, and university. With these terms, my intention is to describe my area of study as

associated to entrepreneurship taking place at the university, mainly stemming from university-based research, which is patented or patentable and considered to have high-potential for growth. The entrepreneurial process, intending to result in a venture is driven by individuals who do not have prior experience in creating and incorporating a venture. Opportunity-based and high-growth potential venture creation is subsequently seen mainly from within a university environment, further described in Chapter 2. In Chapter 3, nascent entrepreneurship is discussed in relation to existing literature, and in relation to the theoretical premise of the thesis, synthesizing theories on the entrepreneurial process, entrepreneurial behavior, positioning and learning. Chapter 4 addresses methodological considerations and choices made. The specific contributions of appended papers are presented and related to the overall purpose of the thesis in Chapter 5. The discussion in Chapter 6 focuses on the synthesized understanding towards facilitation of entrepreneurial behavior development generated in Chapter 3, integrating empirical insights from the appended papers. Conclusions are drawn in Chapter 7, followed by implications and future research in Chapter 8.

2 BACKGROUND

Accessing individuals as they are engaging in nascent entrepreneurship is one of the primary problems facing the research field in nascent entrepreneurship (Kessler and Frank, 2009, Reynolds et al., 2004). I attempt to address this challenge in my research by investigating nascent entrepreneurial activity within the university. The university may not necessarily seem to be an effective arena for developing the driven, single-minded determination utilized in starting new ventures. University research is often early-stage, knowledge-based ideas, requiring longer gestation periods and multiple stages of capital investment in order to reach the marketplace. However, the university, engaging in research utilization, is a valuable environment for knowledge-based development, sometimes requiring longer-term commitment and inter-disciplinary mechanisms for support. The university is can thus be an appropriate empirical setting as it is an environment capable of facilitating entrepreneurial activity (Brennan and McGowan, 2006, Etzkowitz, 2003, Rasmussen and Borch, 2010, Wright et al., 2004) resulting in the creation of new ventures. Thus, instead of an arena of or for the 'heroic-entrepreneur' (Leibenstein, 1987), the university can be where behavior is in focus, both in relation to the individual and influences of the environment, facilitated through infrastructure (Van De Ven, 1993). The university setting may even facilitate the reduction of risk by providing an enabling environment for entrepreneurial activity (Lundqvist, 2009).

Utilization of the university as the empirical setting allows for exploring entrepreneurial behavior developing as the process of venture creation is on-going. In order to observe how factors and interactions impact the development of entrepreneurial behavior, a systems perspective is taken, recognizing contributions from different levels of analysis in a micro-aggregate mix (Davidsson and Wiklund, 2001, Low and MacMillan, 1988). Organizational boundaries allow for more distinctive entry and exit points and designated role responsibilities than can be determined when exploring nascent entrepreneurial activity in society as a whole. At the same time, the university is understood to exist within the greater context of society, connected through formal rules and regulations, and informal norms.

This chapter presents the empirical landscape and specific setting utilized in the thesis. Three main areas of entrepreneurship taking place at the university – university entrepreneurship, entrepreneurship education and entrepreneurial activity – are discussed in order to understand their potential influence in developing and facilitating entrepreneurial behavior. Finally, the specific structure and attributes of the core empirical setting are discussed.

2.1 EMPIRICAL LANDSCAPE – THE UNIVERSITY AS AN ENTREPRENEURIAL ECOSYSTEM

The university encompasses multiple levels of activity and interacting components. While the university can be understood as having one fundamental purpose – to provide benefit to society – this quickly dissipates into multiple missions and numerous operational objectives across the various organizational and operational levels of the university (Fayolle and Kyrö, 2008). Institutional structures of norms, established practices, and rules are intended to regulate interactivity (Edquist, 2006). A dominant view of university organization is captured in the organizational archetype of the "professional bureaucracy" (Styhre and Lind, 2009). This organizational form implies individual autonomy based upon standardization of inputs in terms of skills, exams and other internalized behavioral patterns. It hires duly trained specialists with internalized norms (professionals in the university case being, for example,

professors) for the operating core, and then gives them considerable control over their own work. However, as more and more universities are expected to take on the mission of research utilization (Etzkowitz and Leydesdorff, 2000, Mansfield and Lee, 1996, Mowery and Sampat, 2005, Rasmussen et al., 2006, Tassey, 2005), a setting is established in which entrepreneurial activity takes place (Etzkowitz, 2003, Rasmussen and Borch, 2010, Wright et al., 2004). Instead of an ivory tower of independent researchers acting autonomously, the university engaging in entrepreneurial activity may be better understood as an entrepreneurial ecosystem (Fetters et al., 2010, Neck et al., 2004, Spilling, 1996), composed of physical infrastructure, formal and informal networks and a community culture. These ecosystems contain multiple organizational boundaries, both stringent and open with varying levels of cooperation and interdependency.

The university, as an entrepreneurial ecosystem, exists within and for the benefit of society. The ecosystem with open boundaries can even be seen to allow for the coming and going of other external actors. Soci(et)al (read: social and/or societal, depending upon the geo-cultural perspective) entrepreneurship can be seen as entrepreneurship taking place within a societal (non-corporate) context providing some kind of societal utility. Societal entrepreneurship is integrated into the thesis due to the interest in interaction between nascent entrepreneurs and the environment with which they interact. Only some members of the role-set are directly tied to the university landscape (through employment or affiliation). Thus the remainder could be seen as members of the entrepreneurial ecosystem, but with other roles in society.

2.1.1 Entrepreneurship at the University – University Entrepreneurship

Entrepreneurship at the university is most commonly understood as the transfer of university research to society through commercialization or utilization activities. These activities can include technology transfer, patenting, venture creation, incubation and science park development, and regional development, among others (Libecap, 2005, Rothaermel et al., 2007, Shane, 2004b). Technology transfer and research commercialization or utilization most often results in the creation of property which is intellectual or knowledge-based, either in the form of a patent or agreement, which can then be transferred into a license, collaboration or venture (for example De Coster and Butler, 2005, Wright et al., 2004). In general, university incubators have the purpose to promote the development of new research or technology-based ideas stemming from the university (Hackett and Dilts, 2004, McAdam et al., 2006). They act as coordinators of research, technology, capital and entrepreneurial drive towards industrial partners or customers through a commercialization process. Thus university business incubators are also involved in new venture creation, assisting emerging ventures through provision of market access, services, support networks and financing (Grimaldi and Grandi, 2005, McAdam and McAdam, 2006).

Research commercialization and utilization activities are recognized as broadly defined under the term university entrepreneurship, structured into four sub-streams: entrepreneurial university, productivity of technology transfer offices, new firm creation, and environmental context including networks of innovation (Rothaermel et al., 2007). Rothaermel and colleagues present a conceptual framework (Figure 3) which illustrates the interaction and integration of the four sub-streams, facilitating the process of entrepreneurship at the university.

The entrepreneurial university represents one way of describing the university which has evolved from a traditional teaching and research institution (Dasgupta and David, 1994, Etzkowitz, 2004, Lambert, 2003, Nelson, 2004, Stevens, 2004, among others) to a commercial actor in society. Many societal factors related to the 'environmental context including networks of innovation' presented in Rothaermel et al. (2007) conceptual framework (see Figure 3) are not specifically addressed. Thus, it is important to point out some of the specific components associated to existing national regulations that impact the empirical setting from the societal level, in the context of this particular study.

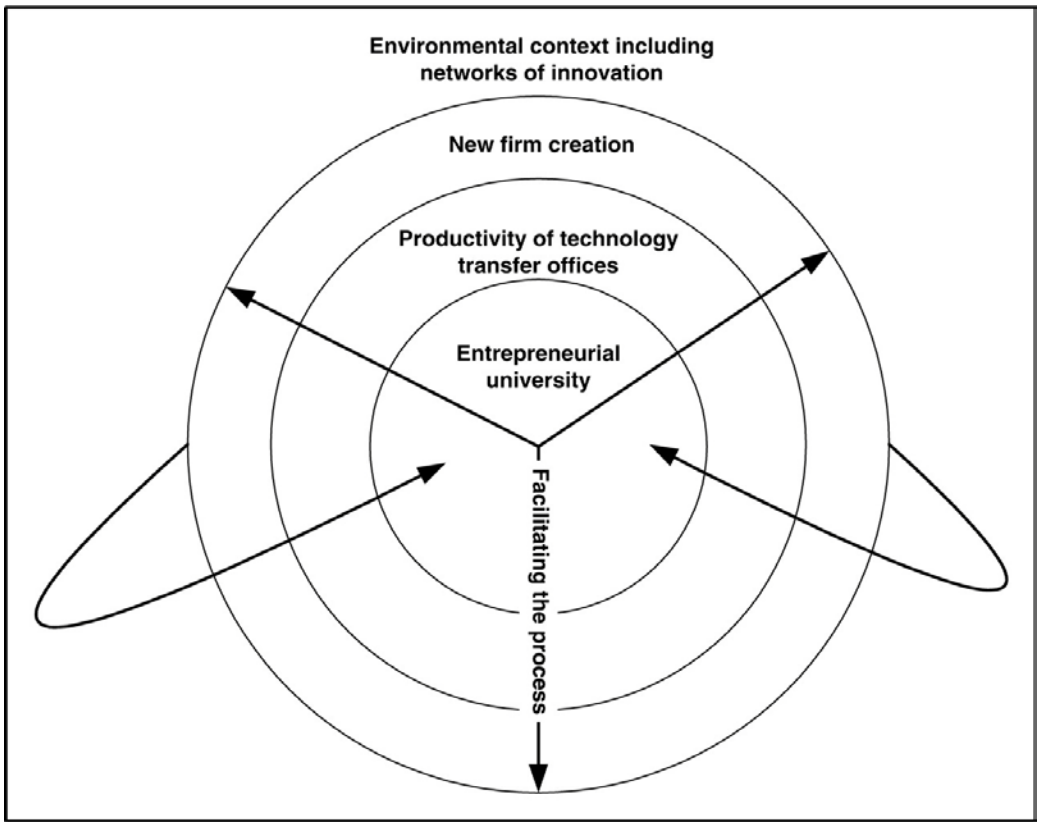


Figure 3. Rothaermel et al. (2007) Conceptual framework of university entrepreneurship

The addition of commercial activity to the university has been explained in certain research literature through the triple helix model where university-industry-government cooperation is intended drive regional development (Etzkowitz and Leydesdorff, 2000, Etzkowitz et al., 2000). Commercial activity has brought regulatory changes. One key example is the governmental regulation regarding ownership of intellectual property at the university. The two national contexts explored in this thesis are Sweden and the U.S. In Sweden, university researchers hold, independently, the responsibility of commercializing their research – this is commonly known as the teacher's exemption or professor's privilege[3]. This differs from the

[3] SFS 1949:345§1-10: This law, known as the teacher's exemption or the professor's privilege, states that the results of publically-funded research are owned by the researcher (usually the professor) and not the research institution at which it was conducted. In Sweden, the scope extends to include teachers, post graduates and doctoral candidates.

more common university regulation utilized in many countries, stemming largely from the model developed in the United States, known as the Bayh-Dole Act[4], and copied in other industrialized countries (O'Connor et al., 2010). These policies stipulate the rights and responsibilities for universities when commercializing federally funded research. Literature has explored the effects and impact of the regulatory changes (Bozeman, 2000, Goldfarb and Henrekson, 2003, Mowery et al., 2001). The regulatory changes are impacting the environment in which entrepreneurial activity is taking place at the university, for example through ownership rights. Financing levels and objectives differ across regions and between nations, in part dependent upon tax structures and regulations. Regional (for example Cooke, 2001, Cooke et al., 1997) and national (for example Edquist, 2006, Lundvall et al., 2002) impact on entrepreneurial activity is an extensive area of research, the details of which are outside the scope of this thesis. Additional legal norms and infrastructure also impact entrepreneurial activity from a societal level. For example, it is generally acknowledged that the legal consequences of bankruptcy in Sweden have a more significant impact on entrepreneurial activity than in other parts of the world.

2.1.2 Entrepreneurship Education at the University

Entrepreneurial education can be understood as a common phenomenon within the university setting (Fayolle and Kyrö, 2008, Finkle and Deeds, 2001, Katz, 2003, McMullan and Long, 1987, Solomon, 2007). University-level entrepreneurial education with emphasis towards venture creation (Menzies, 2004) has implicitly the same intent as the third mission of the university – to contribute to future economic development stemming from new innovations. Combining entrepreneurial education and university entrepreneurship activities (Moroz et al., 2006, Nelson et al., 2005, Pittaway and Cope, 2007, Siegel et al., 2005), allows for using ideas left 'on-the-shelf' by university researchers (Vestergaard, 2007), particularly in the form of venture creation and incubation. However, while it is recognized that university technology transfer and entrepreneurial education may be complementary, relatively little integration of the two areas has taken place (Nelson et al., 2005). Nelson et al. found that, based on three studies at Stanford University, the most effective integration was through soft rather than structured channels, allowing for autonomy and flexibility. This is perhaps due to the potential challenges encountered when combining academic and business perspectives and objectives, such as concerns regarding entrepreneurial activity leading to potentially conflicting roles and responsibilities of university employees (Laukkanen, 2003, Siegel et al., 2007, Tuunainen, 2005).

Research regarding action-based entrepreneurial education at selected Swedish universities, including Chalmers, has been conducted in the past (Jacob et al., 2003, Rasmussen and Sorheim, 2006). However, more longitudinal and in-depth research is needed (Pettigrew et al., 2001). The educational component of the empirical setting is considered important in relation to the objective of studying entrepreneurial behavior as it facilitates a setting intent upon training and development as part of a learning process.

[4] U. S. University and Small Business Patent Procedures Act (The Bayh-Dole Act). This Act is a form of institutional ownership, where publically-funded research is owned by the institution at which the researcher works and conducted the research. Bayh-Dole also extends to non-profit institutions. Generally the Act operates under remuneration, such that a portion of the royalty obtained from marketed items is distributed to the researchers.

2.1.3 Entrepreneurial Activity at the University

While university entrepreneurship covers a substantial proportion of the general entrepreneurial activity taking place at and/or associated with the university, there are some areas of entrepreneurial activity conducted by individuals at the university, which have to a greater or lesser extent been discussed in independently established streams of entrepreneurship research. Louis, et al. (1989) provides an overview of entrepreneurial activity common in the university setting including academic (Glassman et al., 2003, Shane, 2004a), research (Kurek et al., 2007) and institutional (DiMaggio, 1988) entrepreneurship. Academic, research and institutional entrepreneurs differentiate from the majority of university researchers who are not interested in championing their ideas in the marketplace by taking on the role of entrepreneur because they already have a decided career path within academia (Bosma and Harding, 2007). While academic, research and institutional entrepreneurs are not the prime objects of study, they represent other entrepreneurial actors at the university that have the potential to both impact the entrepreneurial behavior of the nascent entrepreneurs, as well as be impacted by systemic factors shaping their own behavior. Kenney and Goe (2004) found that sub-cultures supportive of entrepreneurial activity can counter the disincentives of a university environment ambivalent to entrepreneurial development. These 'other' entrepreneurs may take on responsibilities as mentors and role models in the venture team role-sets of the nascent entrepreneurs and impact the development of their behavior as they engage in the creation of new ventures. There is sparse research regarding the team aspect of entrepreneurship, though with recent work by (Ensley et al., 1999, Ensley et al., 2002), but it is generally recognized that there is a strong team component that contributes to entrepreneurship and venture creation (Davidsson and Wiklund, 2001).

Entrepreneurial activity at the university is not limited to the nascent entrepreneur (whether this be a hired professional, a student, or someone else) and those immediately associated to her, such as entrepreneurial team members. The nascent entrepreneur is associated to a particular social network, called a role-set (Aldrich and Zimmer, 1986, Carsrud and Johnson, 1989). The role-set is a set of individuals that impact the social context of entrepreneurial behavior of the entrepreneur (in this case, nascent), as they partake in defining the social status of the 'role' of nascent entrepreneur. The role-set operates in various organizational configurations, sometimes with local norms and routines separate or even autonomous to those of the nascent entrepreneur. They may be employed within or outside the university, or may have partial employments, introducing multiple role responsibilities. In this thesis, I define the role-set to not only include the family members, financers, partners and distributors suggested by Carsrud and Johnson (1989), but also other advisors and coaches, such as faculty, alumni and board members.

2.2 The Core Empirical Setting - Entrepreneurial Activity at the Subunit

The Venture Creation Subunit (VCS) at Chalmers University of Technology (Chalmers) is the core empirical setting in the thesis. The setting consists of a combined masters-degree entrepreneurial education and an incubator, operating at a technical university, and is considered as an environment in which individuals engage in a process of opportunity-based high-growth potential venture creation. A community of stakeholders, both formally and informally linked to the subunit, described as a role-set, interact with nascent entrepreneurs as they collectively create new ventures. Insider access to the empirical setting allows for real-

time in-depth study, giving deep understanding to interactions facilitating the development of both the new venture and the nascent entrepreneurs. Application and admissions requires that individuals communicate their motivation towards engaging in and learning about venture creation, which is considered to signify intention. Upon acceptance, individuals go through a period of training and development before entering the one-year incubation period. Incubation period entry is again considered to signify intention, this time coupled with signing a contractual agreement. The Chalmers VCS is argued as providing insight into critical junctures (Vohora et al., 2004) during the nascent process, and facilitating the development of entrepreneurial behavior, as the environment produces newly incorporated firms on a yearly basis.

As of February 2010, more than 250 nascent entrepreneurs have graduated from the Chalmers VCS, since its initiation in 1997. The Chalmers VCS has a track record of repeated venture creation and firm incorporation, summarized as 112 ventures attempted, of which 43 (38.4%) were successfully incorporated, and 35 (31.25%) are still in business (as of end of year 2009). This represents an 81% survival rate of incorporated ventures, with approximately 40% of the nascent entrepreneurs engaged in venture creation during the incubation period employed into the venture at time of incorporation. The remaining did not continue with the project at time of incorporation, either due to lack of financing to support their continued involvement or a conscious choice to pursue an alternative employment position. The Chalmers VCS is considered representative of high-growth potential, as the combined portfolio of companies have a shared market value (as of end of year 2009) of 69.6 MEUR, having attracted more than 29.4MEUR in investments, and in total employ 312 individuals (Berggren et al., 2010).

In the Chalmers VCS, there is a need for certain structural designs that establish some boundaries between academic and business activities, due to legal requirements. Academic activities are organized under masters programs while business activities are organized under the incubator (presented as the Education and Incubation “boxes” Figure 4). However, actors working and associated to the academic and business activities are co-located at the Chalmers VCS within which they also conduct combined academic and business activities. Thus, for the most part, both separate and combined activities of the Chalmers VCS are conceptually organized under two entities labeled as schools (represented by the dashed line “box” in Figure 4). Each school has a specific area of concentration: one builds technology-based ventures, ranging from nanotechnology to applied materials, covering all the main engineering sciences and information technologies – called Chalmers School of Entrepreneurship (CSE), while the other builds bio- and life science-based ventures – called Gothenburg International Bioscience Business School (GIBBS).

The university housing the core empirical setting, Chalmers, and its various subsystems and subunits, has been described as an entrepreneurial university (Clark, 1998). As early as the 1980s, researchers were investigating the spin-out company rates at Chalmers in comparison to rates at Stanford University and Massachusetts Institute of Technology, finding that the rates were comparable, though Chalmers companies were smaller and newer (McQueen and Wallmark, 1982). These same researchers then specifically focused on faculty performance in relation to innovation activities, with evidence supporting an increasing rate of entrepreneurial activity in the form of spin-out companies, as correlated to patenting activity (McQueen and Wallmark, 1984). Both studies recognize entrepreneurial activity taking place

at the subunit levels of the university. As these activities evolved at the university, so did the research policy of Chalmers, oriented towards transforming into an entrepreneurial actor, thus drawing attention to the importance of interaction between the national innovation policy, at the societal level, and the organizational autonomy and flexibility at the subunit and other operational levels (Jacob et al., 2003). The Jacob et al. study showed that both infrastructural and cultural changes were necessary to achieve creation of an entrepreneurial university at Chalmers.

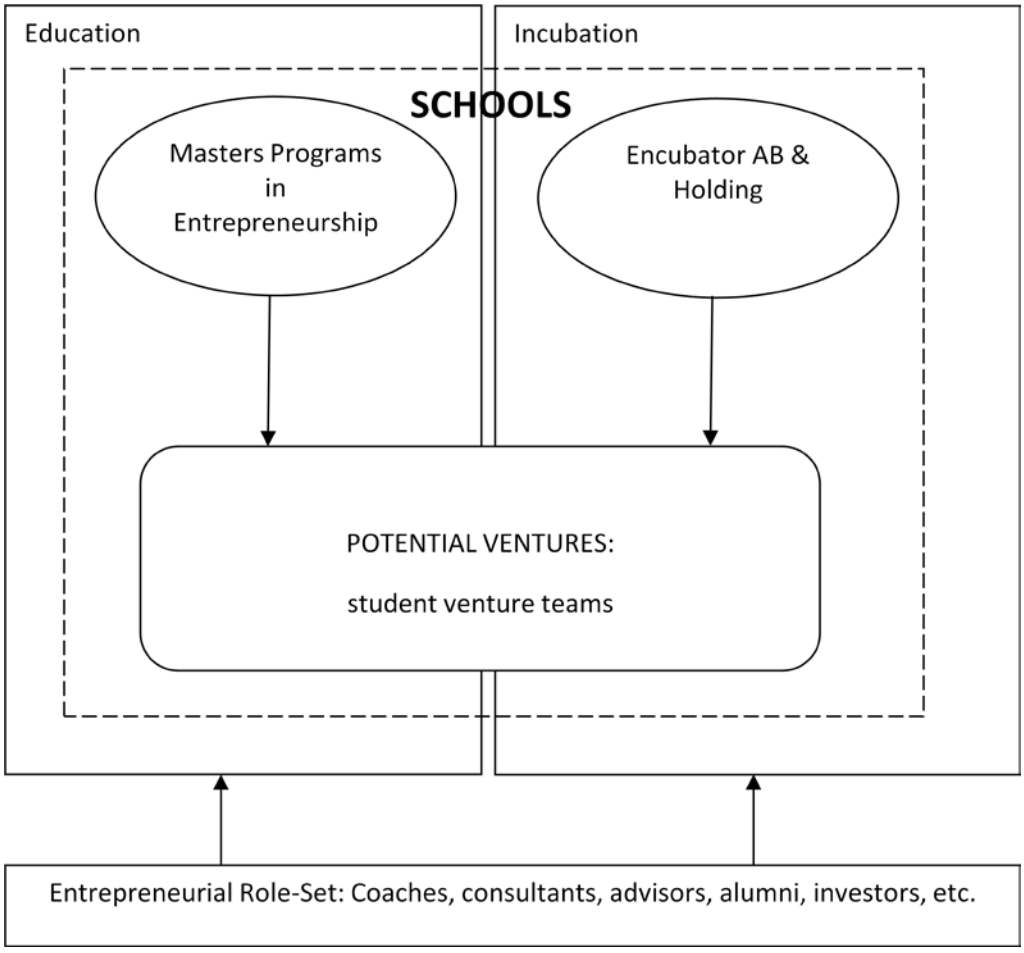


Figure 4. The integrated education and incubation environment

Comparable to the Chalmers VCS are subunits at other universities engaging in entrepreneurial activity, but stemming from different points of departure in regards to their mission objectives. These subunits are also considered to be venture creation subunits as they are environments in which individuals engage in a process of opportunity-based high-growth potential venture creation, supported by additional actors. The University of Pennsylvania Center of Technology Transfer (CTT) case represents a university subunit championing transfer of university technology and research findings, which has reached out to both the research and education communities at the university to develop programs that can facilitate delivery towards multiple missions simultaneously. The Engines and Energy Conversion Lab (EECL) at Colorado State University (CSU) represents a subunit with a steep tradition in

research which has evolved through university-industry collaboration to become a Supercluster™ linking research, education and venture creation. While each of the university subunits have one of the three university missions as their core operating objective, each actively pursues multiple missions through synergized activities at the local level, and in some cases across subunits. The Chalmers VCS is considered the intrinsic case (Stake, 2005) of the thesis, as it is a case in which the phenomenon of study can be investigated in order to gain deeper understanding. The VCSs of University of Pennsylvania and Colorado State University are used as comparison studies, addressed specifically in the first appended paper. The intrinsic and additional cases of the thesis are discussed in detail in Chapter 4, and presented as part of the appended paper discussions in Chapter 5.

3 THEORY AND LITERATURE EXPLORING ENTREPRENEURIAL BEHAVIOR DEVELOPMENT

Stevenson and Jarillo claim that "individuals in our society may attempt entrepreneurship and often succeed even if they do not fit the standards of academic judges as to their entrepreneurial personality" (1990, p 22). Davidsson notes that perhaps there is more value in the question "'How does the process affect the person?' rather than 'How does the personality impact entering the process?'" (2006, p 10). Chapter 1 defined entrepreneurial behavior as an individual phenomenon developed over time through a process of creating a new venture within a structured context. The scope of investigation was refined to the nascent phase with emphasis on opportunity-based, high-growth potential venture development taking place within the university setting. Chapter 3 starts by reviewing literature regarding nascent entrepreneurship and the entrepreneurial process, culminating in a synthesized conceptual model of the entrepreneurial process. Actions related to the process as well as categories of entrepreneurial behavior are then derived from literature. I return to Gartner's behavioral approach (1988) as a basis for connecting the process to the environmental. Using Social Learning Theory (Bandura, 1977), combined with other theories, I translate understanding of how interaction with one's environment can influence the development of entrepreneurial behavior, resulting in a proposed model for facilitation of entrepreneurial behavior development. Finally, I return to the synthesized process model to identify factors influencing entrepreneurial behavior development.

3.1 NASCENT ENTREPRENEURSHIP

Nascent entrepreneurship, also known as firm gestation or organizational emergence, start-up, founding, etc. (Aldrich, 1999, Carter et al., 1996), has recently been thoroughly reviewed by Paul Reynolds (Reynolds, 2007, Reynolds and Curtin, 2008) and Per Davidsson (Davidsson, 2006). The term nascent indicates initial engagement in entrepreneurship, but with lack of prior experience (Rotefoss, 2005). Generally, nascent entrepreneurship regards entrepreneurship up to the point of firm establishment. Reynolds (2000) describes the creation of a new venture as a process in four stages – conception, gestation, infancy and adolescence – signifying development into some form of organizational legitimacy, where the venture becomes recognizable to the marketplace. Accessing the pre-incorporation phase of development, including both of the potential future venture and the nascent entrepreneur(s) championing the process, has proven the main challenge of nascent entrepreneurship research. Furthermore, studies which have addressed gestation have given little attention to environmental factors (Liao and Welsch, 2008).

A growing stream of research is attempting to investigate and better understand nascent entrepreneurship as it occurs, through large scale, systematic studies. These studies, such as the Panel Studies of Entrepreneurial Dynamics (PSED) I and II (Gartner et al., 2004, Reynolds, 2000, Reynolds, 2007, Reynolds et al., 2004), generally attempt to identify individuals that have initiated engagement in the process of entrepreneurship (defined as new firm creation) and investigate factors[5] of the entrepreneurial process that might influence

[5] PSED's 130 factors are not specifically addressed as: 1) PSED studies nascent entrepreneurship in the general population, 2) is recognized as not highly representative of the opportunity-based, high-pot.new venture creation, 3) is mainly investigating the individuals (and their factors), and not environmental factors, and 4) based on partial review of factors, for example as available in appendices of Reynolds (2007) results of PSED, these are considered comparable to the factors identified by Baron (2002) and Bygrave and Churchill (1989) discussed in section 3.2.

their engagement in becoming nascent entrepreneurs. PSED I initiated a broad spectrum screening of a general population by first asking the fundamental question – are you, alone or with others, currently trying to start a business (for yourself or for an employer); or are you currently the owner of a business you help manage – and then investigated more than 130 factors potentially associated with the entrepreneurial process from the entry point to firm creation, as well as creation failure or disengagement. PSED II data built upon the same starting point and the identified respondents as nascent entrepreneurs based on three criteria: (1) they performed some start-up activity in the past 12 months, (2) they expected to own all or part of the new firm, and (3) the efforts could be not be considered an operating business (Reynolds and Curtin, 2009). Initial findings support a behavioral approach to entrepreneurship, stating that it is the actions taken by the individual(s), and not their characteristics, that impacts new firm creation. In particular, developing a productive process, establishing firm presence, and creating organizational and financial structures seem to be the most important actions identified (Reynolds, 2007).

Large scale studies have, however, faced some challenges regarding definitions of entry and exit, heterogeneity of populations, various biases, and under-coverage. Studies often under-represent 'high-growth potential' ventures (Siegel et al., 1993). The comprehensive Australian Study of entrepreneurial emergence (CAUSEE), has attempted to address this issue by establishing specific selection criteria for 'high-growth potential' ventures (in addition to other types of ventures) by specifically targeting university commercialization offices, patent agencies, and innovation and technology networks, among others, to collect data (Senyard et al., 2009). Using this argumentation for selection, the university engaging in a third mission is determined as viable for studying opportunity-based high-growth potential new ventures.

Davidsson (2006) makes the point that nascent is not so much a type of entrepreneur or entrepreneurship as it is a designation of a phase in the process. The nascent phase of entrepreneurship is important to entrepreneurship research because of the emphasis on emergence and the development that takes place as organizations become 'real' (Shane and Venkataraman, 2000). Thus, I review the process of venture creation, including different phases in order to understand the actions and behavior developed as this process takes place.

3.2 The Entrepreneurial Process: Phases and Models

In order to study the facilitation of entrepreneurial behavior development over time, an understanding of the entrepreneurial process is required. Researchers have addressed the process of creating a new venture by asking the questions such as 'how does the organization come into existence?' (Herbert and Link, 1982, Shapero and Sokol, 1982) only to find that a process of entrepreneurship does not follow one distinct sequence of events (Alsos and Kolvereid, 1998, Carter et al., 1996, Gartner and Carter, 2003). Even so, a review of literature results in various conceptual models of the entrepreneurial process, three of which I relate to directly in this thesis (Baron, 2002, Bygrave and Churchill, 1989, Reynolds et al., 2004). Exploring models of the entrepreneurship process in association to the context of the university, I also relate to Rothaermel et al. (2007) to include processes of incubation and technology transfer, as discussed in Chapter 2 (Section 2.1.1). Review of incubation and technology transfer literature results in conceptual models which can be aligned with those of

Baron, Bygrave and Churchill, and Reynolds et al. By relating the different models and descriptions to one another, including the incubation and technology transfer process descriptions, I present a synthesis of models in order to explain the general phases of the entrepreneurial process, emphasizing the emerging (nascent) phase of a new venture being created (see Figure 5).

The Reynolds et al. (2004) model signifies transition into and out of a gestation phase. Transition into the gestation phase is considered a shift from inaction to action, such that nascent entrepreneurship has been initiated. I interpret this first transition point as the identification of the idea as a viable opportunity. The shift into the action, a phase which I term emerging (nascent) phase, allows for investigation of factors associated to the efforts of the nascent entrepreneur, including those through interaction with others, as they attempt to create a venture. The transition point into the emerging (nascent) phase (Transition 1 in Figure 5) occurs when the idea is recognized or conceived in visual or written format such that it can be communicated to another person as a viable opportunity, the idea is selected to be incubated, or the idea is disclosed for intended transference. Thus, activities up to Transition 1 have not specifically focused upon the development of an idea towards the creation of a new venture, but rather have been research or development towards conceptual or applicable problems.

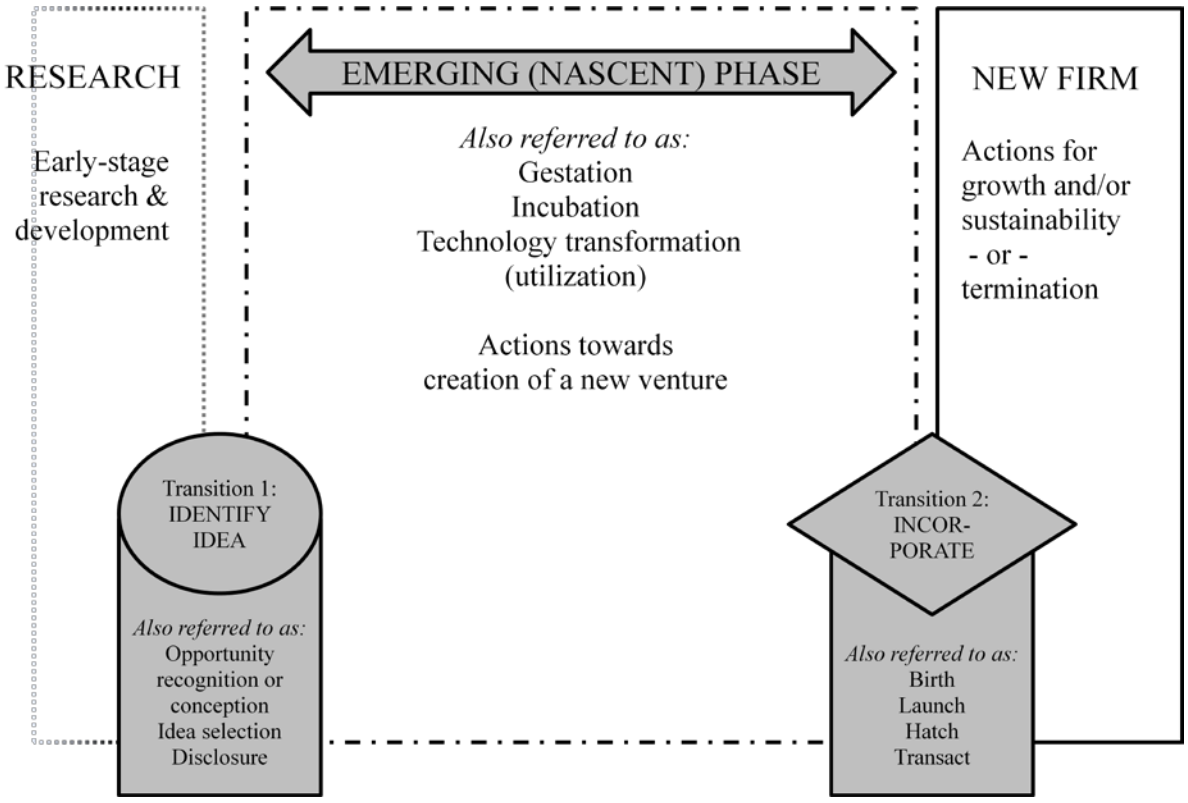


Figure 5. Synthesized model of the entrepreneurial process

The second transition identified by Reynolds et al. (2004) involves the 'birth' of the venture, thus shifting from the gestation phase to an infancy phase. Reynolds et al. describe the

infancy phase as one in which the new venture struggles to establish itself and pursues one of three main paths: growth, stable survival or termination. Based on this, I interpret the second transition point as incorporation of a venture. I propose that Baron's term launch, signifying the event and comparable to the transition point of birth of Reynolds et al., along with the hatch of the incubated firm and the transaction of the technology, are comparable to the incorporation of the venture, Transition 2, as illustrated in Figure 5. In between these points, I argue that the both the pre-launch and launch activities communicated by Baron are in fact associated to the activities taking place in the emerging (nascent) phase, while the post-launch activities are comparable to activities for growth or sustainability of the new firm. Similarly, the activities of the technology transfer process and incubation exist in this phase as they are conducted in order to prepare for transaction or transference out of the university into the market. Hackett and Dilts (2004) summarize (from for example Campbell et al. (1985)) incubation activities to include diagnosis of business needs, selection and application of business services, financing and network access. Harmon et al. (1997) outline models of the technology transfer process to include activities regarding idea generation, disclosure, technology development, patenting, and transference to an actor outside the university. These activities are associated to the emerging (nascent) phase in Figure 5. The activities of the emerging (nascent) and new firm phases are summarized and related to categories of entrepreneurial behavior in Table 1 in the following section.

3.2.1 Process Shaping Behavior – Actions of the Emerging (Nascent) Phase

Liao and Welsch (2008) explore the new venture creation process, differentiating between technology and non-technology based nascent entrepreneurs, defining 26 start-up activities (listed A to Z), including, for example: prepared a business plan, applied for patent/copyright/trademark, sought funds from financial institutions/individuals, etc. Based on a review of start-up process and activity literature, and consistent with Delmar and Shane (2002), they allocate the 26 activities into four categories: planning activities, establishing legitimacy, resource combination, and market behavior (see Appendix A for full list and categorization). Liao and Welsch find significant support suggesting that technology-based nascent entrepreneurs engage in a greater number of activities in the categories of planning activities, establishing legitimacy and market behavior because these activities are more intensive for them in comparison with non technology-based nascent entrepreneurs.

I adopt Liao and Welsch's (2008) categories, which I in turn term entrepreneurial behaviors. I do this based on the definition of entrepreneurial behavior presented in Chapter 1 stating that entrepreneurial behavior is discrete units of actions carried out through a process in which a new venture [organization] is the outcome. The categories are seen to also align with the general behaviors taken from Reynolds (2007), where establishing legitimacy relates to establishing firm presence and the other categories relate to creating organizational and financial structures. The activities identified by Baron (2002) and others, as well as actions outlined in association to incubation and technology transfer[6], are associated to the emerging (nascent) and new firm phases in Figure 5. These are compared to the 26 activities of Liao and Welsch in order to designate the activities as relative to categories of entrepreneurial

[6] Diagnosis of business needs, selection and application of business services, financing and network access, and technology development and patenting.

behavior. This is summarized in Table 1. Subscript letters are used to designate the reference for each action listed.

I argue that the categories proposed by Liao and Welsch are consistent with the choices I have made for my thesis. Technology-based entrepreneurship is designated as comparable to the opportunity-based, high-growth potential focus of my research. Liao and Welsch are building their study on nascent entrepreneurial activity, utilizing PSED data. Finally, they utilize a process approach (Van de Ven and Engleman, 2004) (as compared to an outcome-driven approach), building upon the work of Paul Reynolds, in a fashion considered comparable to what I have proposed.

Table 1. Categorizing actions associated to the emerging and new firm phases

Entrepreneurial Behaviors	**Actions associated to the emerging (nascent) phase**	**Actions associated to the new firm phase**
Planning Activities	Search for opportunity [a,d], identify funding sources [a,c], diagnose business needs [c]	Sales and business development strategies [a], communication with staff and stakeholders [a]
Establishing Legitimacy	Determine legal form [a], determine individual role (title) [b,c,d]	Leadership [a], communication with staff, customers and stakeholders [a], conflict management [a], pay taxes [e]
Resource Combination	Technology development [d], protect/secure intellectual property (patenting) [a,d], secure funding sources [a,c], secure network [c], product or service development [c]	Staffing [a], product or service distribution [c], communication with customers, partners, suppliers and distributors [a,c]
Market Behavior	Identify opportunity [a,d], select application and business model [c,d], secure suppliers and distributors [c], compete [b]	Compete [b], marketing and sales [a], communication with customers, partners, suppliers and distributors [a,c]

a Baron (2002); b Bygrave and Churchill (1989); c Hackett and Dilts (2004); d Harmon et al. (1997); e Reynolds et al. (2004)

3.3 DEVELOPING BEHAVIOR

> *"If my intention was to find answers to issues about how individuals navigated through the complexity of a phenomenon that accounted for aspects of: themselves (the individual), how they went about the process, the kind of business they decided to engage in, and, the context (environment) in which these actions take place, then my quantitative empirical studies[7] were not likely to find answers in the way that my theories and ideas posited. … the nuances of particular entrepreneurial situations, the nuances that actually characterize how individuals go about thinking through, over time, the complications of utilizing their capabilities and resources as they are*

[7] Such as the Panel Studies of Entrepreneurial Dynamics I and II [footnote is not in the original text]

both informed by, and seek to change their circumstances, is 'averaged' away." (Gartner, 2010, p 11)

Entrepreneurial behavior can be seen as action taken in relation to the process endured and the environment that constitutes the contextual events (Gartner, 1988, Gartner and Carter, 2003). Gartner addresses this interactivity as the 'critical mess' (Gartner, 2006) – the nuances of the situation in relation to the process. The interaction with the situation [the environment constituted by context], including both structural and social components, incorporates development of behavior that is both constructing and reactionary, sometimes following the examples of others, experienced members of the role-set, other times leading with independent ideas (Sarasvathy, 2001). To follow Gartner's 'intention to find answers' is to explore the nuances of the actions of the entrepreneur and how her decisions are informed as she attempts to create a new venture. As noted from previous findings mentioned earlier (Reynolds, 2007) and from review of the phases of the entrepreneurial process (section 3.2), it is in the emerging (nascent) phase that actions impact the establishment, or not, of the firm, and thus where entrepreneurial behaviors are tested and either adopted when proven successful, or refined or abandoned if unsuccessful.

"In emerging organizations, entrepreneurs offer plausible explanations of current and future equivocal events as non-equivocal interpretation. Entrepreneurs talk and act 'as if' equivocal events are non-equivocal. Emerging organizations are elaborate fictions of proposed probable future states of existence" (Gartner et al., 1992, p 17).

In this thesis, I argue that the dimensions informing decisions and influencing actions stem not only from the nascent entrepreneur, but her environment and the way in which they interact. Thus, while entrepreneurial behavior is understood as an individual phenomenon, it can be seen as also developed through situational learning and interaction while the individual is engaged in the process of creating a new venture: a 'weaving' of actions and interactions (Bouwen and Steyaert, 1990, Johannisson and Mønsted, 1997). Research has investigated how person and environmental factors influence intention towards behavior (Lüthje and Franke, 2003), but less is known about how social interaction influences observable behavior. Therefore, the development of nascent entrepreneurs' behavior, and how the development can be facilitated in this thesis, is studied by exploring the positioning relative to other actors, impacted by one's environment during the creation of a new venture. I argue that this is an approach that has not yet been significantly studied and which may be enabled by involvement in a venture creation environment. Learning by doing within an environment which allows decision hypothesizing and feedback facilitates the entrepreneur's acting 'as if' during the process of creating a new venture.

3.4 Understanding Behavioral Development in a Social Context

Social Learning Theory states that human behavior is continuous reciprocal interaction between influences of the individual (cognitive, namely attention to and retention of information), her actions, and her environment (Bandura, 1977). Individuals learn from one another as they interact through a mixture of internal and external processes in which they observe and practice behavior. These processes include observational learning, imitation, and

social modeling. Individuals observe and take note of the behavior of others, perceived as knowledgeable or credible, and then practice the behavior and experience the consequences of the behavior. Social learning is dependent upon interaction between individuals and the extent to which they succeed or fail in promoting emotional and practical skills, shaping self-perception and perception by others.

Social Learning Theory is linked to the concepts of self-efficacy (Bandura, 1982) and reciprocal determinism (Bandura, 1978). Self-efficacy is an individual's expectation of success in a situation. Levels of self-efficacy equate to the individual's expectation of their contribution to a given setting. Reciprocal determinism is how the individual and her environment affect each other in a way that impacts behavior. Behavior is learned not only through observation of others, but then through practicing the actions required to perform the behavior (Bratton et al., 2010, p 169). Interaction with the environment, including individuals in the environment, affects and provides information about the understanding and practice of behaviors, which can then influence self-efficacy. Relating to the field of entrepreneurship, Carsrud and Johnson's (1989) propose that entrepreneurial behavior is determined by social context and situations, including role-sets (Aldrich and Zimmer, 1986) and patterns of social interaction leading to entrepreneurial self-efficacy (Pruett et al., 2009) in relation to specific resources. As already mentioned in Chapter 2 (Section 2.1.3), I propose a role-set definition that not only includes the family members, financers, partners and distributors suggested by Carsrud and Johnson (1989), but also includes other advisors and coaches, such as faculty, alumni and board members.

Bandura's theories relate to Vygotsky's Principle which states that behavior is developed both on a social level and on an individual level (Vygotsky, 1978, p 57), initiating with the social level, such that behaviors "originate as actual relationships between individuals." Expanding upon Vygotsky, the focus on the contribution of the others in the social interaction can be understood as a mentor-mentee relationship where the less skilled mentee attempts to accomplish a task, supported by the mentor. If the mentee cannot perform the task to completion, the mentor helps to accomplish the task, in a way that the mentee can observe and copy the mentor's actions for future tasks (Harré and van Langenhove, 1999).

The process of entrepreneurship has been seen as depending on human capital (Kim et al., 2006) and team structure (Aldrich et al., 2003), such that the entrepreneur is affected by the interaction of individuals, with regard to roles taken (Shepherd and Haynie, 2009). The role-sets of nascent entrepreneurs are thus seen as contributing to the development associated to the entrepreneurial action. Senior members, actors in the role-set, influence nascent entrepreneurs as individuals have natural tendencies to defer to the beliefs of others, offsetting their natural experimentation and utility (Aldrich and Martinez, 2001). Within uncertain environments social norms are likely to have the greatest impact on behavior (Cialdini and Trost, 1998). In the empirical landscape of the thesis, social norms are mainly orchestrated by the role-set of the nascent entrepreneur.

I relate general Social Learning Theory to Creation Theory used within the field of entrepreneurship in regards to decision processes. In Creation Theory, decision making is seen as testing hypotheses and building argumentation, as compared to a making a decision to bear a certain amount of risk based on analyzing the opportunity to determine probabilities of

success (Discovery Theory) (Alvarez and Barney, 2007). The iterations of the hypothesis testing, through which the viable opportunity emerges, illustrate that behavior is developed through the social interaction with the marketplace. The entrepreneurial process can be understood as continued testing of hypotheses in order to determine how the opportunity is 'best' pursued. This aligns with a perspective of entrepreneurial behavior development, as behavioral learning through experimental and experiential engagement in the process, and utilizing interpretation and feedback from surrounding factors as part of the decision to act in one particular way or another (Anderson, 2000). As engaging in the entrepreneurial process is considered critical to import some of the knowledge, skill and attitude of an entrepreneur (Fletcher and Watson, 2007, Garavan and O'Cinneide, 1994, Rae, 2005, Rasmussen and Sorheim, 2006, Solomon, 2007, Souitaris et al., 2007), learning through experience is considered valuable in shaping behavior (Deakins and Freel, 1998). Furthermore, entrepreneurship education and training has been shown to influence entrepreneurial behavior and future intentions to engage in entrepreneurship (Fayolle, 2005). The next section will review different learning approaches that have been proposed to for developing entrepreneurial behavior.

3.5 Facilitating Behavior Development through Entrepreneurial Learning

Emphasis on developing new entrepreneurs is marked by the continued growth of entrepreneurial education programs (Finkle and Deeds, 2001, Katz, 2003, McMullan and Long, 1987, Solomon, 2007). But developing new entrepreneurs through education has been and can be conducted in different ways, with different objectives and associated results (Kickul and Fayolle, 2007). Learning can be seen as the dynamic process which enables entrepreneurial behavior to be enacted (Rae and Carswell, 2001). However, once again, this simple statement does not provide any simple answers as learning too is designated as a complex phenomenon (Nicolini and Mesnar, 1995). However, prominent researchers within the field of entrepreneurship education (for example Cope and Watts, 2000, Gibb, 1997, Hjorth and Johannisson, 2007) provide a definition of learning as the potential to change behavior based on processing of information. I build on this definition of learning as the potential to change or develop behavior, where the processing of information which is conducted by the individual is impacted by the environment, through both availability of information and interaction around information.

A review of entrepreneurship education literature (Mwasalwiba, 2010) draws distinctions between education conducted *for*, *about*, *in* or *through* entrepreneurship, where the way in which the education is structured is in part contingent upon the intended outcome of the educational process. Education *about* entrepreneurship (Hytti and O'Gorman, 2004) mainly aims to provide general understanding of the subject area. Education *in* entrepreneurship (Kirby, 2004) intends to orient individuals towards entrepreneurial activity in their existing career or working environment. Education *for* entrepreneurship (Henry et al., 2004), providing tools and skills towards starting a business, is recognized as that which would 'create' an entrepreneur, such that the individual had a present or future intention of engaging in entrepreneurship.

Many scholars agree that higher entrepreneurial education has to have an experiential learning perspective together with some kind of interactive pedagogy in order to enhance

learning and innovative capacity (Barrett and Peterson, 2000, Collins et al., 2006, Hjorth and Johannisson, 2007, Honig, 2004, Johannisson et al., 1998, Vinton and Alcock, 2004, Yballe and O'Connor, 2000). Educating *through* entrepreneurship (Kirby, 2004) is recognized as a pedagogic approach to educating *for* entrepreneurship, where educators utilize engagement in new venture creation to provide experiential learning. Experiential learning theory (Kolb, 1984) states that behavior is developed through learning influenced by environmental factors, building from Lewin's understanding of individual and environment as interdependent when shaping behavior (Lewin, 1951, Sansone et al., 2004). Thus, experiential learning is very much in line with Social Learning Theory. Furthermore, Kolb and Kolb (2005) argue that experiential learning uses a learning space, in which learning is influenced by environmental factors in nested arrangements of structures, at macro-, meso-, and micro-levels.

Entrepreneurial education involving experiential learning has also been described as action-based (Rasmussen and Sorheim, 2006). Action-based approaches, such as entrepreneurial-directed approach (Heinonen and Poikkijoki, 2006), often combine experiential and participative learning with traditional classroom teaching and involving co-learning between teacher and student. The main challenge of such approaches is the decrease in predictability and control of the teaching situation. Gibb (1996) proposes an enterprising teaching approach, which he argues is essential for connecting conceptual knowledge to a range of entrepreneurial behaviors. Some of the key elements Gibb proposes are: a focus on process delivery, ownership of learning by participants, learning from mistakes, negotiated learning objectives and session adjustment and flexibility. Gibb claims this approach can facilitate a learning environment which provides ownership, control, autonomy and 'learner'-led rewards. Learning is multi-disciplinary and process-based, employing a wide range of teaching and learning methods such as conventional lectures, seminars, and workshops, focus groups, teaching of peers etc. The focus is on the "internalization" of knowledge and adoption of a definition of real learning as stated by Maples and Webster (1980).

Cope and Watts (2000) argue that developing entrepreneurial behavior is achieved through learning by doing, involving experiential learning methodology, utilizing critical learning incidents from an individual perspective. They emphasize the importance of reflection in garnering learning from experience, particularly through critical incidents, as incidents are often not isolated events, and are impacted by the surrounding environment. Learning approaches including senior mentors or entrepreneurial role models (Sullivan, 2000) are used to provide social learning through observation, imitation and modeling, where mentors facilitate reflection upon actions while nascent entrepreneurs' actively engage in an emerging (nascent) phase of the entrepreneurial process. I see the use of mentors and role models as analogous to Bandura's general explanation of how behavior is developed through Social Learning Theory (Bandura, 1977) using reciprocal determination (Bandura, 1978). Cope and Watts (2000) build upon Sullivan (2000) and Weinrauch (1984) emphasizing the importance of mentors or other actors who can actively listen and give advice regarding the on-going entrepreneurial process.

Based on the above review of learning concepts, I argue that learning by doing combined with mentoring processes can facilitate a decision cycle for testing hypotheses, providing feedback through physical engagement as well as through perception and reaction from the surrounding role-set. I choose to describe this as learning through interaction. Interaction with

the role-set facilitates "generative learning" (Barrett and Peterson, 2000, Gibb, 1997) providing insights into potential future action, including abilities to see possibilities beyond problem barriers. Learning through interaction thus involves experiential learning including reflection-in-action (Schön, 1984) and generative learning based upon cycles of hypothesis testing and feedback between the nascent entrepreneur and her role-set. Positioning theory provides a perspective upon how learning through interaction can be facilitated, building upon conversations between the nascent entrepreneur and her role-set, in which rights and duties regarding the expectations of a role are negotiated and developed.

3.5.1 POSITIONING

According to Katz and Kahn, role behavior is "a process of learning the expectations of others, accepting them and fulfilling them" (1966, p 188) in a repetitive and stable pattern. Harré and van Langenhove explain that "positioning can be seen as a dynamic alternative to the more static concept of role" (1999, p 14) such that "within a conversations, each of the participants always positions the other while simultaneously positioning him or herself" (ibid, p 22). Through discourse, a mutually understood structure for interactions or instigating dialogues evolves in which the roles presented are negotiated, refined or dismissed such that repositioning takes place. This leads to the unfolding of a conversation in which actors determine their own and each other's actions in a social sense through their joint action and narrative (Davies and Harré, 1990). The process can be understood through the notion of a 'positioning triangle': the interplay of the actors' positions, the social impact of what they say and do, and the storylines of each interaction (Davies and Harré, 1990, Harré and van Langenhove, 1999) (see Figure 6). A shift in one aspect of the triangle can affect the others: for example if an actor changes the topic during a conversation, a verbal social force, and the others engaged in the conversation adapt to the change and discuss the topic further, a shift in the storyline has occurred, and the actor that made the change has established a position in relation to the topic.

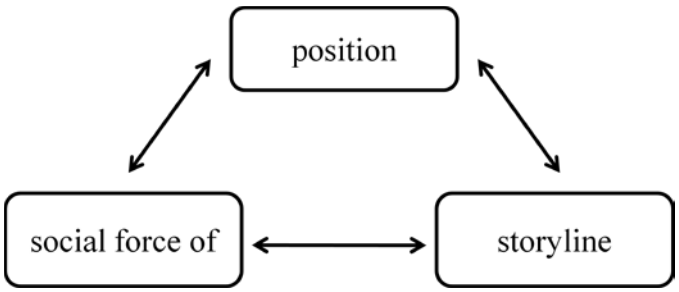


Figure 6. Positioning triangle – a mutually determining triad

Harré and Langenhove state "positioning can be understood as the discursive construction of personal stories that make a person's actions intelligible and relatively determinate as social acts…" (1999, p 18). This recognizes the act of positioning as a communicated process that clarifies the particular 'role' (role is the static description) or interactive relation between those involved. It is important to note that positioning theory is relatively new and not yet established in the field of organizational theory. While I claim that positioning theory can be used as a dynamic analytic scheme to investigate the phenomenon of entrepreneurial behavioral development, it is important to remember that, according to positioning theory,

positioning takes place continually when we interact, and not only when we are in the process of developing behavior. However, it has been proposed that discourse and stories (narrative) can influence construction of entrepreneurial identity (Foss, 2004). Positioning can allow for mutual determination for interaction or can instigate a dialogue or several dialogues in which the 'roles' presented are negotiated and redefined. I see this concept as important to understand the process of developing entrepreneurial behavior because it emphasizes the social interaction that can affect the actions taken by the nascent entrepreneur. I do not specifically apply positioning discursively, but rather recognize the outcomes of discourse in the form of negotiated rights and duties, facilitating (or blocking) positioning relative to a particular role. As the behavior is in the process of development, it is 'tested' and negotiated with other individuals that have definitive 'roles' or are positioned as authorities. In turn, negotiation with these individuals can challenge or change the perception of the individual acting as or aspiring to be the entrepreneur. Applying the concept of negotiated rights and duties allows for exploration of how relationships are formed and developed over time, including understanding of relationship formation and change (Bullough and Draper, 2004).

3.6 Synthesizing Existing Theories

A focus on entrepreneurial behavior allows for a recognition of entrepreneurship as both independent action of one individual and collaborative action based on critical relationships with other actors (Karatas-Özkan and Murphy, 2006). In this thesis, other actors constitute not only the other nascent entrepreneurs in the venture team, but the associated role-set. Development can include the individual developing his or her own behavior, as self-determined or assumed to be entrepreneurial, but this must also be confirmed and appreciated by others. Others include not only the role-set but also additional actors outside the role-set, existent in the greater ecosystem in which the venture creation process is taking place. Thus, while entrepreneurial behavior development is an individual phenomenon, the process in which the development takes place includes a multitude of actors and factors impacting how the behavior is received and affirmed (or not) as it is enacted by the nascent entrepreneur. Thus, the developing process can be further understood through the negotiated rights and duties around the perceived role [of entrepreneur] resulting from positioning. In Figure 7, I illustrate a synthesized understanding of how entrepreneurial behavior development can be facilitated.

As "within a conversation each of the participants always positions the other while simultaneously positioning him or herself" (Harré and van Langenhove, 1999, p 22), positioning theory can be utilized as a tool for understanding the social interactions. Social interactions are then used to facilitate learning related to the development of entrepreneurial behavior. Each event of positioning signifies a change in understanding and action, and a potential for change in behavior, which opens or restricts the ways of making sense about the interaction (Bouwen and Steyaert, 1990). The individual as nascent entrepreneur is accepted, rejected, improved upon and/or in other ways socially determined through the interplay of positions. Rights and duties given, developed, claimed, and championed within conversations in relation to others illustrates the social influence of, for example, the role-set and the various behavioral strategies that are utilized as the individual attempts to fill the aspired role of entrepreneur. Thus, my translation of positioning theory into this conceptual model allows us to examine the interactions of the individuals studied, highlighting how these individuals

communicate their rights and actions in relation to others. Rights, duties, and actions taken evolve into a storyline. The storyline is referred to in order to secure behavior taken and negotiate future action. It is in this way that positioning theory can be utilized to help understand the development of entrepreneurial behavior in individuals engaging in an entrepreneurial process. This is conceptually illustrated in Figure 7, where the interactions are expanded to include an illustration of the negotiated rights and duties that occur through interaction between the nascent entrepreneur and other actors of her environment, most notably her role set.

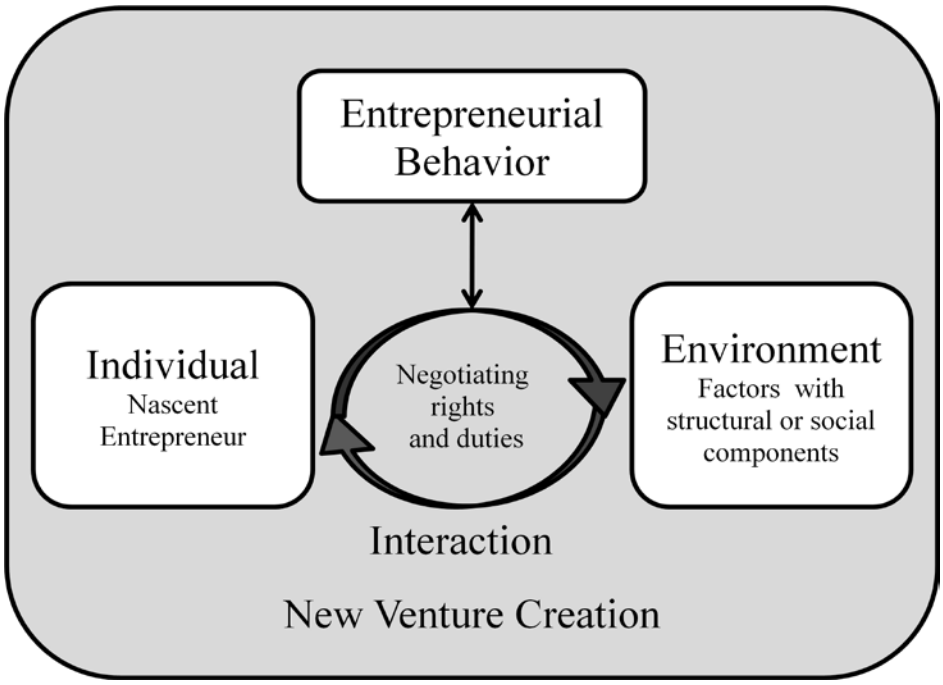


Figure 7. A model for facilitating development of entrepreneurial behavior

In summary, I have now argued for an understanding of entrepreneurial behavior as that which is shaped by engagement in the process of new venture creation; associated to sets of actions regarding planning, establishing legitimacy, combing resources and marketing; and a function of the individual and her environment. The development of entrepreneurial behavior in the nascent entrepreneur involves social interaction with her environment, including observation, imitation and modeling of key actors (her role-set). These actors can engage in discourse with the nascent entrepreneur, allowing for a process of negotiation regarding rights and duties associated to an aspired role. Finally, I will review the factors, particularly those of the environment, identified in literature as impacting and potentially facilitating, behavior development.

3.6.1 Interaction of Individual and Environment Shaping Behavior – Factors of the Emerging Phase

In the models discussed in Section 3.2, some of the authors present not only activities associated to the process, but factors associated to or surrounding the process as well. In his model, Baron (2002) illustrates individual, interpersonal and societal factors that influence the

phases of the entrepreneurial process. Similarly, Bygrave and Churchill's (1989) model illustrates four stages with associated personal, sociological, environmental, and organizational factors. Hackett and Dilts (2004) emphasize that the incubation process is not only entry into a physical locality with access to infrastructure, but is also influenced by the network of individuals and organizations (internal and external to the incubator) facilitating the successful development of a new venture. Factors are summarized in Table 2, with subscript letters used to designate the reference for each factor.

The factors generally identified as traits (including age, gender and race), abilities, skills and cognition, building in part from research as reviewed by Brockhaus (1982), and factors related to motives and goals, building in part from research by McClelland (1961, 1987) are designated factors of the individual. In addition, terms identified as titles used to communicate a role or position, such as leader, manager, etc. are summarized under the term role and designated as an individual factor. Previous literature has not found strong direct correlation between traits and characteristics and successful completion of creating a new venture (Reynolds, 2007), and instead has emphasized the high influence of situational factors (Reynolds, 1995). I do not include traits and characteristics in Table 2 due to the focus on the impact of environmental factors in this thesis.

Table 2. Factors contributing to entrepreneurial behavior development

Behavior as a function of:	**Contributing Factors**
Individual	cognition [a], commitment [b], motives [a,b], values [b], skills (education and experience) [a,b], role (and associated responsibilities) [b]
Environment	***Structural:*** government and institution policy [a,b], legal issues (requirements and regulation) [a], physical resources (facilities, digital networks, equipment) [b,c], capital and labor markets [a], technology [a], exposure to entrepreneurial models (structural models) [b]
	Social: social network (including human capital, social capital, intellectual capital) [a,b,c], support networks [a,b,c], exposure to entrepreneurial models (role models) [a,b], cultural values [a,b], norms [a], competitors [b]

a Baron (2002); b Bygrave (1989) ; c Hackett and Dilts (2004)

Figure 7 indicates that the interaction between the individual and environment is influencing behavior. Individual factors such as skill, motivation and cognition, are seen as relevant in relation to social learning through engagement or intention to engage in the process, and thus included in Table 2. However, these factors are not specifically addressed as the main research question is to understand how entrepreneurial behavior development can be facilitated, where behavior is defined as observable action, in comparison to cognition, motives, values, etc. recognized as contribution to planned behavior (Ajzen, 1991) (or intention to behave). Ensley, et al. (2006) found that behavior in relation to new venture

success is impacted by the dynamics of the environment. Therefore, emphasis is placed upon the factors associated to the environment as these are seen to describe the context in which the entrepreneurial process is occurring. The exception to this is the individual factor of role, as this is recognized as the static equivalent of the negotiated rights and duties determined through positioning.

The factors listed in the referenced literature as interpersonal, societal, environment, sociological, and organizational are designated as environmental. These factors include both structural and social components of the environment, stemming from the definition given in Chapter 1. Thus, societal and most environmental factors, such as government policy, legal issues, capital and labor markets and technology are recognized as structural factors, as they are generally facilitated through infrastructure. Interpersonal, sociological and organizational factors, such as human, social (Coleman, 1990, Davidsson and Honig, 2003) and intellectual capital (Nahapiet and Ghoshal, 1998), and cultural aspects are recognized as social context factors, as they are mediated through interaction. Thus, entrepreneurial behavior is shaped by the interaction between the nascent entrepreneur and her environment as she is going through the process of creating a new venture. The process is impacted by the factors of the environment in which the process is taking place.

This chapter has accounted for received wisdom relating to the development and facilitation of entrepreneurial behavior, per the definition established in Chapter 1. Literature describing nascent entrepreneurship, the entrepreneurial process and its various phases, actions and associated factors, as well as behavior development through learning (including social and pedagogically designed) and positioning, have been reviewed. It has been possible to synthesize an understanding of the entrepreneurial process of new venture creation, and relate the actions, behaviors and factors of this process to a figure illustrating the shaping of behavior through interaction, including negotiated positioning. Learning theories and entrepreneurial education structures propose ways in which entrepreneurial behaviors can be taught and transferred to individuals. However, research regarding environmental impact on behavior has mainly focused on intention to act (Autio et al., 2001, Lüthje and Franke, 2003), and not actual observed behavior. Furthermore, despite this research, there is still a gap in understanding between how the process and factors of the environment of new venture creation shapes entrepreneurial behavior, and how that behavior can be facilitated through interaction and environmental factors. This thesis emphasizes entrepreneurial learning, resulting in the development of entrepreneurial behavior, can be facilitated by learning through interaction. Nascent entrepreneurs are provided an environment incorporating not only a process of venture creation, but associated actors forming a role-set, facilitating learning through interaction, where rights and duties regarding the aspired role are not only observed, simulated or modeled, but also negotiated and tested together with mentors and entrepreneurial role models. This is represented in the Figure 7 model for facilitating development of entrepreneurial behavior by the interaction loop, illustrating the cyclical relationship between the individual and her environment, including her role-set.

Following explanation of the methodological framework and details in Chapter 4, the empirical focus of this thesis, building upon a systems perspective, explores the emerging (nascent) phase of new venture creation recognizing the influence of environmental factors from multiple and interdependent levels in the university landscape. This is done to illustrate

how the learning facilitation equates to the environment of the empirical settings. Action-based, process-oriented learning approaches and educational designs, such as the Chalmers VCS described in Chapter 2, can function as learning spaces (Kolb and Kolb, 2005) where entrepreneurial behavior development can be facilitated through provision of process and management of environmental factors influencing behavior.

4 METHODOLOGY

This thesis aims at contributing to understanding entrepreneurial behavior, in particular how the development of entrepreneurial behavior can be facilitated. I have chosen to recognize entrepreneurial behavior as an individual phenomenon developed through social interaction as part of a process of emergence, where behavior is understood as observable action. I study interaction interpreted not only by the individual acting to create a new venture, but also as interpreted by others questioning, provoking, stimulating and reacting to the actions of the individual, and including the way in which individuals interpret their environment. The research conducted is qualitative, rooted in an interpretative tradition. Action research is used to inquire about and investigate the interactions of a select empirical setting in order to link practice and ideas involving those for whom the questions and issues are significant (Reason and Bradbury, 2008). Additional research using participatory observation is used to compare the core empirical setting to other settings. I begin the chapter by addressing the methodological choices of the intended research and thesis summary, starting first with presenting the intrinsic case chosen for study. This is followed by a description of the specific methodology of the appended papers. The chapter concludes by addressing implications of the choices made.

4.1 THE INTRINSIC CASE

The first choice is the choice of a core empirical setting to be studied. The collective research of the main empirical setting can be as an intrinsic case, as I attempt to gain a better understanding of a specific phenomenon in a unique university landscape (Stake, 2005). This case is then also intended as an instrumental case which potentially contributes to a wider understanding of entrepreneurial behavior development, when placed in contrast to other similar university landscapes, or an alternative environmental setting, as is done through the studies upon which Paper I and Paper V are based.

Determination of the main empirical setting, the Chalmers VCS, as representative of an ongoing entrepreneurial process is based on delivered results assessed relative to the definition of entrepreneurship as a process of emergence (Gartner et al., 1992), a result of which is the creation of new organizations (Gartner, 1988). As described in Chapter 2, section 2.2, the Chalmers VCS delivers sustained process of venture creation with an 80% survival rate for incorporated ventures. Incorporated ventures are legally registered firms, attracting financing, employing additional personnel, delivering to customers just as any start-up. These ventures created are provided specially designed support during an incubation period. Individuals are communicated as nascent entrepreneurs, and enter an entrepreneurial process by engaging in the creation of a venture.

Multiple years of embeddedness, since 2004, as a researcher and member of the university's entrepreneurial community, namely through my role in the Chalmers VCS, allows for comparison of nascent entrepreneurs and their role-sets. Sequential groups of nascent entrepreneurs and role-sets, formed into teams, enter, experience, and then exit the empirical setting on a yearly cycle. My formal employment position, operational responsibilities, and day-to-day activities have evolved, allowing for increased access and influence into the empirical setting. Within the Chalmers VCS, my responsibilities have evolved from delivery

of specific lectures, to program management, course management and design, admissions selection and design, and policy development.

Embeddedness includes participation in planning and execution of daily activities, specific to the design and facilitation of the incubation period of the nascent entrepreneurs, but also in regards to the continuity of the Chalmers VCS across the series of nascent entrepreneurs entering and exiting the Chalmers VCS, such as monthly meetings of the Chalmers VCS staff members. The format of the incubation period allows for involvement and investigation into multiple cycles of essentially the 'same' process 'same' environment. 'Same' is written as such to recognize that the process is never exactly the same, as each cycle involves individuals new to the particular cycle, and ideas upon which the ventures are based are almost always new to the particular cycle[8]. Official protocols from these staff meetings, staff workshops, presentations and other events are coupled with personal observation and notes taken during these events. Staff meetings occur approximately every three weeks during the school year, which generally excludes the end of June, July, and beginning of August. Daily activities of the Chalmers VCS also include both planned and impromptu events specific to the venture creation process of the nascent entrepreneurs, at times also involving members of the role-sets.

The long period of time in the core empirical setting not only allows for continuity in observation of a series of nascent entrepreneurs, their teams, and their role-sets, as mentioned above, but also experiential knowledge and understanding of the structures, norms and routines that govern or influence the nascent entrepreneurs, teams, their role-sets, and associated factors. A potential limitation of this closeness is a risk of bias due to loosing the ability to objectively understand assumptions (Coghlan and Brannick, 2005). The researcher can be challenged to gain distance from the empirical setting, and can feel an obligation, as a member to support the image of the setting. However, this is a weakness if the research is placed in comparison with objectivist research, where the intent is to experiment in order to establish explanations (Shani et al., 2008), as compared to exploratory and descriptive studies. Furthermore, the risk of 'going native' in relation to main approach of the research, action research, is limited, as action research intends the researcher to interact and collectively with others develop research findings in the setting studied. As only one of the 'others', my potential closeness is limited to my interpretation of the nascent entrepreneur and balanced by the influences and interpretations of other actors. In addition, the research and findings have been discussed regularly with individuals outside the Chalmers VCS, as well as challenged and discussed by individuals visiting the environment. In this way, perspectives and interpretations additional to my own have been introduced. Finally, the intrinsic case is addressed through the systems perspective taken, such that the object of study is studied from multiple levels of analysis and in relation to different constructs of actors and components, providing multiple points of view upon the same phenomenon.

4.2 General research approach

Exploration of interaction requires more in-depth and engaged research than is generally conducted when investigating entrepreneurial activity (Gartner and Carter, 2003). As the

[8] Sometimes an idea which has been terminated in a previous year is reintroduced, and selected, into the VCS, often because the either the idea or the market has evolved since the time of termination.

intent of the research is not to explain behavior, but to understand behavior as it is being developed, an interpretative approach is taken (Bryman and Bell, 2007, p 26-27). The ontological and epistemological foundations of this approach in organizational research, as outlined by Burrell and Morgan (1979), build from a subjective understanding of one's social experience due to the way in which the individual makes meaning of the social setting. In order to investigate the development of a phenomenon, it is important to gather evidence within the context of the phenomenon where it is hypothesized that the development is taking place, based on the resulting outcomes. Action research (Coghlan and Brannick, 2005, Reason and Bradbury, 2008) is conducted based on the ability to immerse in the empirical setting, as both a researcher and an actor with a professional role, acting in concert with others. As an action researcher in the Chalmers VCS, I have engaged in multiple annual cycles allowing me to implement developments and changes basically every year.

The methodology chosen involves in-depth longitudinal study (Flick, 2006) of not only the actors developing entrepreneurial behavior, the nascent entrepreneurs, but the surrounding actors, (including a more specifically defined role-set). The research is qualitative, building mainly upon more than six years of observation and embeddedness in an empirical setting determined to engage in high-growth potential venture creation, the Chalmers VCS. The action research approach to the intrinsic case is complemented by a participatory observation approach to two studies, the basis of Paper I and Paper V, used to compare with other VCS settings (Paper I) and environmental settings (Paper V). Historical, observational, and interview methods are blended when gathering and interpreting evidence from quotations, segments of documents, and descriptions (Hammersley, 1990). Data collection methods include various types of interviews, documentation, participant observation, and archival material, and are discussed relative to each study associated to the appended papers.

The thesis uses multiple levels of analysis, both micro and aggregate (Davidsson and Wiklund, 2001). Different levels are specifically addressed through the independent papers appended to the thesis, while contributions from the papers (and the analysis perspective) are combined in the thesis. Thus, the systems perspective I take in the thesis intends to investigate development of entrepreneurial behavior in relation to a conglomerate of interacting and influencing factors from multiple levels.

4.2.1 Action Research

As research based on an interpretative approach requires that understanding is based on the experiences of the individuals working within the social interactions, the main method utilized is action research, particularly stemming from the Lewinian understanding. Lewin is said to view action research as part of a cyclical process involving social planning, reconnaissance (evaluation of action informing next steps), review and iteration (Adelman, 1993, Bradbury et al., 2008). Lewin's understanding of action research is utilized as this is seen to align with the theoretical foundation used in the thesis regarding Social Learning Theory and behavioral development as influenced by one's environment (Lewin, 1951).

Action Research provides knowledge of living and evolving processes rooted in everyday experiences (Reason and Bradbury, 2001). The methodology is most appropriate to studies involving research studying phenomenon concerned with human interaction from an insiders'

perspective, observed from within an everyday life setting, such that the researcher is able to access such a setting, and of a certain size and scope so that the phenomenon can be studied as a case using qualitative data collected by direct observation and other field setting methods (Jorgensen, 1989). A particular specialization of Action Research, Insider Action Research (Coghlan, 2007, Roth et al., 2007), refers to research conducted upon activities within a setting as they take place by a researcher who is part of the setting in which the action is taken (Coghlan and Brannick, 2005). This type of approach is utilized in order to capture the in-depth dynamic of the object of study, not observed by outside researchers. Insider status provides access to the broad spectrum of information that, due to sensitivity, degree of trust, articulation, and other environmentally-based challenges, outsiders would not have access to, decreases reliance upon espoused-theories (Argyris, 1991).

4.2.2 PARTICIPATORY OBSERVATION

For the studies not only investigating the intrinsic case of the Chalmers VCS, participatory observation has been the main methodology utilized. Participatory observation, is understood as a process, in three progressive phases, descriptive observation, focused observation and selective observation (Spradley, 1980), each allowing for deeper access, insight and understanding into the phenomenon studied. Raymond Gold (1958) classifies the role of 'participant-as-observer' as a complete participant in the social setting, regularly engaging and interacting in daily activities, but where the members of the setting are aware that the researcher is conducting research and thus that they are being observed for research purposes. The details participatory observation of the Paper I and Paper V are discussed in section 4.3.

4.2.3 A SYSTEMS PERSPECTIVE

Exploring *inter*-action influencing entrepreneurial behavior development requires a perspective that accommodates the interconnectivity or interdependency of various parts. I describe this as a systems perspective[9], exploring various relationships and interdependent parts such that this perspective recognizes that the interactions of the various actors and components are collectively contributing to the empirical setting. While recognizing entrepreneurial behavior as an individual phenomenon, the systems perspective attempts to capture the structured context, illustrating that the individual does not act independently in a vacuum, but rather is inter-dependent in relation to other actors, components or a combination thereof when involved in the process of new venture creation. This can be seen as analogous with the concept of embeddedness. "The concept of embeddedness expresses the notion that social actors exist within relational, institutional, and cultural contexts and cannot be seen as atomized decision-makers maximizing their own utilities. Embeddedness approaches prioritize the different conditions within which social action takes place." (Ghezzi and Mingione, 2007, p 11).

[9] A systems perspective is not to be confused with system theory; the intention is not to describe the process or the empirical setting as a system. Actors of the role-set are not necessarily employees of the empirical setting, and may have other professional roles, thus being only be associated to, or even independent of the empirical setting or organizing context. Similarly, different structural components, designs, routines, etc. may be either common to the entire empirical setting, or specific to certain parts. The empirical setting may be better understood as an ecosystem of actors, structures and procedures that interact as part of a learning process in order to develop meaning and identity.

A systems perspective is also intended to allow for study of entrepreneurial behavior development from different points of view, while still maintaining a holistic view of a "set of elements connected together … showing properties which are properties of the whole, rather than properties of its component parts" (Checkland, 1981, p 3) and that there exists interaction between these parts and the regulatory framework which guide the organizational activity (Edquist, 2006). A systems perspective is a conceptual framework to allow for aligned study of entrepreneurial behavior through contributions from different levels of analysis in a micro-aggregate mix (Davidsson and Wiklund, 2001, Low and MacMillan, 1988), from the individual to society.

A simple illustration of the systems perspective taken upon the empirical setting of this thesis is presented in Figure 8. Figure 8 is not intended to explain or depict relationships, but simply to illustrate different 'levels' impacting the nascent entrepreneur and the way in which behavior is being developed in that individual within the 'organizing context'. The 'organizing context' of the empirical landscape is represented by different levels, each of which includes actors and components potentially influencing, shaping and developing entrepreneurial behavior due to the way in which they affect interaction with the nascent entrepreneur. The nascent entrepreneur is the focal point of the interdependent action.

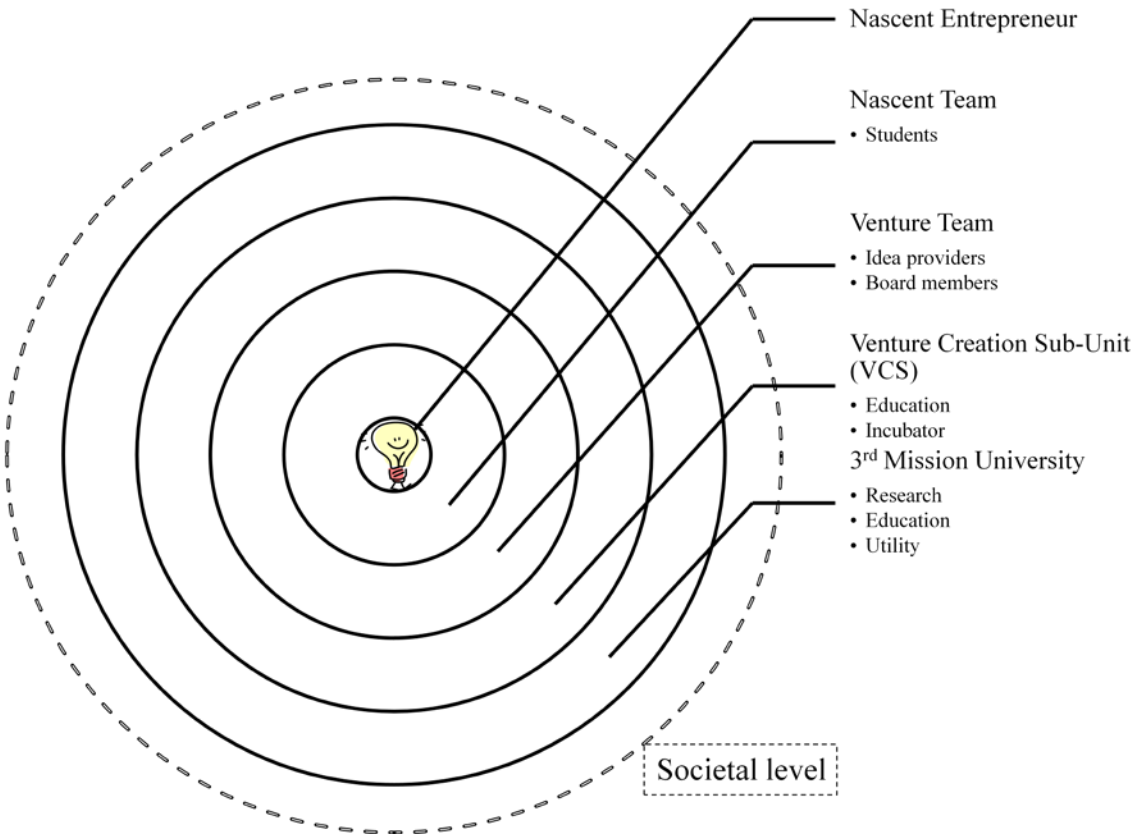


Figure 8. A systems perspective of nascent entrepreneurship at the university

A systems perspective approach to investigating a specialized VCS allows for inclusion of resource accumulation factors, institutional factors, and interaction factors, among others. A systems perspective has the possibility to add richness to large scale studies into nascent entrepreneurship, by recognizing a more homogeneous environment, though still investigated longitudinally, but at varying levels of analysis. The university engaged in a third mission of research utilization in this thesis has been established as a specific bounded condition.

4.3 Specific data collection and analysis of the paper contributions

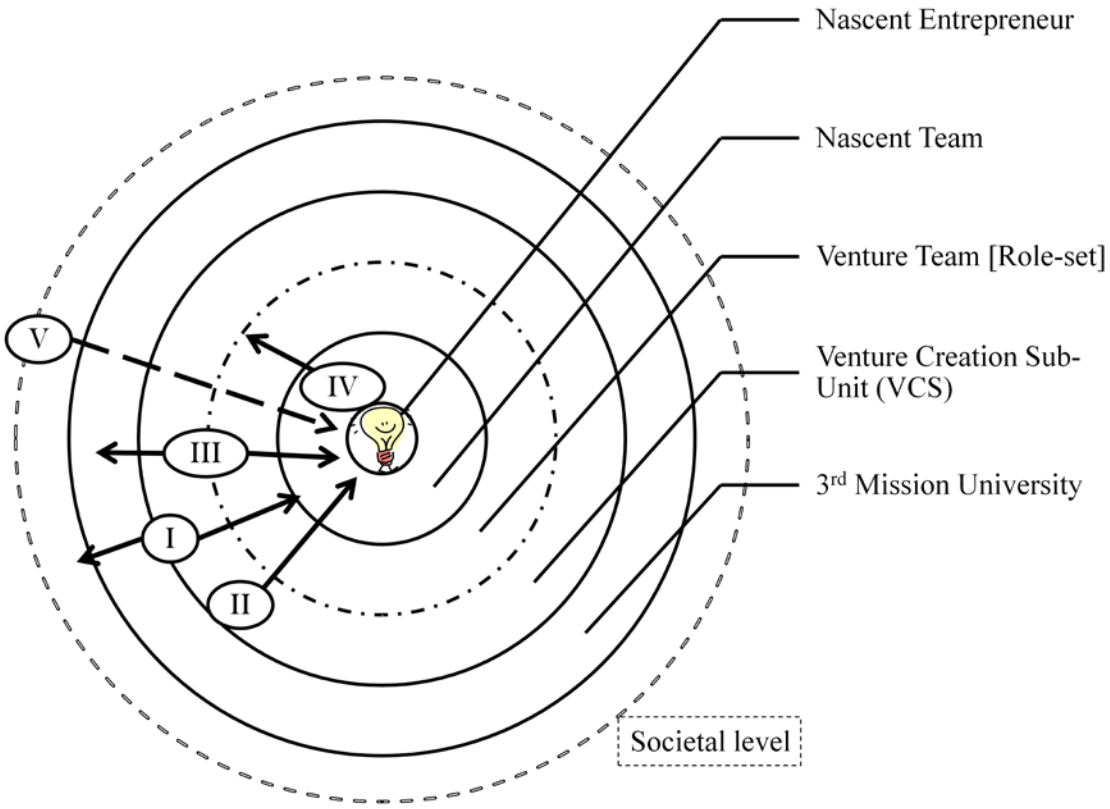
The five appended papers contributing to the thesis are based on independent studies utilizing varying collection and analysis methodology. The data collection and analysis methods utilized for each contribution are presented in Table 3.

The appended papers build upon case studies within university settings engaging in entrepreneurial activity, with the exception of Paper V, which is utilized as a comparison to the university setting. Paper I builds upon case studies of three different subunits (two U.S. and one Swedish) partially or completely embedded in a university engaging in utilization of university research. Papers II, III and IV are independently conducted but interrelated studies of the intrinsic case of the Chalmers VCS. Paper V combines a conceptual model describing societal entrepreneurship with empirical evidence of individuals engaging entrepreneurially beyond their organizational boundaries.

Table 3. Data collection and analysis methods of contributing papers

Paper	Empirical description	Participatory	Non-participatory	Interview	Document/ Archival	Level of Analysis from Systems Perspective
Paper I	Case studies of VCS subunits at three independent universities	Research groups	Observational data	Chalmers (2), Colorado State University (2), University of Penn. (1)	Documentation including annual reports, etc.	University and subunit
Paper II	Case study of Chalmers VCS and 4 nascent venture cases	Focus groups	Experiential data	4 interviews resulting in case vignettes	Reports, press, etc.	Subunit, venture team, nascent team, nascent entrepreneur
Paper III	Multi-year case study of Chalmers VCS	Staff meetings, education, email correspondence	Reflections from students, informal meetings	Staff interviews	Journals, reflection papers, etc.	Subunit, nascent team, nascent entrepreneur
Paper IV	14 month case study of two venture teams in Chalmers VCS	Focus groups; group meetings; staff and management meetings	Observational data	Select venture teams: group and individual	Application information, journals, reflection documents.	Venture team, nascent team, nascent entrepreneur
Paper V	8 month explorative study	Focus groups, study visits, and interactive workshops		59 interviews	Reports, literature review	Society, nascent entrepreneur

As the previous section explained, a systems perspective is used in order to gain a more comprehensive understanding of the impact of environmental factors and general position of relationships influencing interaction. Thus, the general level of analysis and social interaction (as illustrated by the arrows) of the appended papers is presented in relation to the systems perspective in Figure 9.



Paper I: Legitimizing Entrepreneurial Activity at the University
Paper II: Sustainable Wealth Creation beyond Shareholder Value
Paper III: The Venture Creation Approach: integrating entrepreneurial education and incubation at the university
Paper IV: Entrepreneurial positioning
Paper V: Promises of Societal Entrepreneurship: Sweden and Beyond

Figure 9. Paper contributions to provide systems perspective

Paper I is based upon qualitative case studies from three universities. Three cases of university subunits engaging in entrepreneurial activity are selected from an established network, based on their successful achievement in utility creation through integrated activities. Each case represents a subunit having one of the three university missions as their core operating objective – research, education and utility creation – but actively pursuing multiple missions through synergized activities at the local level. Initial comparison of the university settings in which the subunits operate is based on ranking and statistical information. Site visitations and interviews allow for focused investigation into how activity

integration is performed and championed. These are complemented with documentation and other independently available information.

The book chapter (Paper II in the thesis) is based upon action research, from a facilitator perspective on an educational program utilizing research-based venture creation, the Chalmers VCS described in Chapter 2 (section 2.2). The facilitator perspective is complemented with short case vignettes of alumni: one of an individual who later independently started a business, and three regarding ventures incorporated through the Chalmers VCS. The book chapter is mainly descriptive, building upon insider understanding and complemented by historical documentation regarding the different evolutionary phases of the Chalmers VCS.

Paper III is based on a case study of the Chalmers VCS. Insights into the environment, gleaned through insider action research are complemented by participatory observation of three consecutive years of venture creation in the empirical setting. This is complemented by student and organization documentation as well as student and staff interviews in order to explore the ways in which learning is facilitated and received.

In Paper IV, two nascent teams (made up of three nascent entrepreneurs with associated role-sets) are observed throughout a one-year incubation period, during which the teams incubate new ventures, with the intention to incorporate, should the venture be viable. A series of interviews are conducted with the nascent entrepreneurs as a team, coupled with individual interviews with each team member, as well as interviews with select members of the role-set. Interview and observational data are coupled with written documentation including meeting protocols from facilitating staff and board meetings, as well as venture newsletters and nascent entrepreneur journals. From this information, narratives are emploted and analyzed using positioning theory in order to identify communicated rights and duties, and storylines, in relation to social forces.

Paper V builds upon a study designed to explore how the terminology 'societal entrepreneurship' could be interpreted, from a Swedish perspective. Of 176 initially identified actors, 59 (33.5%) were interviewed. Interviewees were asked to identify themselves relative to existing terminology, describing how they understood such terminology, and then explain their understanding of societal entrepreneurship. Observed focus groups of interviewed actors complemented interview data. From data collected, interviewees were independently categorized by the authors and then compared and analyzed. Categorization was compared to definition terms resulting from a literature review.

4.4 Methodological considerations

The limitations of the thesis stem from the theoretical and empirical choices made. The theoretical limitations of the thesis include ramifications of building from Creation Theory and Social Learning Theory, in which the development of entrepreneurial behavior is discussed in relation to the social construction of behavior through interaction. The empirical limitations of the thesis build upon the empirical landscape chosen and defined and then the way in which the landscape was investigated.

The university as the empirical landscape in which the development of entrepreneurial behavior can be investigated potentially limits the applicability of the conceptual findings towards other settings, such as the general population or community settings. However, this choice was made to counter the problems encountered in the large scale studies due to broad and heterogeneous data. The defining criteria of the university landscape studied are relatively specific, dealing mainly with knowledge and/or technology-based opportunities, and university infrastructure that support the mission of utilization of university-based research, including commercial methods. Clearly defined criteria may enable better understanding of the phenomenon of facilitating entrepreneurial behavior development, which can then be tested and compared across other research and development settings.

While the core empirical setting is a select VCS at a technical university in Sweden, this environment is also placed in comparison with investigation into other university VCSs, intending to provide basis for comparison and some generalization. Recognizing and referring to previous, independently conducted research on the same environment, particularly in reference to a common factor (ex. entrepreneurial education) allows for testing of general concepts brought forward in previous research, as well as testing through investigation on the "same" object of study, thus allowing for alternative perspectives. Within the Chalmers VCS, respondent data is also placed in perspective through the integration of interpretations from other actors in the same environment and process, where observed data also can be questioned relative to documentation, thus increasing or correcting the level of reliability of the initial data.

In hindsight, if I were to conduct the research again, I would include more quantitative or outcome-driven research to complement the qualitative interpretative research and event-driven. However, the level of fragmentation in the field was significant enough to require explorative research to establish richer explanations of how behavior can be understood, developed, and development of behavior facilitated. The research could have also been conducted in a way to more concretely illustrate the interactions of the role-sets in the environment. I would also have utilized the cyclicality of the venture creation periods to a greater extent in order to draw comparisons of venture teams and role-sets from one year to the next. This could have potentially provided insight into various factors impacting the phenomenon which are only intrinsically understood.

5 SUMMARY OF APPENDED PAPERS

The thesis builds upon five appended papers. Table 4 provides an overview of the appended papers, including author contribution and status as of November 2010. Each paper contributes to the thesis as positioned from systems perspective, as illustrated in Figure 9 in the previous chapter. The papers are presented in sequence, Paper I through V, first reviewing the initial purpose and findings of the paper and then presenting findings from the papers relative to the core purpose of the thesis. Facilitating entrepreneurial behavior development is addressed relative to the three research questions: RQ1 - the actions of the entrepreneurial process, using terminology from Table 1 (section 3.2.1); RQ2 - the contributing factors of the environment, using terminology from Table 2 (section 3.5.1); and RQ3 – the influence of interaction, through theories of learning and positioning. Findings from the papers are used to substantiate facilitation of entrepreneurial behavior development in relation to the model presented in Figure 7 (section 3.6). The chapter concludes with a summary of contributions stemming from each paper associated to entrepreneurial behaviors, presented in Table 6.

Table 4. Summary of contributing papers

Paper	**Main Title**	**Author(s) Contribution**	**Status**	**Empirical data**	**Interaction position**
Paper I	Legitimizing entrepreneurial activity at the university	Lundqvist and Williams Middleton (50/50)	Submitted to *Research Policy*, October 2010	3 subunits at independent universities	Subunit and university; Subunit and nascent entrepreneur
Paper II	Sustainable Wealth Creation beyond Shareholder Value	Lundqvist and Williams Middleton (50/50)	Published in *Innovative Approaches to Global Sustainability* Palgrave Macmillan 2008	Chalmers subunit and 4 nascent cases	Subunit and venture team; Subunit and nascent team
Paper III	The Venture Creation Approach	Ollila and Williams-Middleton (50/50)	Accepted to *IJEIM*, March 2009; to be published 2010/2011	Multi-year analysis of Chalmers subunit	Subunit and nascent team; Subunit and nascent entrepreneur
Paper IV	Entrepreneurial positioning	Williams Middleton (sole author)	Submitted to *Intl Journal of Entrepreneurial Behaviour and Research*, October 2010	1 year analysis of 2 venture teams at Chalmers subunit	Nascent entrepreneur and nascent team; Nascent entrepreneur and venture team
Paper V	Promises of Societal Entrepreneurship	Lundqvist and Williams Middleton (50/50)	Published in *JEC*, 2010	59 interviews; interactive workshop	Nascent entrepreneur and society

5.1 PAPER I: LEGITIMIZING ENTREPRENEURIAL ACTIVITY AT THE UNIVERSITY

Recognizing that universities are held responsible for a third mission regarding utilization of research findings, this paper aims at understanding how to legitimize entrepreneurial activity resulting in utility creation in the university setting. Defining of the third mission of the university as utility creating allows for the acceptance of activities associated to achieving this mission as core to the university, compared to the more peripheral add-on (technology transfer and similar) or hands-off (academic entrepreneurship) activities. The paper investigates subunits engaged in entrepreneurial activity at three independent universities – two in the United States, one in Sweden. Each of the subunits must adhere to the research utilization (technology transfer) policies of their university, impacted by the societal (regional/national) governing system. However, the social norms of the subunit and its actors also guide the governance and policy structures of the subunit. The main finding of this paper is that entrepreneurial activity is legitimized through organizational routines that integrate activities which can fulfill multiple missions of the university, namely research, education and the third mission defined as utility creation.

5.1.1 CONTRIBUTIONS TO FACILITATING ENTREPRENEURIAL BEHAVIOR DEVELOPMENT

In this paper contribution, behavior leading to entrepreneurial activity is seen as facilitated mainly through establishing legitimacy in the form organizational routines. As the Chalmers VCS is one of the three cases studied, this paper also provides comparison between the core empirical setting of the thesis and other examples of university subunits facilitating nascent entrepreneurial activity. This paper, positioned at the subunit level illustrates how environmental factors from various parts of the university ecosystem impact how venture creation environments are able to facilitate development of entrepreneurial behavior. The governing policies of the university, influenced themselves by the societal (regional/national) policies regarding research utilization set guidelines and initial routines, often intended towards a specific mission in order to transparently deal with conflict of interest. Different subunits have designations for areas of operation: for example research departments responsible for identifying an opportunity and technology development; or business schools focusing on diagnosis of business needs, sales strategies and communicating with customers. Entrepreneurial behavior development is facilitated through integration across the different subunits to complete a process of venture creation. This is exemplified in the three cases.

At the University of Pennsylvania, the newly appointed TTO director of the CTT starts by negotiating what the duties of the office ought to be by redefining the reporting structure. Instead of measuring the number of invention disclosures, emphasis is placed on the number and quality of agreements completed. Thus the measured action of the office shifts from entry into the emerging (nascent) phase – the disclosure of an invention – to completion of the emerging (nascent) phase – transfer into an existing company through license or transformation into a new venture (the latter being the focus in this thesis). Integration of activities between the office of technology transfer and the research units, through outreach programs and fellowship programs, and with educational units, through combined efforts with the business school, form a role-set around the nascent entrepreneurial idea, sometimes championed by the academic, sometimes transferred to another actor. The role-set includes actors not only investigating actions of the emerging phase, such as technology application, claiming of IP and ownership structures, but also new firm actions, such as marketing and

business strategy. The integrated activities across the different subunits can be seen as creating an experiential learning space for not only the academics initially disclosing the idea, but also the business students and fellowship actors.

At Colorado State University, utility creation is facilitated through an engines research laboratory, the EECL, having research as its core function and legitimized activity, as recognized by the university. However, the core objectives of the research lab, to 'put discoveries into products and products into production', align with venture creation actions described by Reynolds (2007) as developing a firm presence or organizational and financial structure. The lab created an organizational culture that facilitated not only technology development, but also financing and organizational structuring, as well as shaping role-sets to support development. Role-sets included not only researchers and industry partners, but involvement of undergraduate and graduate students gaining experiential learning in not only engineering sciences but business as well. The value of joint activities of the laboratory is eventually recognized and legitimized by the university in the formation of the Supercluster™, which then allows for specialized employment and financing structures, bringing additional actors into the role-set to help manage venture creation through provision of business and legal advice and services. The Supercluster™ facilitates development of entrepreneurial behavior not only in the academic researchers but also the undergraduate and graduate students.

The Chalmers VCS, which is the third case of the paper, operates in a similar way to the EECL at CSU, except that the initial framework is an educational platform, using the core mission of education as the initial method for legitimization, into which utility creation is integrated, through the involvement of researchers contributing ideas with potential utility. The different actors interact in an environment facilitating the development of new ventures. The initial concept of combining university researchers and their projects with an education program is redesigned to include incubation, which introduces contractual agreement around ownership of intellectual property and provision of initial financing.

While the three cases exist in different settings, impacted by the specific policy, infrastructure and norm factors of their environments, they all illustrate how entrepreneurial activity at their university is legitimized through integrated activities, embedded in one mission objective, but addressing the other missions of the university as well. Entrepreneurial behavior is facilitated through combining resources provided by different actors, organized into a role-set. Actions include identifying the opportunity and developing the technology, often requiring input from researchers; securing IP, determining the legal form, and managing conflict, often requiring input from transfer or incubation professionals; and diagnosis of business needs, sales and business development and communication with customers, which can be part of business development responsibilities of students. Thus, the actions also focus on business planning and marketing needs of the future venture. The interaction of the researchers, professional and students through various educational, fellowship and internship programs facilitates experiential learning and mentorship of the more experienced individuals towards the less experienced, that can be understood as the learning through interaction contributing to entrepreneurial behavior development, as presented in Figure 7. Illustrating the mutual benefit of these combined actions towards the different missions to the extent that they are routinized helps to legitimize entrepreneurial activity.

5.2 Paper II: Sustainable Wealth Creation beyond Shareholder Value

This paper, in the form of a book chapter, argues that the university can be an arena for generating returns on investment beyond financial returns from entrepreneurial activity. This position is investigated through two research questions: how do you secure educational objectives while also building ventures, and what returns on investments, other than financial, result from the Chalmers VCS. Educational objectives are secured through communicating expected learning outcomes that students are to achieve and then facilitating learning mechanisms, such as role-plays or business plan presentations, through which the learning outcomes can be demonstrated, in addition to more traditional measurement systems such as exams or reports. Assessment mechanisms are complemented with other mechanisms, such as development talks, designed to provide space for reflection and feedback in order to facilitate learning around the on-going creation of the venture. Finally, the Chalmers VCS reserves rights such as right to termination of a developing venture, should it become counterproductive to learning.

Financial value occurs when ventures are created and succeed in the marketplace. Additional returns on investments include societal and educational benefit. The return to society includes evaluation and development of research ideas to determine and even capitalize on potential utility, which might otherwise have remained in the university setting. In this way, the Chalmers VCS then also plays a contributing role to a greater entrepreneurial ecosystem. In turn, the Chalmers VCS, and through it, the students gain access to a broader network of innovation development. Students gain experiential learning as nascent entrepreneurs within a learning environment, sheltered from the risks associated to venture failure. Learning gained can be applied to future ventures or entrepreneurial activity in other arenas.

5.2.1 Contributions to Facilitating Entrepreneurial Behavior Development

The book chapter contributes to how entrepreneurial behavior is developed through a method of ‘testing the water’, allowing for learning about creating a new venture by doing the actions that create the ventures. Entrepreneurial behavior development is seen as facilitated through four main environmental factors: a masters-education program, a pre-incubator, the venture teams, and an entrepreneurial network. The masters-education and pre-incubator provide key structural components contributing to entrepreneurial behavior development such as a structural framework and design involving contractual engagement, governance structures, financing, working facilities and set milestones for delivery. Designating rights and duties guide engagement into the Chalmers VCS. Securitizing rights and duties is done not only through ownership distribution, stipulated at the beginning of the venture creation process, but regarding engagement and decision making, including space for reflection and hypothesis testing through feedback loops. This is done through interaction with other actors.

Structural components are complemented by social components, such as social networks including the role-set, cultural values and exposure to entrepreneurial role-models that facilitate interaction, learning and reflection. The nascent entrepreneurs are provided rights to drive the potential new venture. The associated actors contributing the idea upon which the venture is based, providing guidance once the entrepreneurial team is formed. A role-set is formed around the venture to facilitate the process through the emerging (nascent) phase.

The ownership designation factor was not initially designed into the Chalmers VCS until 2001. It is recognized that the designation of potential ownership, through contractual agreement has proven to be critical towards the successful development of new ventures. Designation of ownership structure helps to securitize the legitimacy of acting as the nascent entrepreneurs for the students when they first start working with the project. Ownership rights can even be used to influence others in the role-sets in relation to their responsibilities to the project, for example around hours of engagement in the new venture creation process.

However, while accessibility to resources is facilitated to a large extent, attention is paid to avoid over-saturation of resources to the nascent entrepreneurs and ventures. The resources provided to the ventures are purposefully limited in order is to establish planning and decision making processes dependent upon lean and agile operation activities. This creates a feedback loop between the nascent entrepreneur and the role-set regarding allocation of funds, time and energy in order to plan and act during an ambiguous process. Monitoring resource allocation is also done in order to stimulate the nascent entrepreneurs to independently attract and combine resources, beyond those provided through the environment. This is intended to strike a balance between providing enough resources to avoid the process becoming stagnant while at the same time forcing decision-making. Thus, the book chapter illustrates how the structural and social components of environmental factors are used to facilitate entrepreneurial behavior development through stimulation of actions towards venture creation and learning through interaction.

5.3 Paper III: The Venture Creation Approach: integrating entrepreneurial education and incubation at the university

Recognizing a gap in the literature between university entrepreneurship and entrepreneurial education, Paper III illustrates the potential of integrating venture creation and entrepreneurial education in an academic environment, thus also proposing how entrepreneurial education can contribute to the field of university entrepreneurship. The Chalmers VCS is the chosen empirical setting. The potential of integrated venture creation and education is explored in order to investigate which teaching approaches and learning philosophies can facilitate learning which develops both entrepreneurial behavior and venture creation.

A venture creation approach is presented as a new learning approach combining different philosophies for learning through entrepreneurship and facilitating learning while creating a new venture. The approach results in a list of key elements, building from conventional and enterprising approaches (Gibb, 1996), emphasizing integration and co-creation of knowledge, involving not only the students and the educators, but also other, complementary actors to provide learning and reflection regarding real-world situations. The paper finds that a venture creation approach requires going beyond stimulating entrepreneurial behavior to include the real-world context in order to provide ‘internalization’ (Gibb, 1996) of knowledge regarding the urgency, prioritization and pressure created by real-world situations. Problem-oriented learning philosophies allow for the development of more traditional academic knowledge, while solutions-focus philosophies allow for practical knowledge through ‘generative’ learning (Barrett and Peterson, 2000, Gibb, 1997). A venture creation approach demands a learning environment that is ‘reality’, where real ventures are used as a core learning object, while still balancing problem-oriented and solutions-focused learning philosophies in order to

maintain space for reflection. The main challenge is finding the balance between engagement and reflection. Letting the student loose to only focus on business activities in the venture takes away the value and credibility of the educational system, including the space for reflection in order to internalize knowledge (Maples and Webster, 1980). Too much restriction of business activity through the venture limits the venture as a learning object involving real-world situations.

5.3.1 Contributions to Facilitating Entrepreneurial Behavior Development

Relating to the purpose of the thesis, facilitating the development of entrepreneurial behavior, using the venture creation approach, is done through an educational platform which includes a venture creation process. From a systems perspective, the paper is mainly addressing the interaction between the role-set within the Chalmers VCS and the nascent entrepreneurs, both individually and as a team. The environment, in which the education is provided, the Chalmers VCS, is impacted by various factors, having both structural and social components. The factors also influence the process of venture creation facilitated in the Chalmers VCS. Governing policies and regulations of the university, and the society in which it operates, impact the rights and duties of the various actors facilitating learning within the Chalmers VCS.

By incorporating different perspectives and utilizing various learning philosophies, a venture creation approach facilitates entrepreneurial behavior which can be considered sustainable, such that the behavior is retained beyond the immediate time frame in which the learning takes place. The approach mixes academic perspectives and business perspectives to support learning about venture creation, most importantly including mentors and role models that provide feedback loops regarding hypothesis testing of decisions. Students are supported in the role of nascent entrepreneur, and through experiential-based pedagogies practice venture activities, acting as nascent entrepreneurs. Nascents interact with the role-set who utilize the inherent tension of mixed objectives and perspectives to introduce learning around business activities introduced during the emerging (nascent) phase of the ventures. Actions such as sales strategies and customer communication are integrated into the emerging (nascent) phase in order to allow for testing, evaluation, adjustment, practice and redesign, sometimes resulting in decisions, documents or presentations. Facilitating the process requires development of entrepreneurial behavior not only in the nascent entrepreneurs, but in role-set members as well, in order to adjust to the needs and demands of the nascent entrepreneurial teams and enable them to fit within the organizational confines of the university. Therefore, paper III emphasizes the learning gained through interaction with the role-set, including not only testing of current and future actions, but reflection upon mistakes made and successful decisions in order to shape behavior.

5.4 Paper IV: Entrepreneurial positioning

Paper IV investigates the development of entrepreneurial behavior as the nascent entrepreneur engages in an entrepreneurial process and interacts with a surrounding role-set. The role-set includes the nascent entrepreneur's teammates, the provider of the idea on which the venture is based, a representative of the incubator in which the venture is housed and from whom the venture has received seed financing, educators and advisors, and board members. As they engage in the venture creation process, all actors have designated rights and duties. Behavior

development is studied through interaction, focusing on how the nascent entrepreneurs position themselves, through negotiation of rights and duties, often in respect to roles, relative to their role-set as the venture is created. The descriptions, rights and duties of the nascent entrepreneur(s) and the role-set are presented in Table 5.

The paper illustrates how nascent entrepreneurs engaging in venture creation develop entrepreneurial behavior through a series of situational interactions involving discussion and negotiation with their role-set. Nascents utilize their initial positions, stipulated by contractual agreement as required by the Chalmers VCS, as a springboard for action. As nascent entrepreneurs take on their responsibility of developing a new venture, they test their initial positions by proposing and testing decisions with their role-set. Rights and duties are re-negotiated with the role-set in regards to areas of application, operative roles and business strategies. As rights are negotiated and acted upon, the nascent entrepreneurs establish legitimacy as being capable of performing the role of entrepreneur. Thus, interactions also facilitate experiential learning regarding the positions proposed and decisions made that inform the nascent entrepreneurs and can increase confidence in taking future actions.

5.4.1 Contributions to Facilitating Entrepreneurial Behavior Development

Facilitating entrepreneurial behavior development is addressed by specifically focusing on the interactions taking place between the nascent entrepreneurs and their role-set. The initial position of each actor is designed through contractual agreement, allocating ownership distribution, and policies of the Chalmers VCS, stipulating the rights and responsibilities of each actor in relation to the creation of the venture. These are the key structural factors of the environment that are used to legitimize the students in the role of nascent entrepreneur and potential future entrepreneur of the venture, should it be incorporated. Legitimization is not only about giving the nascent entrepreneurs rights, but also monitoring the influence of members of the role-set, in particular the idea providers, as they at least initially are perceived as having expertise and control regarding the initial specification of the venture.

The social and support network factors provided through the Chalmers VCS, more directly consolidated into a role-set, facilitate learning through interaction. Feedback loops in which nascent entrepreneurs can test hypotheses regarding decisions for the development of the venture are used to, for example, determine an application area or business model, or shape partnership agreements. Role-sets influence the nascent entrepreneurs and the collective nascent team through provision of expertise, but also by presenting multiple perspectives upon key issues, thus requiring the nascent entrepreneurs to establish their own argumentation and decision making procedures. Thus, not only does the role set provide feedback and learning through imitation or modeling, but they also facilitate as space for the nascent entrepreneurs to reflect upon the decisions they are intending to take. The information gained through learning and reflection is used by the nascent entrepreneur to negotiate rights and duties in association to roles or areas of responsibility. Cycles of negotiation, as illustrated in Figure 7, help the nascent entrepreneur to claim and be recognized in the entrepreneurial position in relation to the role-set surrounding them based upon how they interact and negotiate the ‘terms’ of the position. Recognition gained from the role-set also allows the nascent entrepreneurs to communicate legitimacy towards actors and environments outside the Chalmers VCS.

Table 5. Rights and duties of individuals engaging in venture creation

Role	**Description**	**Duties**	**Rights**
Nascent entrepreneur	Student communicating entrepreneurial intent and engaging in venture creation	learn how to create a new venture; apply learning to developing venture with intention to incorporate; attract financing, develop business, represent venture towards market	3,33 to 5% initial ownership claim; skills and knowledge as part of packaged education; support including access to staff, advisors and coaches;
Idea provider	professor, researcher or industry actor providing an idea or invention with perceived commercial value	provide the idea and associated intellectual property; 8 hrs per week of advice and support to the team, often particularly regarding technical development	up to 45% ownership claim; considered expert in field and allowed to continue research/work activities as primary focus
Incubator	business actors providing initial investment and resources for the ventures	initial screening of ideas; team formation; investment and management of incubated ventures; partial management of incorporated ventures up to point of exit	20% ownership claim; manages 10% used for attraction of additional competencies; can reject termination request (from nascent entrepreneurs) if argumentation not valid or can enact termination based on policy issues; controls seed-capital distribution
Education Management	university actors and educators responsible for the program structure, through which the new ventures are to be developed	team formation; facilitate and assess learning at individual and team level; scheduling activities; general guidance, advice and support	design of overall process; can enact termination if project negatively influencing educational objectives
Board member, including chair	individual with business, industry or research expertise; idea providers and incubator (see above) are specialized board members	guide the venture towards incorporation by meeting at regular intervals and approving key decisions, including approving budget allocations	oversee decisions regarding direction of venture, including selection of nascent continuing with venture should it be incorporated; no initial ownership claims
Advisor	coach or consultant that provides specialized information to the team	general or specialized advice regarding business development information, sometimes provided at specific structured points through the incubation period	freedom to disengage; no initial ownership claims

5.5 Paper V: Promises of Societal Entrepreneurship: Sweden and Beyond

Paper V aims to interrelate various terminologies used to describe the development of new organizations with a societal purpose within Sweden. Seven societally-oriented entrepreneurship discourses with various geographical origins are identified and conceptually and empirically investigated. Characteristics for interrelating the different discourses are based on type of actors (individual or collective) and purpose (socio/ecological or economic). Interactions of discourses across the actor/purpose characteristics indicate a potential for a unifying concept of societal entrepreneurship, recognizing the potential for changing perceptions towards entrepreneurial activity as a mechanism for renewal and experimentation in a welfare setting. The study upon which the paper is based found that examples of societal entrepreneurship in Sweden often included individuals engaging into projects or ventures while maintaining some level of employment in established organizations. Existing discourses did not readily account for these 'engaged professionals'. The conceptual mapping of the discourses thus enabled recognition of the collaborative and collective action towards entrepreneurial activity.

5.5.1 Contributions to Facilitating Entrepreneurial Behavior Development

In the previous four paper contributions, facilitation of entrepreneurial behavior development has been addressed within the confines of the university, with emphasis on venture creation involving actors within or associated to the university and factors stemming from its structural and social framework. In Paper V, the university is instead one of many potential contributors to entrepreneurial activity. The main contribution of Paper V in regards to the facilitation of entrepreneurial behavior development is an emphasis on collective action towards an entrepreneurial process resulting in societal utility. Once again, actions and decisions towards creating societal utility in the form of new ventures, projects or other organizations is facilitated through a role-set around the main driving force – in the context of the thesis, the nascent entrepreneur. The role-set, including for example the engaged professionals, activists, community members and/or industrial actors, in interaction with the nascent entrepreneur, test different hypotheses regarding ways in which actions such as business models, legal forms, or securing funding can be conducted to achieve societal utility. The actors in the role-set operate across organizational borders, either utilizing their professional role or acting despite their role in order to help enable an emergent opportunity having a societal objective.

Nascent 'societal' entrepreneurs are challenged with determining their positions or roles in relation to existing terminology and legal forms. Different interpretations of the various societal 'types' and the greater ambiguity of the fundamental purpose of not only contributing to economic development but also societal development, or even societal development in place of economic development. Interaction with a role-set can also become collective action. In either case, the role-set helps to establish legitimacy through shaping the position of the individual (the "societal entrepreneur") based on activities determined to deliver societal utility. Collective action can also indicate two levels of entrepreneurship – the economic understanding, but also the general collective action towards disruption about a social idea or social structures. Negotiated rights and duties include not only economic but social value.

The term ‘societal’ potentially influences the impact that policy has on the entrepreneurial activity and behavior of the societal entrepreneur. Individuals engaging in societal entrepreneurship (engaged professionals) may have more freedom or rights to operate because of the public service provided through their actions and the positive cultural values associated to these actions. This can call attention to the establishment of social norms that allow entrepreneurial behavior in individuals that have an existing position in society with established responsibilities. In particular, social acceptance of their entrepreneurial behavior may increase if they are able to synergize the behavior with their existing duties, thus delivering not only expected value to their various constituents, but delivering beyond expectations based on multiple roles.

5.6 Actions and Factors Impacting Entrepreneurial Behavior Development

In each of the sections of this chapter, discussing the contributions to the thesis, I have explained how the actions, factors and the process of learning through interaction facilitate the development of entrepreneurial behavior. The summaries of contributions in Table 6 and Figure 10 are used to exemplify the actions and factors across multiple levels of analysis in regards to the main empirical setting, the Chalmers VCS, and comparison of this setting to other environments.

In order to illustrate how actions of the empirical settings of the papers facilitate entrepreneurial behavior, I have used the logic presented in Table 1 – Categorizing actions associated to the emerging and firm phases. Action examples from the paper contributions are compared to both the emerging (nascent) and new firm actions in Table 1 in order to determine a category of behavior. The association of action example and entrepreneurial behavior category is presented in Table 6. The logic presented in Table 2 – Factors contributing to entrepreneurial behavior development – is used to determine environmental factors from the contributing papers by comparing examples identified in the paper contributions to table factors. Environmental factors are then presented relative to the systems perspective in Figure 10 in order to illustrate the impact of these factors at different levels.

The appreciation of actions leading to the facilitation of establishing legitimacy through factors of the environment and interaction has been prominent across all the papers. Establishing legitimacy can be seen as developed as part of the process of new venture creation, facilitated through initial allocation of rights and duties, in relation to core missions, such as in all the subunits of Paper I, or through securitization of ownership, as discussed in Papers II and III. Legitimacy established in relation to ownership is mainly facilitated through various structural components of environmental factors, such as policies and legal structures occurring at various system levels. The papers also illustrate that establishing legitimacy is facilitated through interaction with a role-set, which can be understood as legitimacy established in relation to a role. In the cases of the Chalmers VCS and the CSU EECL (also a VCS), the role-set is part of the design of the environment. But the UPENN case in Paper I as well as the findings of Paper V illustrate that the role-set can exist across organizational boundaries.

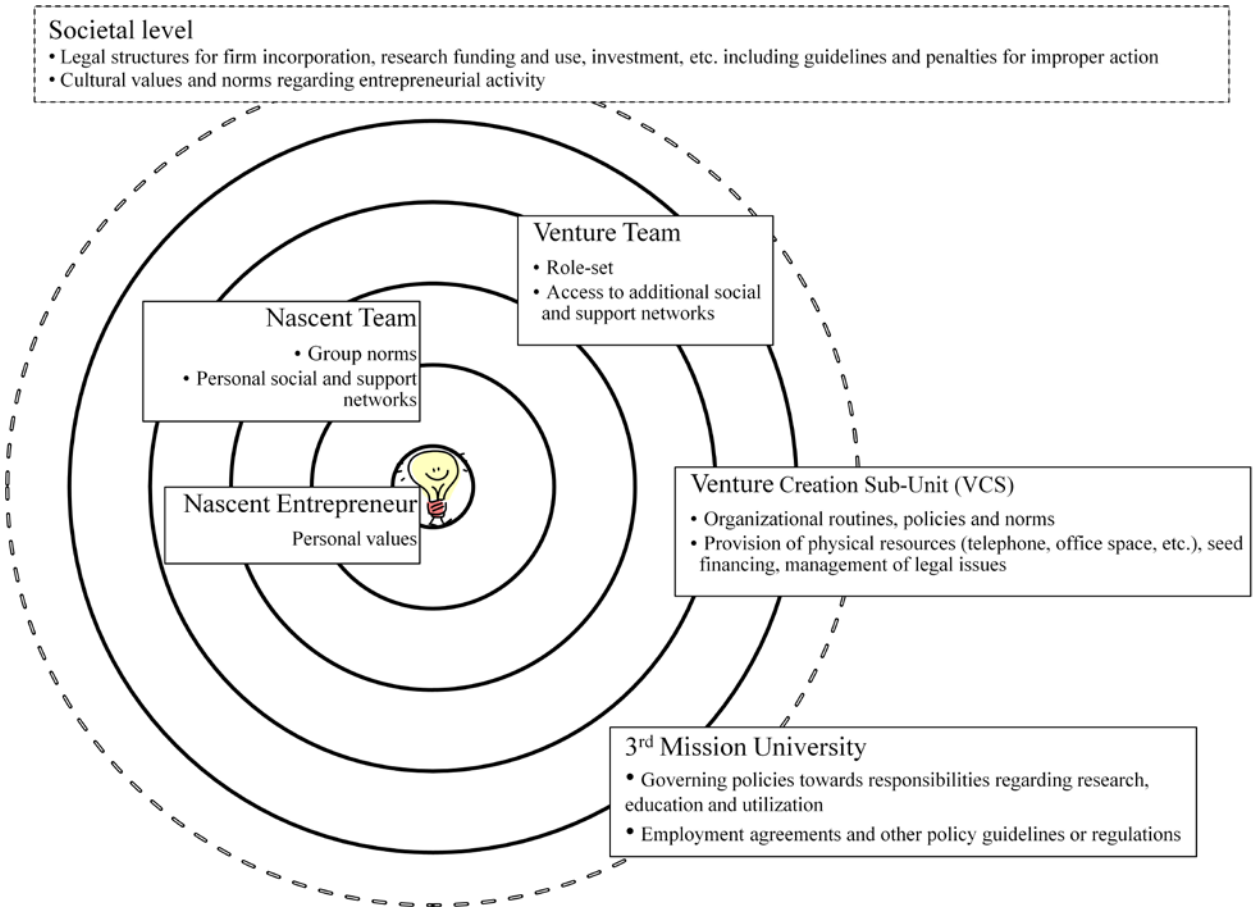


Figure 10. Environmental factors of the paper contributions impacting development of entrepreneurial behavior

The papers also illustrate actions leading to the facilitation of the other three behaviors categorized – planning activities, resources combination and market behavior – through factors of the environment and interaction, but to a lesser extent. Physical resources, capital, social and support networks and exposure to both structure and role models are provided as part of the environment, which enable initial action to take place. The learning that takes place through interaction with the role-set, and others, facilitates testing various decision hypotheses regarding both current and future actions. The role-set not only provides feedback, but helps the nascent entrepreneurs to reflect upon the outcomes of the tested hypothesis or the consequences of decisions taken, such that the nascent entrepreneurs gain experience around planning, resource combination and market behavior. Finally, actions taken as the venture is created are not only associated to the emerging (nascent) phase, but also the new firm phase.

Table 6. Summary of identified actions from contributing papers impacting development of behavior

Paper	Planning Activities	Establishing Legitimacy	Resource Combination	Market Behavior
Paper I	*identifying the opportunity; diagnosis of business needs … business development responsibilities*	*organizational routines; determining the legal form and managing conflict*	*combining resources provided by different actors; technology development … securing IP; interaction of researchers, professionals and students*	*Sales and business development and communication with customers*
Paper II	*allocation of … time and energy in order to plan and act during an ambiguous process*	*designation of ownership structures … used to influence others in the role-sets in relation to their responsibilities*	*role-set formed around the venture; allocation of funds … in order to plan and act; independently attract and combine resources*	*independently attract and combine resources*
Paper III	*sales strategies … are integrated into the emerging (nascent) phase*	*students are supported in the role of nascent entrepreneur … practice venture activities, acting as nascent entrepreneurs*	*mentors and role models that provide feedback loops regarding hypothesis testing*	*customer communication integrated into the emerging (nascent) phase*
Paper IV		*initial position of each actor…allocating ownership distribution…stipulating rights and responsibilities; monitoring the influence of members of the role-sets; nascent entrepreneur negotiate rights and duties in association to roles or areas of responsibility*		*feedback loops … are used to determine an application area or test a business model*
Paper V		*challenged with determining their positions or roles in relation to existing terminology and legal forms; shaping the position of the individual based on activities determined to deliver societal utility*	*role-set, including for example the engaged professionals, activists, community members and/or industrial actors; securing funding [which] can be conducted to achieve societal utility*	*role-set … in interaction with the nascent entrepreneur, test different hypotheses regarding … business models*

6 DISCUSSION

In this thesis, my purpose has been to understand how development of entrepreneurial behavior can be facilitated by investigating the interactions between an individual, the nascent entrepreneur, and her environment. To investigate this purpose, I have posed three research questions: RQ1 Which behaviors are developed as part of the process of creating a new venture; RQ2 How can factors of the environment facilitate the development of entrepreneurial behavior; and RQ3 How can interaction between the individual and her environment facilitate the development of entrepreneurial behavior. This chapter will propose an understanding of how entrepreneurial behavior development can be facilitated. I discuss the research questions, starting with the entrepreneurial behaviors to be developed, followed by behavior development facilitated through interaction and finally how factors can facilitate the development of entrepreneurial behavior. This implies answering the research questions in the order RQ1, RQ3, and RQ2.

The discussion is structured around a set of propositions. In answering research question RQ1, I propose that entrepreneurial behavior of the nascent entrepreneur mainly comprises of two 'meta' behaviors: establishing legitimacy and reducing uncertainty and ambiguity. In answering research question RQ3, I propose that interaction between the individual and her environment, particularly her role-set, facilitates the development of these behaviors by learning through interaction and pre-emptive action. Pre-emptive action is described as introducing actions associated to the phase in which a new firm already exists, into the emerging (nascent) phase. Finally, environmental factors identified at different levels are proposed to facilitate learning through interaction and pre-emptive action through the creation of a learning space (Kolb and Kolb, 2005) – answering research question RQ2. These propositions are incorporated into a revised model for facilitating entrepreneurial behavior development, Figure 11.

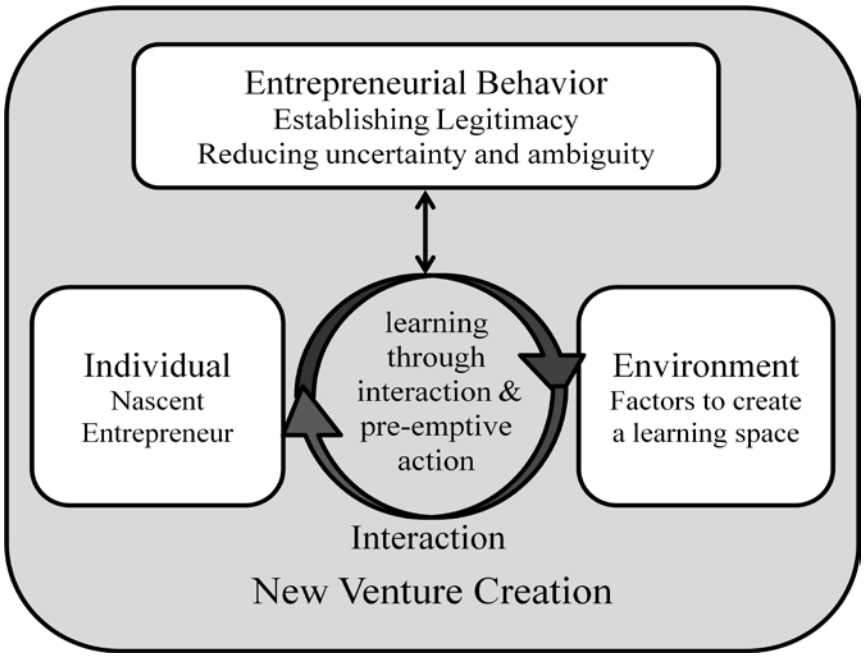


Figure 11. Revised model for facilitating entrepreneurial behavior development

6.1 WHICH BEHAVIORS? ADDRESSING THE FIRST RESEARCH QUESTION

As I stated in the beginning of the thesis, in order to understand how to facilitate the development of behavior, I needed to understand not only how behavior can be developed, but understand which behaviors are developed. Based on my findings, I propose that two key 'meta' entrepreneurial behaviors be developed in nascent entrepreneurs – establishing legitimacy and reducing uncertainty and ambiguity.

Building from a process perspective, in Chapter 1, I defined entrepreneurial behavior as the observable sets of actions of an individual occurring over time (through a process) resulting in the creation of a new venture. A literature review in Chapter 3 of nascent entrepreneurship and the entrepreneurial process resulted in actions seen as belonging to the emerging (nascent) and new firm phases. These were associated to the categories by Liao and Welsch (2008), based on the argument that the actions could be understood as behaviors as they are observable, conducted by individuals over time, and in a process. This resulted in Table 1. I then compared actions found in the empirical studies to the actions in Table 1 in order to associate the actions of the empirical studies to the categories of behavior. This resulted in Table 6.

A common theme found in my empirical studies is nascent entrepreneurs acting in order to position themselves in the role of entrepreneur, in association with a venture, with legal stature. Individuals identify themselves as entrepreneurs when communicating with fellow nascent entrepreneurs, stakeholders and external actors. This illustrates behavior to establish legitimacy, not only establishing firm presence in a legal form and determining the role as the individual leading the firm being established, but acting as an entrepreneur executing business, as if the new firm already exists. The other categories of behavior stemming from Liao and Welsch (2008) – planning activities, recourse combination and market behavior – are actions taken, often in counsel with others, to identify, diagnose, secure and communicate ideas, needs, and resources as the venture is being created. All of these actions can be seen as conducted in order to reduce uncertainty and ambiguity regarding available and unavailable information relating to the venture in order to make decisions and move forward to the next step in the process of creating the venture.

6.1.1 ESTABLISHING LEGITIMACY

Suchman defines legitimacy as "a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions" (1995, p 574). I argue that establishing legitimacy is a key entrepreneurial behavior of the opportunity-based, high-growth potential venture creation process, building on the findings of the papers. This confirms with Reynolds (2007) findings from large scale studies that establishing firm presence is important to the birth of new firms. This also aligns with the findings of Delmar and Shane (2004) who argued that legitimacy activities are important to the sustainability of a venture. As indicated in Chapter 5, initial legitimacy of the venture can be established through the use of contractual agreements. It can also be reinforced through norm structures or policies of the immediate environment, such as the integrated research and venture development activities of the EECL at CSU, or adapt to

policies of other subunits, such as the outreach programs to the research units at University of Pennsylvania, which the CTT did in order to build trust with researchers.

Another way in which legitimacy is enabled is through the policies of the greater ecosystem. For example university missions towards utilization can be seen as guidelines towards determining an entrepreneurial role for employees of the university and managing conflict of interest in relation to fulfilling multiple roles. As illustrated in the findings from Papers II, III and IV, the example of an initial ownership claim established within the VCS for the nascent entrepreneur helps to determine a role – that of entrepreneur for the venture being developed – as well as provides a position from which the nascent entrepreneur can act to carry out other behaviors, such as diagnosis of business needs, securing IP or funding, and communicating with customers and other external actors.

The importance of establishing legitimacy in the chosen university setting may be partially context dependent, and as such the need for legitimacy establishment may be experienced differently in other environments. The university setting has pre-existing expectations of roles and responsibilities, such as conducting research and providing education. However, even nascent entrepreneurs creating new ventures free of existing organizational boundaries need to establish a presence and legitimacy as individuals conducting business in order to gain recognition from customers, stakeholders and others. For this reason, establishing legitimacy is likely a valid behavior beyond the empirical landscape of this thesis – i.e. the university.

6.1.2 Reducing ambiguity and uncertainty

Actions associated to categories of planning activities, resource combination and market behavior can arguably be seen as associated to making and preparing for decisions regarding the way in which the business is to be modeled, relative to potential or accessible resources and in anticipation or response to the marketplace. In order to make decisions regarding these actions, I therefore propose that the second key 'meta' entrepreneurial behavior of nascent entrepreneurs is to reduce uncertainty and ambiguity regarding information about the venture. In Creation Theory, entrepreneurs are identified as willing to bear the uncertainty of the process they are undertaking (Alvarez and Barney, 2007). I argue that the nascent entrepreneur bears uncertainty by taking action to reduce uncertainty and ambiguity.

Uncertainty can be defined to mean that "the list of possible events is not predetermined" such that "some relevant information cannot be known, not even in principle, at the time of making many important decisions" (Dequech, 2003, p 520). Ambiguity, in turn, can be seen as "uncertainty about probability, created by missing information that is relevant and could be known" (Camerer and Weber, 1992, p 330). Dequech adds that even when all the possible events are not completely known (i.e. 'uncertainty'), "the list of all possible events is already predetermined" by the decision maker (Dequech, 2003, p 520)[10]. In this way, the nascent entrepreneur, in interaction with others and using factors of the environment, can be seen as

[10] Definitions of uncertainty and ambiguity are not definitive (see Camerer and Weber (1992)). Criteria such as the field of science in which the terms are applied, the order level of probability considered and objective/subjective perspective impact the way in which the terms are utilized. I choose a Dequech's definitions of ambiguity and uncertainty as these are the definitions Alvarez and Barney utilize when discussing Creation Theory. This is done in order to remain consistent with argumentation presented in the thesis.

testing hypotheses, for example regarding business models, and gathers information in order to establish a predetermined list of possible events, thus reducing uncertainty to ambiguity. Furthermore, the nascent also takes action to seek missing knowledge, for example, the likely success of each business model, in order to reduce ambiguity.

Reducing uncertainty and ambiguity allows the nascent entrepreneur to progress in the creating of the new venture, in a way which similar to how Gartner and colleagues (1992) described entrepreneurs talking about non-equivocal events in order to propose probable future states. For example, at the University of Pennsylvania, the CTT redefined communication to focus on quality of agreements. In order to do this, a role-set was formed around the nascent entrepreneurial idea to gather information regarding marketing needs (from the business students), definitions and development of technology (from the researchers) and options for IP protection and security of financing (from TTO staff). The champion of the nascent entrepreneurial idea interacts with the role-set to gather different information and test different hypotheses about the potential progressive steps for the venture. The information is acted upon to reduce uncertainty and ambiguity to facilitate making decisions.

Reduction of ambiguity and uncertainty can be seen to be as more vital for opportunity-based, high-growth potential venture creation, as this form of venture creation often stems from new inventions or discoveries, not yet tested, or even understood by the general population. For nascent entrepreneurs building new ventures based on existing ideas implemented in new markets, or establishing lifestyle ventures, there often exists information not only about the full list of potential outcomes when making decisions, but significant information about the probability of success. As Katz and Gartner (1988) discuss, creating something new may involve variations of existing forms, such that there is likely to be information available about the likelihood of various actions. Furthermore, this behavior may not be as critical as the venture matures. However, for early stage research or technology based ideas, where freedom to operate and intended market is unclear, behavior which reduces uncertainty and ambiguity can be critical to the ability to bring a new venture to fruition.

6.2 How interaction can facilitate entrepreneurial behavior development

I initially adopt Social Learning Theory as a basis to explain how behavior is developed, and then suggest additional learning theories and positioning theory to further reason around how behavior is changed, resulting in a model for facilitation (Figure 7). Based upon my findings, I argue that the establishment of legitimacy and reduction of uncertainty/ambiguity is not only affected by cycles of interaction between the nascent entrepreneur and actors of her environment – described as learning through interaction in Chapter 3 – but also through the introduction actions associated to the phase in which a new firm already exists into the emerging (nascent) phase – described as pre-emptive action.

6.2.1 Understanding learning through interaction

Learning through interaction can be seen as taking place in the moment, relative to a particular event or incident. However, while the experiential learning gained in each interaction is unique, it is not independent. Experiential learning changing behavior in one interaction can be utilized to influence structures and positions as new interactions are

encountered. For example, each of the nascent entrepreneurs studied in the Chalmers VCS has an initial claim to ownership in the venture through a structured agreement, though not enacted until the point of incorporation. The first interaction relative to the initial ownership claim becomes the starting point for establishing legitimacy in relation to the role of entrepreneur. Each interaction with the surrounding role-set involves positioning, where the nascent entrepreneur negotiates through actions and communicatively with the role-set actors regarding actions being taken or to be taken. It is through these communications and negotiations with the role-set and other actors that the nascent entrepreneur also reduces the uncertainty/ambiguity of the emergent process of creating a new venture, by testing hypotheses in feedback loops, facilitating both observed and experiential learning and reflection in action. The criticality of these events depends upon the outcome or the importance of the reflection or learning taking place. The interactions allow for the determining of new information about likely outcomes, and enriching existing information about the probability of likely outcomes. Additional information informs preparing for and making decisions, which can lead to the enactment of a framework into a legitimate action.

In the case of the Chalmers VCS, the interaction is facilitated through the design and engagement of the role-set around the nascent entrepreneurs, with both scheduled interactions, such as board meeting, development talks, or project presentations, but also with room for spontaneous interactions initiated through nascents making phone calls or asking for a meeting with an advisor, etc. In the other cases of Paper I, this is through designed internship programs or agreements with other subunits to work collaboratively (at UPENN) or the integration of many different actors with different roles into a Supercluster™ at CSU, with a specially designed culture to encourage mentorship and collective action.

A potential limitation of the empirical research is not directly observing all of the interactions taking place between the nascent entrepreneurs and all the different actors of the role-set and thus not necessarily observing behaviors as they are taking place. However, as a member of the Chalmers VCS, the environment for the majority of the studies, as well as a member of the research project discussed in Paper V, I was able to discuss second hand accounts of observed behaviors, from multiple sources, as well as utilize documentation, illustrating, for example, other results of actions which can be observed. As a member of the environment, in many cases, I also am an acting member of the role-set. While this allows for direct observation of behavior, it also introduces that I am, in my responsibility within the role-set, influencing behavior. My influence is however only one of a minimum of ten actors in each role-set, and an even greater set of immediate social and support networks. However, I must also recognize that my position also influences my view on the behavior developing. Again, this can be seen as balanced by the perspectives of the actors of the role-set.

6.2.2 Pre-Emptive Action facilitating entrepreneurial behavior development

When looking at the actions communicated as taking place as part of the venture creation process in the paper contributions, a key insight is that many of the actions are actually actions that are normally associated to the new firm phase, as compared to the emerging (nascent) phase. The nascent entrepreneurs, and their facilitating subunits or role-sets, are not just talking ‘as if’ (Gartner et al., 1992), but engaging in practicing and carrying out actions ‘as if’ they were already business owners and their firms were already established as

incorporated firms. Facilitation of pre-emptive action allows for informing and making decisions based on hypothesis testing in an environment that has a learning objective. Actions associated to 'firm activities', such as staffing, marketing, sales strategies, conflict management, leadership, communication with staff, customers, and stakeholders, are introduced into the design of the environment and facilitate development of behavior towards future entrepreneurial activity related to planning, marketing and resource combination. In some cases, these new firm actions are integrated with emerging (nascent) phase actions, as seen in findings not only from the main empirical setting in Papers II, III and IV, but also in the other subunit cases in Paper I.

The nascent entrepreneur can be seen as developing behavior towards future entrepreneurial actions by practicing in interaction with the role-set. This can be seen as developing behavior which can reduce uncertainty and ambiguity, by facilitating learning regarding future actions in the emerging (nascent) phase. The actions normally attributed to the new firm phase but practiced in the emerging (nascent) phase inform decisions that will be necessary in the later stages of venture development. Ambiguity about how to act can be seen as reduced, as the feedback loop informs the nascent entrepreneur how better to act in order to achieve the objective of starting a new firm. Pre-emptive action also allows for legitimizing behavior in the role of entrepreneur even before the legal form of the business is in place through interaction with the role-set, in which rights and duties claimed by the nascent entrepreneur are negotiated, challenged, recognized or rejected. West and Wilson (1995) find that ventures often fail because nascent entrepreneurs do not properly monitor information and opportunities, because their perspectives are limited to their previous experience. Facilitating pre-emptive action can allow the testing of potential future scenarios while the nascent entrepreneurs have access to the interactive learning provided through the role-set, and is particularly beneficial if the factors of the environment facilitate some protection from failure consequences.

A potential weakness in my argumentation is that pre-emptive action is dependent upon demarcation between the emerging (nascent) phase and the new firm phase. There are many differing opinions regarding the point at which a new organization has emerged (Reynolds and Miller, 1992), in part determined by when a 'new firm' is an active participant in the economy. This may be first tax payment, associated with incorporation or legal status, first financing, first hiring or first sales. However, the general premise of pre-emptive action, integrating likely future actions of the potential firm into the current actions carried out in order to test and train in the actions, is relevant independent of the definition of the phase shifts. As long as the actions practiced are understood to precede the point in which they are expected to occur, the action can be understood as pre-emptive and therefore facilitating training and developing self-efficacy for future actions.

6.3 How environmental factors can facilitate entrepreneurial behavior development

In Chapter 3, I argued that experiential learning and learning by doing, particularly through co-participation can develop entrepreneurial behavior. Furthermore, learning was found to be influenced by environmental factors in nested arrangements of structures in what Kolb and Kolb (2005) call a learning space. Based upon my findings, I propose that environmental factors facilitating the development of entrepreneurial behavior basically have in common the

realization of such a learning space, enabling interactive learning and pre-emptive action which in turn establishes legitimacy and reduces uncertainty and ambiguity.

Both structural and social environmental factors can be seen to shape a learning space in which entrepreneurial behavior development can take place. Environmental factors with structural components, such as policy or legal requirements, physical resources, technology, and structural models, are (relatively) static and often designed with a particular intention of use or to achieve an expected outcome. Factors such as incubation facilities, seed financing, or initial 'title' as an 'entrepreneur' can be used to facilitate establishing legitimacy and reduce uncertainty or ambiguity as they provide a working space, with designated rights to act, which can be communicated to others, as well as enable action, through purchase of materials or access to resources. The factors of the environment with social components,, such as networks of actors with knowledge, networks of actors who provide support, mentors or role models, competitors, etc., are more fluid factors which can be used to facilitate a forum for communication and interaction. Facilitation of social and support networks, such as a role-set, can enhance new venture survival as they help to overcome the liability of underdeveloped social ties between new ventures and their external stakeholders (Stinchcombe, 1965, Stuart et al., 1999).

In regards to large scale studies investigating nascent entrepreneurship, Reynolds found that the two main factors impacting actions towards the creation of a new firm were education and experience (2007). However, these factors were factors attributed to the individual, not the surrounding environment. There are many studies which have addressed environmental impact in relation to behavior, but these addressed how factors influence entrepreneurial intention, not observed action (Autio et al., 2001, Fayolle, 2005, Lüthje and Franke, 2003). Limited research has addressed how environmental factors impact the learning environment in which behavior is developed, especially including not only the perspective of the nascent entrepreneur, but also the way in which factors impact other actors also involved in the development of behavior, such as the role-set in the case of this thesis. This thesis addresses this need, communicated by Gartner and Carter (2003) among others.

This thesis has built upon the work of Gartner, looking not only at 'what the entrepreneur does' (Gartner, 1988), but how the entrepreneur behaviors in concert with others, within a 'contextual event', as part of a process in relation to the environment in which actions occur. An in-depth look into the 'critical mess' (Gartner, 2006) has illustrated the importance of social interaction with a role-set within a learning space (Kolb and Kolb, 2005) in shaping entrepreneurial behavior.

7 CONCLUSIONS

I have chosen to investigate the entrepreneurial process in the nascent phase, building from a Creation Theory approach, where the result of the entrepreneurial process is the creation of a new venture, and the creation is dependent upon the subjective action of the entrepreneur bearing uncertainty. With the interest of investigating interaction and factors impacting interaction, I adopted a systems perspective in order to recognize the impact of contributions from different levels of analysis in a micro-aggregate mix, from individual to society.

7.1 FACILITATING THE DEVELOPMENT OF ENTREPRENEURIAL BEHAVIOR DEVELOPMENT

Nascent entrepreneurs of opportunity-based, high-growth potential ventures need to develop behavior to establish legitimacy and reduce uncertainty and ambiguity, which can potentially decrease failure associated to liability of newness, liability of underdeveloped social ties between new ventures and their external stakeholders, or lack of self-efficacy. These behaviors can be developed through social interaction with a key set of actors, the role-set. Behaviors are developed through learning, including cycles of interaction where nascent entrepreneurs not only observe, imitate and model mentors and role models with experiential or expert knowledge, but also engage in testing hypotheses and negotiating actions and positions while engaging in creating a new venture. The learning is facilitated through both organic interactions that naturally occur between the nascent and the role-set while undergoing the venture creation, but can also be triggered through designed interactions, where communication is facilitated and feedback stimulates reflection in action and negotiation. Interaction can also be triggered through introducing and integrating actions which are associated to future expected actions or needs of the venture during the emerging (nascent) phase, allowing for testing of hypotheses and feedback.

Learning through interaction and pre-emptive action facilitate establishment of legitimacy for the nascent entrepreneur. Legitimacy is developed through interaction with the role-set as the nascent emulates or gains recognition from the role-set in the role of entrepreneur. This can then be used as a platform towards other actors, such as customers, suppliers, or financers. Pre-emptive action allows the nascent entrepreneur to practice future action, developing better understanding of expectations based on behavior, thus increasing self-efficacy. Interaction and pre-emptive action develops the behavior of reducing uncertainty/ambiguity as the nascent entrepreneur, in counsel with others, gathers, tests, analyzes and determines information to shape or inform decisions, either through establishing predetermined outcomes where none existed (reduction of uncertainty), or improving information about the likelihood of predetermined outcomes (reduction of ambiguity). Interaction and pre-emptive action can be facilitated through the creation of a learning space (Kolb and Kolb, 2005), particularly when involving a role-set. The framework of a learning space is facilitated by a multitude of environmental factors on different systemic levels.

Factors of the environment impacting the learning space have both structural and social components. Structural environmental factors, such as office space, initial financing, or initial ownership rights, may be provided in order to facilitate initial action and interaction, or identify, develop and or purchase additional resources. Structural environmental factors may be used to facilitate guidelines or regulations regarding expected action and behavior in the

learning space. Social environmental factors, particularly the role-set may be specifically assembled to address different perspectives determined as important for interactive learning.

The reasoning of this thesis builds strongly upon Social Learning Theory, understanding that the interaction between the individual and her environment are contributing to behavior. However, this thesis has mainly focused on the environmental factors influencing the development of entrepreneurial behavior through facilitation, thus not addressing individual factors such as traits, attitudes and factors leading to entrepreneurial intention. In part this is due to the significant amount of research already addressing some of these areas in relation to behavior, such as the research of Bird (1988, 1992), Shapero (1982), Autio and colleagues (2001), and others. However, research has also shown that intention is a poor predictor of actual engagement into a venture creation (Katz, 1990), and Reynolds (1995) emphasizes the high influence of situational factors.

7.2 Self-efficacy and entrepreneurial careers

Increased legitimacy and reduced uncertainty/ambiguity can be seen as affecting self-efficacy in the nascent entrepreneur, as she feels more confident in the expected outcome of her actions. Although beyond the purpose of the current thesis, increased self-efficacy of actions can also be understood as impacting the way in which the nascent entrepreneur interacts and negotiates with the environment, potentially influencing change in environmental factors, such as the proposition of new polices, or introduction of new social norms and values, thus increasing self-efficacy about engaging in the process of venture creation.

Individuals interested in careers in entrepreneurship can seek out learning spaces capable of facilitating interacting with entrepreneurial communities or designed role-sets, as these allow for development of entrepreneurial behavior. As the behavior is developed through a learning process while the venture is created, prior to the 'success' or 'failure' of the venture, it is proposed that the behavior developed is not specifically contingent on the venture success. This can be seen by studying alumni of the Chalmers VCS, who have transitioned from engagement in one start-up process to leading another start-up, either by shifting from one venture to another at the end of the incubation period, or starting firms independently after leaving the Chalmers VCS.

7.3 The choice of the university

The university engaging in entrepreneurial activity is underutilized as a setting for researching the nascent entrepreneurial process, which can otherwise be challenging to identify (Aldrich and Martinez, 2001, Kessler and Frank, 2009). Furthermore, as the university is a setting for research discovery and development, it also has the potential to provide more focused access to technology and knowledge-based entrepreneurial opportunities (Senyard et al., 2009, Siegel et al., 2004). The potential of the university setting comes not only from its engagement in research utilization and entrepreneurial activity in conjunction with research activity, but also as a provider of entrepreneurial education, housing the ability to teach, facilitate and nurture the development of entrepreneurial behavior in individuals (Gibb, 2007, Johannisson et al., 1998, McMullan and Gillin, 1998). One way in which universities can be more productive in facilitating entrepreneurial behavior development is to provide entrepreneurial education involving nascent entrepreneurship.

Engagement in venture creation not only allows for entrepreneurial learning through interaction, but illustrates how universities may more effectively contribute to venture creation, particularly opportunity-based ventures (technology-based and IP-based), deemed as having high potential for growth and economic contribution to society. These contributions may provide information that can aide more effective direction of funding and use of resources, as well as increase integration and synergy across university activities and responsibilities.

8 IMPLICATIONS AND FUTURE RESEARCH

Understanding the way in which structural design can influence the development of entrepreneurial behavior may have policy implications regarding university commercialization not only for the university but even for regional and national policy regarding entrepreneurship and innovation. And, because some research and policies claim that investing into research leads to development, which in turn leads to regional (presumably economic) development through increased employment opportunities, tax, etc., then effectively dealing with the process of transforming research into tangible economic results is critical. The amount of investment going into the entrepreneurial process is significant if one considers investment into research and development, investment into entrepreneurship and business education, as well as specific policies and investments for entrepreneurship activity. Whether or not this is effectively assessed is an important question, because while there may be integration and synergy of action, perhaps not all the benefits are recognized, or perhaps the benefits are not allocated to the actual source, but associated to something else. The university setting, particularly when viewed as an ecosystem, includes phases peripheral to the emerging (nascent) phase, involving academic and research entrepreneurs, and phases following the emerging (nascent) phase, such as new or even small firm activity at university science parks and elsewhere. Furthermore, as the university setting can include multiple phases of entrepreneurial development, it may be valuable to investigate the development of entrepreneurial behavior across multiple phases, to further understand the dynamic between individual and environment, and process.

Integrating entrepreneurial education with university based venture creation shifts the university from a transferor of technology to a transformer of technology. The learning process of transforming the idea into a venture, as illustrated by going though the emerging phase towards achieving organizational legitimacy (Reynolds, 2000), helps to also transform the capacity of the individual, so that both the idea and the individual are transformed. There is therefore potential for new pedagogic models towards integrated entrepreneurial activity and education in the university setting (Kickul and Fayolle, 2007), allowing for greater utilization of resources available. Structural design creates the ability to more easily identify and control the entry and exit points of the nascent entrepreneurial process, and reduce some of the complexity of the impacting factors. There is potential to increase the output of entrepreneurship through investment and support of such environments, and thus the potential for entrepreneurial behavior development to take place.

This thesis has argued that development of entrepreneurial behavior is not contingent on whether or not the venture created is successful, but on the interactions involved during the attempted creation of the venture. It would be interesting to explore the behavior development further, to determine if there is some differentiation in behavior developed between those that only experienced successful development of one venture, those that experienced failure and then success with ventures within the same environment, those that experienced failure in one environment but success in another, and those that only experienced a failed attempt to develop a venture. While this has not been the research focus of this thesis, observation of multiple cycles of venture teams throughout the years of involvement and engagement at the VCS has shown tendencies of more tangible learning after the nascent entrepreneurs have experienced venture failure. While failure can impact

motivation, as communicated by one of the individuals interviewed in Paper IV, many of the nascent entrepreneurs have communicated greater self-efficacy in decision making after failure, in part due to a better understanding of what kind of factors and influences impact their decisions. To some extent this can be seen even in the two cases presented in Paper IV, though this is not placed in comparison to venture teams that only experienced success.

8.1 SUGGESTIONS FOR FUTURE RESEARCH

The thesis has specifically investigated nascent entrepreneurship within a university setting. Additional research ought to investigate the impact of interaction between individual and environment on behavior in other settings, as defined by other forms of entrepreneurship, or in other phases of entrepreneurship. Other settings could include privately funded research institutions, research and development units of large corporations, and innovation systems, as these could facilitate entrepreneurial activity impacted by identifiable role-sets. How do the environments, including the associated role-sets impact entrepreneurial behavior in these settings, and how does it differentiate from the entrepreneurial behavior created in the university setting, or does it? For example, does a more corporate setting develop behavior that is comparable to behavior developed in the university setting, is it dramatically different, or somewhere in between?

Investigation into structural design factors and impact may also help answer additional questions common to the field of new venture creation: Is there some special sequence of activities that should be followed in order to develop entrepreneurial behavior (as opposed to successful creation of a venture)? Is the business idea a spontaneous flash of insight or a product of data collection and careful assessment? How long does the process take? What is the proportion of start-up efforts that actually become new firms?

Another future question regards exploring training for entrepreneurial careers: Does the potential to develop entrepreneurial behavior enable a specific educational track for an entrepreneurial career, in which entrepreneurial behavior through entrepreneurial action is the key contribution to program design? Fayolle (2005, 2007) finds that just the presence of entrepreneurship education programs and a positive image of entrepreneurs within the university incentivize students to choose an entrepreneurial career. Thus, the first step is just to make the environment in which venture creation and learning take place visible and legitimate, such as was discussed in Paper I regarding entrepreneurial activity and Paper V regarding societal entrepreneurship. Facilitating learning through interaction which can increase self-efficacy also promotes a positive image of entrepreneurs, and illustrating this image as it is developing also allows for individuals to identify with entrepreneurship even if they don't associate to the 'heroic' entrepreneurial story. Entrepreneurial behavior, and perhaps even an entrepreneurial career, can be conducted by individuals having other primary roles or employments, and can be done as part of a complex and collective effort. Nascent entrepreneurs, through on-the-job training (in other words through action-based, learning through interaction, entrepreneurship education) can become more fluent in their entrepreneurial behaviors, building self-efficacy for future entrepreneurial activity.

REFERENCES

1949. Lag om rätten till arbetstagares uppfinningar. *In:* ARM, A. (ed.) *SFS 1949:345 § 1-10.* Sweden: Regeringskansliet.

1980. University and Small Busines Patent Procedures Act. *In:* CONGRESS, U. S. (ed.) *35 U.S.C. § 200-212 (37 C.F.R. 401).* United States: U.S. Code.

ADELMAN, C. 1993. Kurt Lewin and the Origins of Action Research. *Educational Action Research,* 1**,** 7-24.

AJZEN, I. 1991. The theory of planned behavior. *Organizational Behavior and Human Decision Processes,* 50**,** 179-211.

ALDRICH, H. E. 1999. *Organizations Evolving,* Newbury Park, CA, Sage Publications.

ALDRICH, H. E., CARTER, N. M., RUEF, M. & KIM, P. H. 2003. Hampered by homophily? The effects of team composition on the success of nascent entrepreneurs' organizing efforts (Summary). *In:* BYGRAVE, W. D. (ed.) *Frontiers of Entrepreneurship Research 2003.* Wellesley, MA: Babson College.

ALDRICH, H. E. & MARTINEZ, M. E. 2001. Many are called but few are chosen: an evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice,* 25**,** 41-56.

ALDRICH, H. E. & WIEDENMAYER, G. 1993. From traits to rates: an ecological perspective on organizational foundings. *In:* KATZ, J. & BROCKHAUS, R. (eds.) *Advances in Entrepreneurship, Firm Emergence, and Growth.* Greenwich, CT: JAI Press.

ALDRICH, H. E. & ZIMMER, C. 1986. Entrepreneurship through social networks. *In:* SEXTON, D. & SMILOR, R. (eds.) *The Art and Science of Entrepreneurship.* Cambridge, MA: Ballinger.

ALSOS, G. A. & KOLVEREID, L. 1998. The business gestation process of novice, serial and parallel business founders. *Entrepreneurship Theory and Practice,* 22**,** 101-114.

ALVAREZ, S. A. & BARNEY, J. 2007. Discovery and Creation: Alternative Theories of Entrepreneurial Action. *Strategic Entrepreneurship Journal,* 1**,** 11-26.

AMERICANHERITAGE 2006. The American Heritage Dictionary of the English Language. *In:* PICKETT, J. P. E. E. (ed.) *The American Heritage Dictionary of the English Language.* Fourth ed. Boston, MA USA: Houghton Mifflin Company.

ANDERSON, A. R. 2000. Paradox in the periphery: an entrepreneurial reconstruction? *Entrepreneurship and Regional Development,* 12**,** 91-109.

ARGYRIS, C. 1991. Teaching Smart People How to Learn. *Harvard Business Review,* 4**,** 4-15.

AUTIO, E., KEELEY, R. H., KLOFSTEN, M., PARKER, G. G. C. & HAY, M. 2001. Entrepreneurial Intent among Students in Scandinavia and in the USA. *Enterprise & Innovation Management Studies,* 2**,** 145-160.

BANDURA, A. 1977. *Social Learning Theory,* New York, NY, General Learning Press.

BANDURA, A. 1978. The self system in reciprocal determinism. *American Psychologist,* 33**,** 344-358.

BANDURA, A. 1982. Self-efficacy mechanism in human agency. *American Psychologist,* 37**,** 122-147.

BARON, R. A. 2002. OB and entrepreneurship: The reciprocal benefits of closer conceptual links. *Research in Organizational Behavior,* 24**,** 225-269.

BARRETT, F. J. & PETERSON, R. 2000. Appreciative Learning Cultures: Developing Competencies for Global Organizing. *Organizational Development Journal,* 18**,** 10-21.

BAUMOL, W. J. 1993. Formal Entrepreneurship Theory in Economics: Existence and Bounds. *Journal of Business Venturing,* 8**,** 197-210.

BERGGREN, J., BRUNNEGÅRD, V., EDGAR, B., FAXHEDEN, T., HENRICSON, K., LUNDQVIST, M., NAMOUSI, D., NORELL, L., RYDELL, M. & SKARIN, M. 2010. Progress Report 2009. Göteborg, Sweden.

BHAVE, M. P. 1994. A process model of entrepreneurial venture creation. *Journal of Business Venturing,* 9**,** 223-242.

BIRD, B. 1988. Implementing Entrepreneurial Ideas: The Case for Intention. *The Academy of Management Review,* 13**,** 442-453.
BIRD, B. & SCHJOEDT, L. 2009. Entrepreneurial Behavior: Its Nature, Scope, Recent Research, and Agenda for Future Research. *In:* CARSRUD, A. L. & BRÄNNBACK, M. (eds.) *Understanding the Entrepreneurial Mind: Opening the Black Box.* New York, NY: Springer.
BIRD, B. J. 1992. The operation of intentions in time: The emergence of the new venture. *Entrepreneurship Theory and Practice,* 17**,** 11–20.
BOSMA, N. & HARDING, R. 2007. Global Entrepreneurship Monitor. GEM 2006 Results. *In:* BABSON, G. (ed.). London Business School,.
BOUWEN, R. & STEYAERT, C. 1990. Construing organizational texture in young entrepreneurial firms. *Journal of Management Studies,* 27**,** 637-649.
BOZEMAN, B. 2000. Technology transfer and public policy: a review of research and theory. *Research Policy,* 29**,** 627-655.
BRADBURY, H., MIRVIS, P., NEILSEN, E. & PASMORE, W. A. 2008. Action Research at Work: Creating the Future Following the Path from Lewin. *In:* REASON, P. & BRADBURY, H. (eds.) *The Sage Handbook of Action Research: Participative Inquiry and Practice.* 2nd ed. London, UK: Sage Publications Ltd.
BRANDSTÄTTER, H. 1997. Becoming an entrepreneur -- A question of personality structure? *Journal of Economic Psychology,* 18**,** 157-177.
BRATTON, J., SAWCHUK, P., FORSHAW, C., CALLINAN, M. & CORBETT, M. 2010. *Work and Organizational Behaviour,* Basingstoke, UK, Palgrave Macmillan.
BRENNAN, M. C. & MCGOWAN, P. 2006. Academic entrepreneurship: an exploratory case study. *International Journal of Entrepreneurial Behaviour & Research,* 12**,** 144-164.
BROCKHAUS, R. H. 1982. The psychology of the entrepreneur. *In:* KENT, C. A., SEXTON, D. L. & VESPER, K. H. (eds.) *Encyclopedia of Entrepreneurship.* Englewood Cliffs, NJ: Prentice Hall.
BRUYAT, C. & JULIEN, P.-A. 2001. Defining the field of research in entrepreneurship. *Journal of Business Venturing,* 16**,** 165-180.
BRYMAN, A. & BELL, E. 2007. *Business Research Methods,* Oxford, UK, Oxford University Press.
BULLOUGH, R. V., JR. & DRAPER, R. J. 2004. Making Sense of a Failed Triad: mentors, university supervisors, and positioning theory. *Journal of Teacher Education,* 55**,** 407-420.
BURRELL, G. & MORGAN, G. 1979. *Sociological Paradigms and Organizational Analysis: Elements of the Sociology of Corporate Life,* London, UK, Heinemann.
BUSENITZ, L. W. & BARNEY, J. B. 1997. Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing,* 12**,** 9-30.
BYGRAVE, W. D. & CHURCHILL, N. 1989. The Entrepreneurship Paradigm (I): A Philosophical Look at Its Research Methodologies. *Entrepreneurship Theory and Practice,* 14**,** 7-26.
CAMERER, C. & WEBER, M. 1992. Recent Developments in Modeling Preferences: Uncertainty and Ambiguity. *Journal of Risk and Uncertainty,* 5**,** 325-370.
CAMPBELL, C., KENDRICK, R. C. & SAMUELSON, D. S. 1985. Stalking the Latent Entrepreneur: Business Incubators and Economic Development. *Economic Development Review,* 3**,** 43-49.
CARSRUD, A. L. & JOHNSON, W. R. 1989. Entrepreneurship: a social psychological perspective. *Entrepreneurship and Regional Development,* 1**,** 21-31.
CARTER, N. M., GARTNER, W. B. & REYNOLDS, P. D. 1996. Exploring start-up event sequences. *Journal of Business Venturing,* 11**,** 151-166.
CASSON, M. 1982. *The Entrepreneur,* Totowa, NJ., Barnes & Noble Books.
CHECKLAND, P. 1981. *Systems Thinking, Systems Practice,* Chichester, UK, John Wiley & Sons.
CHELL, E. 1985. The Entrepreneurial Personality: A Few Ghosts Laid to Rest? *International Small Business Journal,* 3**,** 43-54.
CIALDINI, R. B. & TROST, M. 1998. Social influence: social norms, conformity, and compliance. *The Handbook of Social Psychology***,** 151-192.

CLARK, B. R. 1998. *Creating Entrepreneurial Universities: Organizational Pathways of Transformation,* New York, Pergamon Press.
COGHLAN, D. 2007. Insider action research: opportunities and challenges. *Management Research News,* 30**,** 335-343.
COGHLAN, D. & BRANNICK, T. 2005. *Doing action research in your own organization,* London, UK, Sage.
COLEMAN, J. 1990. Social capital and the creation of human capital. *American Journal of Sociology,* 94**,** 95-120.
COLLINS, L., SMITH, A. & HANNON, P. 2006. Applying a synergistic learning approach in entrepreneurship education. *Management Learning,* 37**,** 335-354.
COLLINS, O. & MOORE, D. 1970. *The organization makers,* New York, NY, Appleton-Century-Crofts.
COOKE, P. 2001. Regional Innovation Systems, Clusters, and the Knowledge Economy. *Industrial and Corporate Change,* 10**,** 945-974.
COOKE, P., GOMEZ URANGA, M. & ETXEBARRIA, G. 1997. Regional innovation systems: Institutional and organisational dimensions. *Research Policy,* 26**,** 475-491.
COPE, J. & WATTS, G. 2000. Learning by doing: An exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behaviour and Research,* 6**,** 104-124.
DASGUPTA, P. & DAVID, P. A. 1994. Toward a new economics of science. *Research Policy,* 23**,** 487-521.
DAVIDSSON, P. 2006. Nascent entrepreneurship: empirical studies and developments. *Foundations and Trends in Entrepreneurship,* 2**,** 1-76.
DAVIDSSON, P. & HONIG, B. 2003. The role of social and human capital among nascent entrepreneurs. *Journal of Business Venturing,* 18**,** 301-331.
DAVIDSSON, P. & WIKLUND, J. 2001. Levels of Analysis in Entrepreneurship Research: Current Research Practice and Suggestions for the Future. *Entrepreneurship Theory and Practice,* 25**,** 81-100.
DAVIES, B. & HARRÉ, R. 1990. Positioning: the discursive production of selves. *Journal of Theory of Social Behavior,* 20**,** 43-63.
DE COSTER, R. & BUTLER, C. 2005. Assessment of proposals for new technology ventures in the UK: characteristics of university spin-off companies. *Technovation,* 25**,** 535-543.
DEAKINS, D. & FREEL, M. 1998. Entrepreneurial learning and the growth process in SMEs. *The Learning Organization,* 5**,** 144-155.
DELMAR, F. & SHANE, S. 2002. What founders do: A longitudinal study of the start-up process. *In:* BYGRAVE, W. D., DAVIDSSON, P., FIET, J., GREENE, P. G., HARRISON, R., LERNER, M., MEYER, G. D., SOHL, J. & ZACHARAKIS, A. (eds.) *Frontiers of Entrepreneurship Research 2002.* Wellesley, MA.
DELMAR, F. & SHANE, S. 2004. Legitimating first: Organizing activities and the survival of new ventures. *Journal of Business Venturing,* 19**,** 385-410.
DEQUECH, D. 2003. Uncertainty and Economic Sociology. *American Journal of Economics & Sociology,* 62**,** 509-532.
DIMAGGIO, P. J. 1988. Interest and agency in institutional theory. *In:* ZUCKER, L. (ed.) *Institutional patterns and organizations: Culture and environment.* Cambridge, MA: Ballinger Publication Co.
EDQUIST, C. 2006. Systems of Innovation: Perspectives and Challenges. *In:* FAGERBERG, J., MOWERY, D. C. & NELSON, R. R. (eds.) *The Oxford Handbook of Innovation.* Oxford, UK: Oxford University Press.
EKEHAMMAR, B. 1974. Interactionism in Personality from a Historical Perspective. *Psychological Bullentin,* 81**,** 1026-1048.
ENSLEY, M. D., CARLAND, J. C., CARLAND, J. W. & BANKS, M. 1999. Exploring the existence of entrepreneurial teams. *International Journal of Management,* 16**,** 276-286.

ENSLEY, M. D., PEARCE, C. L. & HMIELESKI, K. M. 2006. The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *Journal of Business Venturing,* 21**,** 243-263.

ENSLEY, M. D., PEARSON, A. W. & AMASON, A. C. 2002. Understanding the dynamics of new venture top management teams: cohesion, conflict, and new venture performance. *Journal of Business Venturing,* 17**,** 365-386.

ETZKOWITZ, H. 2003. Research groups as `quasi-firms': the invention of the entrepreneurial university. *Research Policy,* 32**,** 109-121.

ETZKOWITZ, H. 2004. The evolution of the entrepreneurial university. *International Journal of Technology and Globalisation,* 1**,** 64-77.

ETZKOWITZ, H. & LEYDESDORFF, L. 2000. The dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university-industry-government relations. *Research Policy,* 29**,** 109-123.

ETZKOWITZ, H., WEBSTER, A., GEBHARDT, C. & TERRA, B. R. C. 2000. The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research Policy,* 29**,** 313-330.

FAYOLLE, A. 2005. Evaluation of entrepreneurship education: behaviour performing or intention increasing? *International Journal of Entrepreneurship and Small Business,* 2**,** 89-98.

FAYOLLE, A., GAILLY, B. & LASSAS-CLERC, N. 2007. Towards a new methodology to assess the entrepreneurship teaching programmes. *In:* FAYOLLE, A. (ed.) *Handbook of Research in Entrepreneurship Education: A General Perspective.* Cheltenham, UK: Edward Elgar.

FAYOLLE, A. & KYRÖ, P. (eds.) 2008. *The Dynamics between Entrepreneurship, Environment and Education,* Cheltenham, UK: Edward Elgar Publishing Limited.

FETTERS, M. L., GREENE, P. G., RICE, M. P. & BUTLER, J. S. (eds.) 2010. *The Development of University-Based Entrepreneurship Ecosystems,* Cheltenham, UK: Edward Elgar Publishing Limited.

FINKLE, T. A. & DEEDS, D. 2001. Trends in the market for entrepreneurship faculty, 1989-1998. *Journal of Business Venturing,* 16**,** 613-630.

FLETCHER, D. E. & WATSON, T. M. 2007. Entrepreneurship, Management Learning and Negotiated Narratives: 'Making it Otherwise for Us - Otherwise for Them'. *Management Learning,* 38**,** 9-26.

FLICK, U. 2006. *An Introduction to Qualitative Research,* London, UK, Sage Publications.

FOSS, L. 2004. 'Going against the grain ...' Construction of entrepreneurial identity through narratives. *In:* HJORTH, D. & STEYAERT, C. (eds.) *Narrative and Discursive Approaches in Entrepreneurship.* Cheltenham, UK: Edward Elgar Publishing Limited.

GARAVAN, T. N. & O'CINNEIDE, B. 1994. Entrepreneurship Education and Training Programmes: A Review and Evaluation - Part 1. *Journal of European Industrial Training,* 18**,** 3-12.

GARTNER, W. B. 1985. A Conceptual Framework for Describing the Phenomenon of New Venture Creation. *The Academy of Management Review,* 10**,** 696-706.

GARTNER, W. B. 1988. "Who is an Entrepreneur?" Is the Wrong Question. *American Journal of Small Business,* 12**,** 11-32.

GARTNER, W. B. 2006. Entrepreneurship, psychology and the 'Critical Mess'. *In:* BAUM, J., FRESE, M. & BARON, R. (eds.) *The Psychology of Entrepreneurship.* Mahwah, NJ: Lawrence Erlbaum Associates.

GARTNER, W. B. 2010. A new path to the waterfall: A narrative on a use of entrepreneurial narrative. *International Small Business Journal,* 28**,** 6-19.

GARTNER, W. B., BIRD, B. J. & STARR, J. A. 1992. Acting As If: Differentiating Entrepreneurial From Organizational Behavior. *Entrepreneurship: Theory & Practice,* 16**,** 13-31.

GARTNER, W. B. & CARTER, N. M. 2003. Entrepreneurial behavior and firm organising processes. *In:* ACS, Z. J. & AUDRETSCH, D. B. (eds.) *Handbook of Entrepreneurship Research.* Dordrecht, NL: Kluwer.

GARTNER, W. B., SHAVER, K. G., CARTER, N. M. & REYNOLDS, P. D. 2004. *Handbook of Entrepreneurial Dynamics: The Process of Business Creation,* Thousand Oaks, CA, Sage.
GHEZZI, S. & MINGIONE, E. 2007. Embeddedness, Path Dependency and Social Institutions: An Economic Sociology Approach. *Current Sociology,* 55**,** 11-23.
GIBB, A. 2007. Creating the entrepreneurial university: do we need a wholly different model of entrepreneurship? *In:* FAYOLLE, A. (ed.) *Handbook of Research in Entrepreneurship Education, Volume 1: A General Perspective.* Cheltenham, UK: Edward Elgar Publishing Limited.
GIBB, A. A. 1996. Entrepreneurship and Small Business Management: Can We Afford to Neglect Them in the Twenty-first Century Business School? *British Journal of Management,* 7**,** 309-321.
GIBB, A. A. 1997. Small firms' training and competitiveness. Building on the small business as a learning organistion. *International Small Business Journal,* 15**,** 13-29.
GLASSMAN, A. M., MOORE, R. W., ROSSY, G. L., NEUPERT, K., NAPIER, N., JONES, D. E. & HARVEY, M. 2003. Academic Entrepreneurship: Views on Balancing the Acropolis and the Agora. *Journal of Management Inquiry,* 12**,** 353-374.
GOLD, R. L. 1958. Roles in Sociological Field Observations. *Social Forces,* 36**,** 217-223.
GOLDFARB, B. & HENREKSON, M. 2003. Bottom-up versus top-down policies towards the commercialization of university intellectual property. *Research Policy,* 32**,** 639-658.
GRIMALDI, R. & GRANDI, A. 2005. Business incubators and new venture creation: as assessment of incubating models. *Technovation,* 25**,** 111-121.
HACKETT, S. M. & DILTS, D. M. 2004. A Systematic Review of Business Incubation Research. *Journal of Technology Transfer,* 29**,** 55-82.
HAMMERSLEY, M. 1990. *Reading Ethnographic Research: A Critical Guide,* London, UK, Longman.
HARMON, B., ARDISHVILI, A., CARDOZO, R., ELDER, T., LEUTHOLD, J., PARSHALL, J., RAGHIAN, M. & SMITH, D. 1997. Mapping the university technology transfer process. *Journal of Business Venturing,* 12**,** 423-434.
HARRÉ, R. & VAN LANGENHOVE, L. 1999. *Positioning Theory,* Oxford, UK, Blackwell Publishers Ltd.
HEIDER, F. 1958. *The Psychology of Interpersonal Relations,* New York, NY, John Wiley & Sons.
HEINONEN, J. & POIKKIJOKI, S.-A. 2006. An entrepreneurial-directed approach to entrepreneurship education: mission impossible? *Journal of Management Development,* 25**,** 80-94.
HENRY, C., HILL, F. M. & LEITCH, C. M. 2004. The Effectiveness of Training for New Business Creation: A Longitudinal Study. *International Small Business Journal,* 22**,** 249-271.
HERBERT, R. F. & LINK, A. N. 1982. *The Entrepreneur,* New York, NY, Praeger.
HJORTH, D. & JOHANNISSON, B. 2007. Learning as an entrepreneurial process. *In:* FAYOLLE, A. (ed.) *Handbook of Research in Entrepreneurship Education, Volume 1: A General Perspective.* Cheltenham, UK: Edward Elgar Publishing Limited.
HONIG, B. 2004. Entrepreneurship education: toward a model of contingency-based business planning. *Academy of Management Learning and Education,* 3**,** 258-273.
HSU, D. H. 2008. Technology-Based Entrepreneurship. *In:* SHANE, S. (ed.) *Handbook of Technology and Innovation Management.* John Wiley & Sons, Ltd.
HYTTI, U. & O'GORMAN, C. 2004. What is "enterprise education"? An analysis of the objectives and methods of enterprise education programmes in four European countries. *Education + Training,* 46**,** 11-23.
JACOB, M., LUNDQVIST, M. & HELLSMARK, H. 2003. Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology. *Research Policy,* 32**,** 1555-1568.
JOHANNISSON, B., LANDSTROM, H. & ROSENBERG, J. 1998. University training for entrepreneurship -- an action frame of reference. *European Journal of Engineering Education,* 23**,** 477-496.
JOHANNISSON, B. & MØNSTED, M. 1997. Contextualizing Entrepreneurial Networking: The Case of Scandinavia. *International Studies of Management & Organization,* 27**,** 109-136.

JORGENSEN, D. L. 1989. *Participant Observation: A Methodology for Human Studies,* London, UK, Sage.
KARATAS-ÖZKAN, M. & MURPHY, W. D. 2006. Venturing as a relational process. *In:* KRYRIAKIDOU, O. & OZBILGIN, M. F. (eds.) *Relational Perspectives in Organization Studies: a Research Companion.* Cheltenham, UK: Edward Elgar.
KATZ, D. & KHAN, R. 1966. *The Social Psychology of Organizations,* New York, NY., John Wiley.
KATZ, J. & GARTNER, W. B. 1988. Properties of Emerging Organizations. *The Academy of Management Review,* 13**,** 429-441.
KATZ, J. A. 2003. The chronology and intellectual trajectory of American entrepreneurship education: 1876-1999. *Journal of Business Venturing,* 18**,** 283-300.
KENNEY, M. & GOE, W. R. 2004. The role of social embeddedness in professorial entrepreneurship: a comparison of electrical engineering and computer science at UC Berkeley and Stanford. *Research Policy,* 33**,** 691-707.
KESSLER, A. & FRANK, H. 2009. Nascent Entrepreneurship in a Longitudinal Perspective: The Impact of Person, Environment, Resources and the Founding Process on the Decision to Start Business Activities. *International Small Business Journal,* 27**,** 720-742.
KETS DE VRIES, M. F. R. 1977. The entrepreneurial personality: a person at the cross-roads. *Journal of Management Studies,* 1**,** 34-57.
KICKUL, J. & FAYOLLE, A. 2007. Cornerstones of change: revisiting and challenging new perspectives on research in entrepreneurship education. *In:* FAYOLLE, A. (ed.) *Handbook of Research in Entrepreneurship Education, Volume 1: A General Perspective.* Cheltenham, UK: Edward Elgar Publishing Limited.
KIM, P. H., ALDRICH, H. E. & KEISTER, L. A. 2006. Access (Not) Denied: The Impact of Financial, Human, and Cultural Capital on Entrepreneurial Entryin the United States. *Small Business Economics,* 27**,** 5-22.
KIRBY, D. 2004. Entrepreneurship education: can business schools meet the challenge? *Education + Training,* 46**,** 510-519.
KOLB, A. Y. & KOLB, D. 2005. Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. *Academy of Management Learning and Education,* 4**,** 193-212.
KOLB, D. 1984. *Experiential Learning: Experience as a Source of Learning and Development,* Englewood Cliffs, NJ, Prentice-Hall.
KUREK, K., GEURTS, P. & ROOSENDAAL, H. 2007. The research entrepreneur: strategic positioning of the researcher in his societal environment. *Science and Public Policy,* 34**,** 501-513.
LAMBERT, R. 2003. Lambert Review of Business-University Collaboration. London: HMSO.
LAUKKANEN, M. 2003. Exploring academic entrepreneurship: drivers and tensions of university-based business. *Journal of Small Business and Enterprise Development,* 10**,** 372-382.
LEIBENSTEIN, H. 1987. Entrepreneurship, entrepreneurial training, and x-efficiency theory. *Journal of Economic Behavior & Organization,* 8**,** 191-205.
LEWIN, K. 1951. *Field Theory in Social Science: Selected Theoretical Papers,* New York, NY, Basic Books.
LIAO, J. & WELSCH, H. 2008. Patterns of venture gestation process: Exploring the differences between tech and non-tech nascent entrepreneurs. *The Journal of High Technology Management Research,* 19**,** 103-113.
LIBECAP, G. D. 2005. *University Entrepreneurship and Technology Transfer,* New York, NY, JAI Press.
LOUIS, K. S., BLUMENTHAL, D., GLUCK, M. E. & STOTO, M. A. 1989. Entrepreneurs in academe: an exploration of behaviors among life scientists. *Administrative Science Quarterly,* 34**,** 110–131.
LOW, M. B. & MACMILLAN, I. C. 1988. Entrepreneurship: past research and future challenges. *Journal of Management,* 14**,** 139-161.
LUNDQVIST, M. 2009. Den tekniska högskolan på den samhällsentreprenöriella arenan. *In:* GAWELL, M., JOHANNISSON, B. & LUNDQVIST, M. (eds.) *Samhällets entreprenör - en forskarantologi om samhällsentreprenörskap.* Stockholm: KK Stiftelsen.

LUNDVALL, B.-Å., JOHNSON, B., ANDERSEN, E. S. & DALUM, B. 2002. National systems of production, innovation and competence building. *Research Policy,* 31**,** 213-231.
LÜTHJE, C. & FRANKE, N. 2003. The making of an entrepreneur: testing a model of entrepreneurial intent among engineering students a MIT. *R&D Management,* 33**,** 135-146.
MANSFIELD, E. & LEE, Y. 1996. The modern university: contributor to industrial innovation and recipient of industrial R&D support. *Research Policy,* 25**,** 1027-1058.
MAPLES, M. F. & WEBSTER, J. M. 1980. Thorndike's connection. *In:* GASDA, G. M. & COSSINS, R. J. (eds.) *Theories of Learning: A Comparative Approach.* Itasca, IL: F. E. Peacock.
MARKMAN, G. D., BALKIN, D. & BARON, R. 2002. Inventors and New Venture Formation: the Effects of General Self-Efficacy and Regretful Thinking. *Entrepreneurship Theory and Practice,* 27**,** 149-165.
MAZZAROL, T., VOLERY, T., DOSS, N. & THEIN, V. 1999. Factors influencing small business start-ups: a comparison with previous research. *International Journal of Entrepreneurial Behaviour & Research,* 5**,** 48-63.
MCADAM, M., GALBRAITH, B., MCADAM, R. & HUMPHREYS, P. 2006. Business Processes and Networks in University Incubators: A Review and Research Agendas. *Technology Analysis & Strategic Management,* 18**,** 451 - 472.
MCADAM, M. & MCADAM, R. 2006. The networked incubator: The role and operation of entrepreneurial networking with the university science park incubator (USI). *The International Journal of Entrepreneurship and Innovation,* 7**,** 87-97.
MCCLELLAND, D. C. 1961. *The Achieving Society,* Princeton, NJ, Van Nostrand.
MCCLELLAND, D. C. 1987. *Human Motivation,* New York, Cambridge University Press.
MCMULLAN, W. E. & GILLIN, L. M. 1998. Industrial Viewpoint -- Entrepreneurship Education: Developing technological start-up entrepreneurs: a case study of a graduate entrepreneurship programme at Swinburne University. *Technovation,* 18**,** 275-286.
MCMULLAN, W. E. & LONG, W. A. 1987. Entrepreneurship education in the nineties. *Journal of Business Venturing,* 2**,** 261-275.
MCQUEEN, D. H. & WALLMARK, J. T. 1982. Spin-off Companies from Chalmers University of Technology. *Technovation,* 1**,** 305-315.
MCQUEEN, D. H. & WALLMARK, J. T. 1984. Innovation Output and Academic Performance at Chalmers University of Technology. *Omega,* 12**,** 457-464.
MENZIES, T. V. 2004. Are universities playing a role in nurturing and developing high-technology entrepreneurs? *Entrepreneurship and Innovation,* 5**,** 149-157.
MOROZ, P. W., HINDLE, K. & ANDERSON, R. 2006. The role of entrepreneurship education in commercializing intellectual property in Canadian universities. *26th Babson College Entrepreneurship Research Conference.* Bloomington, IN USA.
MOWERY, D. C., NELSON, R. R., SAMPAT, B. N. & ZIEDONIS, A. A. 2001. The growth of patenting and licensing by U.S. universities: an assessment of the effects of the Bayh-Dole act of 1980. *Research Policy,* 30**,** 99-119.
MOWERY, D. C. & SAMPAT, B. N. 2005. The Bayh-Dole Act of 1980 and University-Industry Technology Transfer: A Model for Other OECD Governments? *Journal of Technology Transfer,* 30**,** 115-127.
MWASALWIBA, E. S. 2010. Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators. *Education + Training,* 52**,** 20-47.
NAHAPIET, J. & GHOSHAL, S. 1998. Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review,* 23**,** 242-266.
NECK, H. M., MEYER, G. D., COHEN, B. & CORBETT, A. C. 2004. An Entrepreneurial System View of New Venture Creation. *Journal of Small Business Management,* 42**,** 190-208.
NELSON, A., BYERS, T. & GARY, D. L. 2005. Organizational Modularity and Intra-University Relationships between Entrepreneurship Education and Technology Transfer. *Advances in the Study of Entrepreneurship, Innovation, & Economic Growth.* JAI.

NELSON, R. R. 2004. The market economy, and the scientific commons. *Research Policy,* 33**,** 455-471.
NICOLINI, D. & MESNAR, M. B. 1995. The social construction of organisational learning: conceptual and practical issues in the field. *Human Relations,* 48**,** 727-747.
O'CONNOR, S., GRAFF, G. D. & WINICKOFF, D. E. 2010. Legal Context of University Intellectual Property and Technology Transfer. *The Committee on Management of University Intellectual Property: Lessons from a Generation of Experience, Research, and Dialogue.* National Research Council.
PETTIGREW, A. M., WOODMAN, R. W. & CAMERON, K. S. 2001. Studying Organizational Change and Development: Challenges for Future Research. *Academy of Management Journal,* 44**,** 697-713.
PITTAWAY, L. & COPE, J. 2007. Entrepreneurship Education - A Systematic Review of the Evidence. *International Small Business Journal,* 25**,** 479-510.
PRUETT, M., SHINNAR, R., TONEY, B., LLOPIS, F. & FOX, J. 2009. Explaining entrepreneurial intentions of university students: a cross-cultural study. *International Journal of Entrepreneurial Behaviour & Research,* 15**,** 571-594.
RAE, D. 2005. Entrepreneurial learning: a narrative-based conceptual model. *Journal of Small Business and Enterprise Development,* 12**,** 323-335.
RAE, D. & CARSWELL, M. 2001. Towards a conceptual understanding of entrepreneurial learning. *Journal of Small Business and Enterprise Development,* 8**,** 150-158.
RASMUSSEN, E. & BORCH, O. J. 2010. University capabilities in facilitating entrepreneurship: A longitudinal study of spin-off ventures at mid-range universities. *Research Policy,* 39**,** 602-612.
RASMUSSEN, E., MOEN, Ø. & GULBRANDSEN, M. 2006. Initiatives to promote commercialization of university knowledge. *Technovation,* 26**,** 518–533.
RASMUSSEN, E. A. & SORHEIM, R. 2006. Action-based entrepreneurship education. *Technovation,* 26**,** 185-194.
RAUCH, A. & FRESE, M. 2007. Let's put the person back into entrepreneurship research: A meta-analysis on the relationship between business owners' personality traits, business creation, and success. *European Journal of Work and Organizational Psychology,* 16**,** 353-385.
REASON, P. & BRADBURY, H. 2001. *Handbook of action research,* Thousands Oaks, CA, Sage.
REASON, P. & BRADBURY, H. (eds.) 2008. *The Sage Handbook of Action Research: Participative Inquiry and Practice,* London, UK: Sage Publications Ltd.
REYNOLDS, P. D. 1995. Who starts new firms? Linear additive versus interaction based models. *Babson - Kauffman Entreprepreneurship Research Conference.* London Business School.
REYNOLDS, P. D. 2000. National panel study of US business start-ups. Background and methodology. *In:* KATZ, J. A. (ed.) *Advances in Entrepreneurship, Firm Emergence and Growth.* Stamford, CT: JAI Press.
REYNOLDS, P. D. 2007. New Firm Creation in the United States: A PSED I Overview. *Foundations and Trends in Entrepreneurship,* 3**,** 1-150.
REYNOLDS, P. D., BOSMAN, N., AUTIO, E., COX, L. W. & HAY, M. 2005. Global Entreprenuerhsip monitor: data collection design and implementation 1998-2003. *Small Business Economics,* 24**,** 205-231.
REYNOLDS, P. D., CARTER, N. M., GARTNER, W. B. & GREENE, P. G. 2004. The prevalence of nascent entrepreneurs in the United States: Evidence from the Panel Study of Entrepreneurial Dynamics. *Small Business Economics,* 23**,** 263-284.
REYNOLDS, P. D. & CURTIN, R. T. 2008. Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II Initial Assessment. . *Foundations and Trends in Entrepreneurship,* 4.
REYNOLDS, P. D. & CURTIN, R. T. 2009. Introduction. *In:* REYNOLDS, P. D. & CURTIN, R. T. (eds.) *New Firm Creation in the United States.* New York, NY: Springer.
REYNOLDS, P. D. & MILLER, B. 1992. New firm gestation: conception, birth and implications for research. *Journal of Business Venturing,* 7**,** 405-417.

ROBERTS, E. B. 1990. Evolving toward product and market-orientation: The early years of technology-based firms. *Journal of Product Innovation Management,* 7**,** 274-287.
ROTEFOSS, B. 2005. Aspiring, nascent and fledgling entrepreneurs: an investigation of the business start-up process. *Entrepreneurship and Regional Development,* 17**,** 109-127.
ROTH, J., SHANI, A. B. & LEARY, M. M. 2007. Insider action research: Facing the challenges of new capability development within a biopharma company. *Action Research,* 5**,** 41-60.
ROTHAERMEL, F. T., AGUNG, D. S. & JIANG, L. 2007. University entrepreneurship: a taxonomy of the literature. *Industrial and Corporate Change,* 16**,** 691-791.
SANSONE, C., MORF, C. C. & PANTER, A. T. 2004. *The Sage Handbook of Methods in Social Psychology,* Sage Publications, Inc.
SARASVATHY, S. D. 2001. Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *The Academy of Management Review,* 26**,** 243-263.
SAY, J. B. 2007 [1863]. *A Treatise on Political Economy,* (Originally published by Grigg & Elliot).
SCHOONHOVEN, C. & ROMANELLI, E. 2001. Emergent themes and the next wave of entrepreneurship research. *In:* SCHOONHOVEN, C. & ROMANELLI, E. (eds.) *The Entrepreneurship Dynamic: Origins of Entrepreneurship and the Evolution of Industries.* Stanford, CA: Stanford Business Books.
SCHUMPETER, J. A. 1942. *Capitalism, socialism, and democracy,* New York, London,, Harper & Brothers.
SCHÖN, D. A. 1984. The Architectural Studio as an Exemplar of Education for Reflection-in-Action. *Journal of Architectural Education,* 38**,** 2-9.
SENYARD, J., DAVIDSSON , P., GORDON, S. R. & STEFFENS, P. R. 2009. The comprehensive Australian Study of entrepreneurial emergence (CAUSEE) high potential nascent entrepreneurs: some preliminary findings. *The 6th AGSE International Entrepreneurship Research Exchange.* Adelaide, Australia.
SHANE, S. 2003. *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus,* Cheltenham, UK, Edward Elgar.
SHANE, S. 2004a. *Academic Entrepreneurship: University Spinoffs and Wealth Creation.,* Cheltenham, UK, Edward Elgar.
SHANE, S. 2004b. Encouraging university entrepreneurship? The effect of the Bayh-Dole Act on university patenting in the United States. *Journal of Business Venturing,* 19**,** 127-151.
SHANE, S. & VENKATARAMAN, S. 2000. The Promise of Enterpreneurship as a Field of Research. *The Academy of Management Review,* 25**,** 217-226.
SHANI, A. B., MOHRMAN, S. A., PASMORE, W. A., STYMNE, B. & ADLER, N. 2008. *Handbook of Collaborative Management Research,* Thousand Oaks, CA, Sage.
SHAPERO, A. & SOKOL, L. 1982. The social dimension of entrepreneurship. *In:* KENT, C. A., SEXTON, D. L. & VESPER, K. H. (eds.) *The Encyclopedia of Entrepreneurship.* Englewood Cliffs: NJ: Prentice-Hall.
SHEPHERD, D. & HAYNIE, J. M. 2009. Birds of a feather don't always flock together: Identity management in entrepreneurship. *Journal of Business Venturing,* 24**,** 316-337.
SHOOK, C. L., PRIEM, R. L. & MCGEE, J. E. 2003. Venture Creation and the Enterprising Individual: A Review and Synthesis. *Journal of Management,* 29**,** 379-399.
SIEGEL, D., WRIGHT, M. & LOCKETT, A. 2007. The rise of entrepreneurial activity at universities: organizational and societal implications. *Industrial and Corporate Change,* 16**,** 489-504.
SIEGEL, D. S., PHAN, P. H. & LIBECAP, G. D. 2005. Analyzing the Effectiveness of University Technology Transfer: Implications for Entrepreneurship Education. *Advances in the Study of Entrepreneurship, Innovation, & Economic Growth.* No longer published by Elsevier.
SIEGEL, D. S., WALDMAN, D., ATWATER, L. & LINK, A. N. 2004. Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies. *Journal of Engineering and Technology Management,* 21**,** 115–142.

SIEGEL, R., SIEGEL, E. & MACMILLAN, I. C. 1993. Characteristics distinguishing high-growth ventures. *Journal of Business Venturing,* 8**,** 169-180.
SOLOMON, G. 2007. An examination of entrepreneurship education in the United States. *Journal of Small Business and Enterprise Development,* 14**,** 168-182.
SOUITARIS, V., ZERBINATI, S. & AL-LAHAM, A. 2007. Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing,* 22**,** 566-591.
SPILLING, O. R. 1996. The entrepreneurial system: On entrepreneurship in the context of a mega-event. *Journal of Business Research,* 36**,** 91-103.
SPRADLEY, J. P. 1980. *Participant Observation,* New York, NY, Holt, Reinhart and Winston.
STAKE, R. E. 2005. Qualitative Case Studies. *In:* DENZIN, N. K. & LINCOLN, Y. S. (eds.) *The Sage Handbook of Qualitative Research.* Thousand Oaks, CA Sage Publications Inc.
STEVENS, A. 2004. The Enactment of Bayh-Dole *Journal of Technology Transfer,* 29**,** 93-99.
STEVENSON, H. H. & JARILLO, J. C. 1990. A paradigm of entrepreneurship: Entrepreneurial management. *Strategic Management Journal,* 11**,** 17-27.
STINCHCOMBE, A. L. 1965. Social Structure and Organisations. *In:* (ED.), J. G. M. (ed.) *Handbook of Organizations.* Chicago: IL: Rand McNally and Company.
STUART, T. E., HOANG, H. & HYBELS, R. C. 1999. Interorganizational endorsements and the performance of entrepreneurial ventures. *Administrative Science Quarterly,* 44**,** 315-349.
STYHRE, A. & LIND, F. 2009. The softening bureaucracy: Accommodating new research opportunities in the entrepreneurial university. *Scandinavian Journal of Management***,** DOI.
SUCHMAN, M. C. 1995. Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review,* 20**,** 571-610.
SULLIVAN, R. 2000. Entrepreneurial learning and mentoring. *International Journal of Entrepreneurial Behaviour & Research,* 6**,** 160-175.
TASSEY, G. 2005. The disaggregated technology production function: A new model of university and corporate research. *Research Policy,* 34**,** 287-303.
TIMMONS, J. A. 1986. Growing up big: Entrepreneurship and the creation of high-potential ventures. . *In:* SEXTON, D. L. & SMILOR, R. W. (eds.) *The Art and Science of Entrepreneurship.* New York: Ballinger.
TIMMONS, J. A. 1999. *New Venture Creation: Entrepreneurship for the 21st Century,* Boston, MA, IRWIN/McGraw-Hill
TUUNAINEN, J. 2005. Contesting a hybrid firm at a traditional university. *Social Studies of Science,* 35**,** 173-210.
VAN DE VEN, A. H. & ENGLEMAN, R. M. 2004. Event- and outcome-driven explanations of entrepreneurship. *Journal of Business Venturing,* 19**,** 343-358.
VAN DE VEN, H. 1993. The development of an infrastructure for entrepreneurship. *Journal of Business Venturing,* 8**,** 211-230.
WEINRAUCH, J. D. 1984. Educating the Entrepreneur: understanding adult learning behavior. *Journal of Small Business Management,* 22**,** 32-37.
WEST, G. & WILSON, E. V. 1995. A Simulation of Strategic Decision Making in Situational Stereotype Conditions for Entrepreneurial Companies. *Simulation & Gaming,* 26**,** 307-327.
VESTERGAARD, J. 2007. The Entrepreneurial University Revisited: Conflicts and the Importance of Role Separation. *Social Epistemology,* 21**,** 41-54.
VINTON, G. & ALCOCK, S. 2004. Entrepreneuring in education. *The International Journal of Education,* 18.
VOHORA, A., WRIGHT, M. & LOCKETT, A. 2004. Critical junctures in the development of university high-tech spinout companies. *Research Policy,* 33**,** 147-175.
WRIGHT, M., BIRLEY, S. & MOSEY, S. 2004. Entrepreneurship and University Technology Transfer. *Journal of Technology Transfer,* 29**,** 235-246.
VYGOTSKY, L. S. 1978. *Mind in Society,* Cambridge, MA, MIT Press.

YBALLE, L. & O'CONNOR, D. 2000. Appreciative pedagogy: constructing positive models for learning. *Journal of Management Education,* 24**,** 474-483.

APPENDIX A: Refined organization of 26 events for start-up allocated to categories as defined by Liao and Welsch (2008), from Table 1. A list of startup activities and timing

Categories	Events*
Planning Activities	A Spent time on thinking about business idea? B Has a business plan been prepared for? C Has a start-up team been organized? J Developed projected financial statements? K Saved money to invest in the business? O Arranged child care or household help to allow more time on business? T Taken any classes/workshop on starting a business?
Establishing Legitimacy	R Opened a bank account exclusively for this business? U Listed new business in the phone book? V Installed a separate phone line for business? W Paid state unemployment insurance tax? X Paid federal social security taxes (FICA)? Y Filed a federal tax return? Z Listed with Dun & Bradstreet
Resource Combination	F Application for a patent/copyright/trademark? G Purchase of raw materials, inventory, supplies? H Purchase/lease/rent of equipment/facilities/property? I Defined market opportunities? L Invested your own money in this business? M Asked financial institutions or other people for funds? N Established credit with a supplier? P Devoted full time to the business (N35 h/week) Q Hired any employees/managers?
Market Behavior	D Developing models and procedures? E Have marketing or promotional efforts been started? S Received money for the sales of goods/services?

* The labels A, B, C, etc. are the designation of the 26 events used in the Liao and Welsch (2008) article

Paper I

Legitimizing entrepreneurial activity at the university

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Abstract

Entrepreneurial activity ought to be at the core of aspiring entrepreneurial universities. However, there is little understanding about how such activity is legitimized and sustained beyond its idiosyncratic occurrences. Utility creation – one of the outcomes of entrepreneurial activity – is still mostly treated as an add-on function (a technology transfer office, an incubator, etc.) or as something occurring locally in entrepreneurial research groups where the university maintains a hands-off approach. There is little evidence around universities being able to legitimize entrepreneurial activity in the form of utility creation as integrated activity towards the achievement of university missions. This article empirically explores three cases of entrepreneurial activity in which utility creation is increasingly integrated with research and education. The article builds upon an organizational routines perspective when seeking to understand how entrepreneurial activities are legitimatized.

Keywords: University, entrepreneurship, utility, legitimization, mission, routines

1. Introduction

While many universities have adopted a 'third mission', calling it innovation, entrepreneurship, utilization, collaboration, or something similar, few have made explicit strategies around how such a mission interacts with the established missions of education and research. Instead, the third mission in practice is often seen as something more isolated, often understood as either an add-on organizational function [in forms such as technology transfer offices (Markman et al., 2005; Wright et al., 2004), incubators, science parks (Phan et al., 2005), etc.] or as instances of hands-off academic entrepreneurship (Brennan and Wall, 2005; Laukkanen, 2003). Much research around entrepreneurial universities has also been more concerned with the ideology rather than the daily practice of entrepreneurial activity. Clark's seminal work on the topic makes clear that entrepreneurial developments at universities will be incremental and time-consuming rather than something decided through top-down policies and strategies. It also points at the need for an entrepreneurial culture and a diversified funding in a stimulated academic heartland, apart from a strengthened managerial core and an enhanced periphery of TTOs, incubators, etc. (Clark, 1998). This article empirically explores three cases of entrepreneurial activity in which university actors engage into not only creating specific utility but also integrating utility creation with research and education activities to fulfill multiple university missions simultaneously.

The greater extent of ambiguity regarding what constitutes a third mission (Kenney and Goe, 2004; Mowery and Sampat, 2005) presents challenges for both theory and practice, in comparison to the established missions of research and education. The distinct outcomes of the university missions of research and education are widely understood in terms of scientific publishing and granting of exams, respectively. The lack of agreement around the third mission is partly due to differences in intellectual property (IP) perspectives. Some university environments favor a third mission understanding as utility occurring through research collaborations with industry and other partners. In such cases, generated IP is often not owned by the university. Instead, partners collaborating with the university are assumed to take the direct responsibility of managing the IP generated as well as reap the associated benefit around any utility that is created from the IP. In other university environments, only IP owned by the university and then licensed to either established firms or start-up ventures is accounted.

A broad view on the third mission would comprise of all utility stemming from the university. However, such a view would then blur boundaries with the missions of research and education, as these missions also generate substantial utility through side-effects (externalities) of their core activities, for example through informal exchange and valuable contributions to the public domain (research) or through training individuals to become useful contributors to society (education). By emphasizing universities' direct and deliberate engagement into utility creation, this overlap can be avoided. Subsequently, in this article, the third mission should be understood as the systematic and direct (i.e. not serendipitous or indirect) engagement into utility creation by the university, through formalized collaborations, licensing and venture creation.

Received wisdom around entrepreneurial activity that affects how universities achieve utility creation is very scarce, assumingly because both state of the art and state of the science is fairly young (Rothaermel et al., 2007). The purpose of this article is to understand how entrepreneurial activity at the university can be legitimized. The focus is on entrepreneurial activities that develop the academic heartland (Clark, 1998) in selected local environments of the university. The article proceeds as follows. First we discuss the entrepreneurial activity at the university as associated to the term university entrepreneurship, focusing mainly on how a third mission of utility creation has been introduced independently and in relation to the missions of research and education. We also discuss the emergence of more collective modes of organizing university missions since these often emphasize utility creation. Methodological considerations regarding concept development and choice of cases follow, including empirical foundations. Case presentations and the subsequent analysis focus on understanding and comparing integrated activities that result in legitimized entrepreneurial activity, accepted and supported by university bureaucracy. Conclusions are drawn around case similarities, providing understanding of legitimized entrepreneurial activity at universities through the building of organizational routines that integrate activities fulfilling the multiple missions of the university.

2. University entrepreneurship

Literature on university activities emphasizing entrepreneurship is relatively young and somewhat fragmented (for a review of "university entrepreneurship" research including e.g. entrepreneurial universities, see (Rothaermel et al., 2007)). One stream of this literature focuses on conceptualizing a new role of universities, in the way it produces and makes use of

knowledge in a more applied and iterative – "mode 2" (Gibbons et al., 1994) setting. Another stream of literature is more concerned with utility creation and the university becoming an economic actor (Etzkowitz and Leydesdorff, 1997; Libecap, 2005; Youtie and Shapira, 2008). A main originator of the idea of entrepreneurial universities (Clark, 1998) offers an integrative view to explain entrepreneurial university transformation, although not primarily from a utility creation perspective. Conceptualizations of entrepreneurial universities and their engagement into a knowledge economy have thus far been criticized for lacking deeper empirical investigation (Deem, 2001), and for neglecting the resiliency of established university bureaucracy (Tuunainen, 2005).

Utility creation at universities has primarily been studied at a regulatory level or as a relatively detached university function. Literature has investigated regulatory changes and their effects, such as the U.S. Bayh-Dole Act of 1980 which stipulates rights and responsibilities for universities when commercializing federally funded research (Bozeman, 2000; Goldfarb and Henrekson, 2003; Mowery et al., 2001). The growth of the university technology manager profession has resulted in proposed measurements, and descriptions of specialized units commercializing research – Technology Transfer Offices, Offices of Technology Licensing (TTO, OTL) (Carlsson and Fridh, 2002; Debackere and Veugelers, 2005; Siegel et al., 2001; Siegel et al., 2003; Siegel et al., 2004), etc. It could be presumed that regulation such as Bayh-Dole is structured to stimulate integration of utility creation with research and education. However, in most cases, technology transfer activities have become an add-on function of disclosing and licensing occasional inventions. These centralized offices are structured in a way that do not necessarily accept and/or capture the entrepreneurial activity of the university actors, but instead focus on accounting for and packaging research and ideas into transactions, often in the form of licensing. Thus, studies regarding research commercialization units, as well as incubators and science parks are rarely concerned with utility creation as integrative towards the core missions, and subsequent operations, of the university.

Already in the 1980's the value of entrepreneurship education was recognized beyond a strictly add-on function towards a more strategic contribution to economic development, being part of a regional innovation system, including technology transfer, science parks as well as private investment (McMullan and Long, 1987). Nonetheless, there are only rare accounts of utility creation being integrated with education, and in some cases, including

research stemming from the university. Some investigate links between entrepreneurship educations and university commercialization (Lundqvist and Williams-Middleton, 2008; Siegel et al., 2005), while others focus more on integration of research and utility creation through university-industry linkages (collaborative R&D) (Acworth, 2008; Etzkowitz, 2003; Santoro and Gopalakrishnan, 2001). Implementing education capable of both providing students learning and skill development in start-up activities and reaching across a network of actors, perhaps even outside university boundaries, requires new approaches to entrepreneurship education (Solomon, 2007). Action-based, participatory approaches (Collins et al., 2006; Rasmussen and Sorheim, 2006) in which students engage with an existing entrepreneurial community, or even embark upon a venture creation process simultaneously (Ollila and Williams-Middleton, In press) have been addressed, acknowledging the integration of education and utility creation activities and achieving all three university mission objectives through synergized results.

2.1 Collective and entrepreneurial developments of university missions

The ways in which core university activities are organized are increasingly recognized as a strategic factor alongside the more traditional concern of having research excellence (Adler et al., 2009). Changes into less traditional and more collective forms of organizing are captured, among others, by Larédo and Mustar in the following:

> "The universities are themselves changing. In France, the rise of 'research units' has produced a progressive de-coupling of activities, and a progressive hybridization of management. Comparable new approaches to research management can be seen in the NSF's engineering centers in the US, research council centers in the UK, and in the policies of the Dutch NWO. Smaller countries like Sweden, Finland, and Norway have developed policies to promote 'centers of excellence', while the Dutch government has initiated 'Top Technology Institutes'. All these call for a transformation in the ways that public-sector research is governed." (Laredo and Mustar, 2004, p 24)

These collective, and often local, developments introduce more diversity in the practices of research (Laredo and Mustar, 2004) and can be seen as entrepreneurial activity when including utility creation through e.g. industry collaboration. However, more collaborative research activities (centers, etc.) have been described in terms of "soft bureaucracy" handling soft negotiations between university and industry (Styhre and Lind, 2009) and having

insufficient levels of institutionalization (Youtie et al., 2006). Thus such collaborative research activities often seem to occur informally, in the extent to which they address utility creation, and without any legitimized change in how research work is carried out and incentivized at the university.

The challenge of entrepreneurial activity creating utility beyond disclosing, patenting and licensing inventions has recently been observed by Bercovitz and Feldmann (2008) in regards to Technology Transfer Offices:

> "Although virtually all universities have created formal TTOs, policies, and procedures, there have been great variations in realized commercial activity. Rather than solely a function of resources, these organizational outcomes appear to reflect differences in the organization's ability to move away from the older, more established norms and embrace new norms of academic entrepreneurship." (pg 84)

TTOs are addressing utility creation developments in parallel to developments in research and educational activities. From having been bureaucratically organized activities, examples of more entrepreneurial responsibilities of TTOs are now appearing (Bercovitz and Feldman, 2008; Jain and George, 2007). Such developments are similar to those faced by many research centers, in dealing with increased industry collaboration. They are also parallel to instances where entrepreneurship education is evolving to where concrete utilization is in focus, as illustrated through action-based business development. There have been modifications of individual roles in mission-spanning environments (Jain et al., 2009) but there is limited understanding about the building of organizational structures or routines that can solidify and legitimize the entrepreneurial activity of individuals or teams at the university.

In sum, even though universities often have clear intentions of allowing entrepreneurial activities there is little evidence regarding how these activities are legitimized. Entrepreneurial activity often seem to operate in more "soft" (Styhre and Lind, 2009) and informal ways. Bureaucracy and lack of leadership are still major obstacles found when looking into more novel ways of organizing university activities (Adler et al., 2009; Tuunainen, 2005). Consequently, we need more knowledge from examples where university

actors have succeeded in building legitimacy in order to propose theory that can increase our understanding of such developments. Therefore the empirical questions of this article are:

1. How can utility creation become legitimized in the larger university setting?
2. How can examples of integration between research, education and utility creation become legitimized?

3. Method

Three independent cases are used to explore the research questions, as the use of multiple cases allows for each case to be analyzed as independent experiments (Brown and Eisenhardt, 1997). The three cases were selected from a network, initiated in 2003, of university local environments, in American and European settings, engaging in the creation of utility around university knowledge, the general phenomenon of our study. Through the network, the local environments have been followed for several years, ranging from three to seven, depending upon the existence of the local environment. The network has facilitated organizational observation of the local environments through qualitative methods of participant and non-participant observation, complemented with semi-structured interviews and site visits (Flick, 2006).

The cases were selected based on several criteria. Common criteria concern the general phenomenon of our study – entrepreneurial activity through utility creation. Each case constitutes a local environment at the university involved entrepreneurial activity through the creation of utility. Each case also has, over time, routinized integrating utility creation activities with either research or education activities, or both. Differentiating criteria, allowing for each case to be considered and analyzed as independent experiments include the starting point and contextual factors of the local environment. Starting point here means that the initial operational mandates of key actors in each case were in the research, education or utility creation respectively and then these mandates gradually expanded into the activities, and thus achieving additional missions beyond the initial one associated to the operational mandate. Contextual factors include different regulatory environments as well as "market environments". Table 1 presents how the universities are positioned to one another ranking-wise, and how the rankings are interpreted relative to the university missions (see Table 2), as well as positioned to one another statistically (see Table 3). Context is assumed to be of importance since, for example, more "prestigious" universities can be assumed to have

stronger abilities to attract specific resources but also allow less experimental risk-taking. University documentation, independent articles and interviews, and online information were used to qualify the selection of the cases: specifically a magazine interview (Key, 2007) and annual reports (Arcari, 2007, 2008) for the University of Pennsylvania; a video interview published online (Cote, 2009), other online information (ColoradoStateUniversity, 2010) and annual reports (2008; KPMG, 2006) for Colorado State University, and annual and other reports (Chalmers, 2008; Regestad and Larsson, 2006, 2007, 2008) as well as public documents (Hyenstrand et al., 2008; Vetenskapsrådet, 2006) for Chalmers University of Technology.

Table 1: Ranking data of cases

	Chalmers University of Technology	**Colorado State University**	**University of Pennsylvania**
QS World University Ranking™ 2009 (Times Higher Education)	198	363	12
Academic World University Ranking 2009 (Shanghai Jiao Tong University)[1]	303	168	15
International Professional Ranking of HEI 2009 (Mines Paris Tech)	42 (shared with 20 other universities)	Not Ranked	7 (shared with 2 other universities)

[1] For Chalmers and CSU, the rank was determined by calculating the score according to weights and then adjusting total in accordance with criteria (other institutions calculated as a percentage of the top score, 100), then resorting the universities within the range according to their total, and then ranking them within each group. Thus, for example, CSU, in group 152-200, has the 17th highest score in the group, thus, actual rank is 168 (1= 152, then 17= 168).

Table 2: University Missions as Criteria in International Rankings

	Research	**Education**	**Utilization**
QS World University Ranking™ 2009 (Times Higher Education)[a]	Academic Peer Review (40%) Citations per Faculty (20%) International Faculty (5%)	Faculty Student Ratio (20%) International Students (5%)	Employer Review (10%)
Academic World University Ranking 2009 (Shanghai Jiao Tong University)[b]	# alumni and staff winning Nobel Prizes and Fields Medals # highly cited researchers selected by Thomson Scientific # articles published in journals of *Nature* and *Science* # articles indexed in Science Citation Index - Expanded and Social Sciences Citation Index	# alumni and staff winning Nobel Prizes and Fields Medals	per capita performance with respect to the size of an institution
International Professional Ranking of HEI 2009 (Mines Paris Tech)[c]		# alumni holding a post of CEO or equivalent in one of the 500 leading international companies (as determined by the Fortune Global 500 classification (Fortune Magazine), based on turnover published	# alumni holding a post of CEO or equivalent in one of the 500 leading international companies (as determined by the Fortune Global 500 classification (Fortune Magazine), based on turnover published

Table 3: University statistics for selected cases (as reported 2009)[d]

	Chalmers University of Technology	Colorado State University	University of Pennsylvania
Faculty Staff (FTE)	767	1,323	3,491
Undergraduates	2,298	24,273	12,932
Graduate/Postgraduates	8,471	6,810	11,904
PhDs Awarded	164	206	463
R&D Expenditures in Science & Engineering (FY 2006)	206 Million USD [1,411 MSEK]*	254 Million USD	676 Million USD

*Based on average exchange rate for Dec. 2006 (http://www.oanda.com/lang/sv/currency)

[a] http://www.topuniversities.com/university-rankings/world-university-rankings/methodology/simple-overview
[b] http://www.arwu.org/aboutARWU.jsp
[c] http://www.mines-paristech.fr/Actualites/PR
[d] Data taken from QS University Ranking™ (http://www.topuniversities.com) except for R&D expenditure data, which is taken from the National Science Foundation Website (www.nsf.gov/statistics) for Colorado State University and University of Pennsylvania, and from the 2006 Annual Report (http://www.chalmers.se/sections/om_chalmers/arsredovisning/gamla_arsredovisning) for Chalmers University of Technology.

In comparison with the other two cases, CSE/GIBBS is also special in being an insider-case offering unique insights but also challenges as regards to putting the case into perspective. The authors have used colleagues from other universities to ensure balanced descriptions of the internal case as compared to the other two, using the online and documented information from the universities in order to counter potential operational bias.

The selected cases illustrate how different activities at "strategic research sites" (Bijker et al., 1987) can be integrated into the existing university governance, operations and culture. Examples of utility creation that appeared to have ambitions of integrating utility with research and education activities were focused upon, rather than historical review of commercial success. Once the cases were selected, data collection through interviews and site visits were used to focus on the ways in which practice is conducted. Respondents are asked to talk about specific cases of utility creation (specific industry collaborations and new ventures) and how these interacted with research and education activities. Any programs, roles, relationships within and outside the university were of special interest to understand since these were considered as potential indication of the building of new routines integrating utility creating with education and research beyond the single case. Potential operational bias from the individuals interviewed was countered through comparison with material presented through website or print media (and thus presumed to be university sanctioned).

4. Case Description and Analysis

The cases will first be presented and discussed independently. Important steps will be distinguished in terms of how each case establishes routines for the creation of utility, particularly through integrating utility creation with other activities within the local environment and/or in conjunction with other local environments of the university. Case comparisons will subsequently constitute the main ground for achieving our purpose of how entrepreneurial activity can be legitimized and making propositions for future research and practical relevance.

4.1 Center for Technology Transfer at University of Pennsylvania

The first case originated as a local environment for utility creation. The Center for Technology Transfer (CTT) at the University of Pennsylvania represents a technology transfer office built upon the national university research utilization regime of the United States. CTT is a local environment of the university that has commercialization as its core operational

objective. The University of Pennsylvania, a world-wide top-twenty ivy-league institution, is what can be called a prestigious university, emphasizing its' cross-disciplinarily and quality research, tradition of innovation, including the first teaching hospital in the United States, and a business school (Wharton) ranked as among the best in the world. CTT's success is measured by the number and quality of disclosures, patent filings and new ventures established per annum as well as the organization's ability to be fiscally self-sufficient. CTT as a case was chosen due to its integrative activities towards research and educational programs the last three years.

University of Pennsylvania hired a new director in 2007, to make a turn-around in its technology transfer operation. The new director describes the initial situation in the following way:

> *When I got to Penn, the credibility of the office, with the faculty, was relatively low. There had been a high level of turnover in the executive director of the TTO. The morale was low and there were not enough people. […] The only thing they seemed to understand was number of disclosures, and the income. I tried to get the university management to change their expectations. I persuaded them to understand the value was through number of agreements and quality and value of the agreements, as outlined in a portfolio. Quality was categorized and defined: first royalty and non-royalty bearing licenses, and then for the royalty bearing, into high level, medium level and low level.*

A step-by-step process was taken by the newly-hired director, to get activities in order.

> *I put a three year plan together … firstly, to improve faculty service and win back the respect of the faculty. Secondly was to start doing more agreements and more deals, and the third, was – because [university management] insisted on it – […] get ourselves to a position where we paid for ourselves.*

Answering to the criteria of the university management, but also using the strong negotiation position with the university based on previous credentials and success in similar local environment, the new director was able to establish new routines and policies which he felt

were crucial to achieving the mission of CTT. Subsequently, new programs into education and research were initiated by CTT – activities not asked for by the university management.

> *A lot of what you do when you come into an office is to see what you have already and see if you can re-negotiate the initial licenses. Next step is to talk to the faculty. The school of medicine was the first stop. […] I promised the faculty more support and more say in what is going on. […] Once the staff was operative, [CTT] could start to make more offerings to the faculty. Ex. SBIR funding; university seed funding are two examples [… CTT] went over to the business school and formed the CAP [Commercialization Acceleration Program], jointly operated under the TTO office and the Entrepreneurship program at the business school. The students wrote business plans and also provided marketing analysis material. [CTT] created a fellowship program where they used graduate students/docs/post docs were paid to do idea evaluation. They have 25-30 interns. It increases their disclosure analysis rate; it provides a curriculum program to the university. They have just started on with the law school now.*

Within a two year time period, CTT achieved its objectives, becoming cost neutral to the university, while increasing by 50% the number of disclosures processed through the office. Furthermore, the fellowship program integrated educational objectives with the commercialization activities of the office, and a faculty outreach program, part of the initial plan, allowed joint review and analysis of research ideas by faculty and CTT actors, leading to more effective packaging and development of utility from the university. The CAP program with Wharton business school implied cost savings for CTT while it was communicated as experiential learning towards MBA students. Such a program became attractive for students wanting to gain experience that they could not get elsewhere.

CTT can be seen as a turn-around operation where the university management hires a renowned technology transfer director who negotiates a strong mandate around doing more successful commercialization of university invention disclosures. After some initial hiring, improving CTT incentive structures and improving some “old deals” by re-negotiating terms, CTT started to integrate towards both education and research. The program with Wharton produced clear synergies both in terms of experiential education and better evaluated

inventions. The fellowship program with selected research groups integrated CTT into selected promising research settings, thereby becoming a partner not only around occasional invention disclosures but also helping researchers more clearly define research utility and develop their industry collaborations and other sources of financing. CTT, at the time of study, had less than three years since the turn-around was initiated. Yet the effects of the integrating activities are already tangible both in terms of improved utilization (the initial core mission) and in terms of established programs linking utilization to education and research.

4.2 Engines and Energy Conversion Lab at Colorado State University

The second case had its origin as a local research environment. The Engines and Energy Conversion Laboratory (EECL) at Colorado State University (CSU) started as an engine research unit in 1992 and conducts mechanical engineering research that leads to disseminable solutions as the core operational objective. CSU has one of the highest funding to faculty ratios in the United States. The laboratory is recognized as one of (if not the) leading engine research laboratories in the world, attracting and commuting industry partnerships to developing solutions with commercial viability and impact on global energy challenges. EECL has launched two companies directly; Envirofit International (in 2003) and Solix Biofuels (in 2006), as well as contributed to the founding of others. In 2008, EECL took a lead role as part of the establishment of the Clean Energy Supercluster™ at CSU (ColoradoStateUniversity, 2010). Three Superclusters today are set up as an alternative mechanism for technology transfer, geared towards large-scale, global problems, building upon multidisciplinary research. EECL was chosen as one case due to its systematic integration of research towards utilization (industry collaboration and venture creation) and education activities.

EECL's operations are highly research based, but with a self-described solutions-focus. The founder of the laboratory, also a professor of mechanical engineering, explains:

> *I started the laboratory in 1992, and for the first ten years, we really just focused on the first part of our name, on engines. … And we're working on developing new technologies to use on engines … one of the things we're developing for these engines is what we call laser ignition. We use focused lasers instead of spark plugs to ignite the mixtures. And while we weren't the first to do this, we had come the farthest in developing this into a commercializable technology. […] we really want to go the next step and*

put those discoveries into products and then get those products into production. Cause, that's the point at which your work has impact.

EECL has been challenged with attracting federal funding, not only, because of the commercial, solutions-oriented focus, but because the energy area is one that is not as well-financed on at the federal level as for instance life science. The responsibility of the laboratory to the university is as a research unit, but they need to attract funding outside the common arenas, as explained by the co-director:

Energy gets a tenth of funding than health … R&D energy companies only a little compared to e.g. health. However, right now energy is hot – but there are no clear pathways to bring products out – it's been so underfunded. […] Energy is a Brownfield – existing models, old pricing models, not many consumer choices, etc. … So, if you're interested in energy, and work at a university, you ask for DOE [Department of Energy funding] or – as we have found – the best [funding] is with industry and VC [venture capital]. With [an industry actor] we execute a contract on e.g. engine testing; we impress them with our services. Then we go back to them with an idea … "Are you interested in being a steward of this idea?" and then we set up a licensing agreement sponsorship. […] 90% of the [revenue of the] lab is industry. Over half of that private funding comes from the spinouts, which is a relatively new phenomenon. We would like it to be 33-33-33 [split into equal thirds]: being corporate, spinouts, [and] federal funding. All of this has happened because we are among the top energy labs.

The solutions-focus makes the laboratory, and the associated research, sometimes difficult to position within the existing organizational framework of the university.

[An] important feature of the lab is the Pasteur's quadrant… not applied vs. fundamental [research]: always in the Pasteur. You need to know the difference between interesting and important! A culture […] is needed to make it happen. [...] an ecosystem of willingness to collaborate […] We are six to seven primary faculty, and in total 15 faculty. Hiring is under the department [of mechanical engineering], under which the lab operates. The department would hire someone that we need. But we are

doing stuff going into other departments such as electronics. We also do bio[fuels]. We are supported by the college of engineering as much as the departments.

The relationship with the university evolved over time, spanning institutional boundaries and also acting as a predecessor to the type of commercialization activity that would be formed into Supercluster™. The first (of three) Superclusters™ was initiated 2007 in Cancer Research, followed by Infectious Disease. In 2008, 16 years after its founding, EECL became a key player in the third Supercluster™ at CSU, Clean Energy, at which the founder of EECL acts as director and chief scientific officer for business development. The co-founder reports:

We generate OH to the university: 26% on everything. We are an off-campus facility so we cover our own expense – i.e. on campus you have a federally negotiated OH-rate – for CSU it is 49% on campus but we have 26% for our off-campus [status]. But we then have direct expenses such as the utility bill. For the 26% I send, I get: the name of CSU, accounting system, administration, etc. In reality I look at it as a franchising fee. … We are money-wise a blip on the screen. You look at the press releases, etc. we are a big chunk. […] on the enterprise side we do stuff: ... For example, Solix [Biofuels] was difficult pre-Supercluster but now there is a recognition that [CSU] wants to do this! Instead of threatening to fire you; you get a pat on the back … conflict of interest is bound to happen. If it doesn't then you're not doing anything cool. […] The Superclusters have really enabled us to do commercialization.

The laboratory continues to build collaboration with industry partners and research departments across the university, while also facilitating Master Thesis work and supporting new educational programs, such as the Global Social and Sustainable Enterprise master program in conjunction with the business school. Through the collaboration with the Supercluster structure, the laboratory has securitized the solutions-focused commercialization activity championed since its founding. Both faculty and students take on non-conventional roles while partaking in a special culture as expressed by the co-director:

I am 75% PI [Principal Investigator] and 25% admin. Even as a PI, it's a lot of student talk, etc. Students have the fun. We manage them. Talking to sponsors, grad students, admin, and along the way - when a new proposal

comes up - having collaboration talks. […] When students defend their theses we think about problems. We have 40-60 students. Grads funded and undergrads supporting. All are employees of the lab: they get orientations, three large staff meetings every year. When they start they have a 'nu-be' [new person] orange uniform and there is a list of things to do in order to get a black uniform. It is fraternal […] in the end of the day we are really sensitive about culture. […] My principle investigators are my salesmen but I am not their boss. People need to have the right attitude.

EECL has a history in terms of integration university missions in new ways, dating back almost two decades. Here the point of departure is a strong research being able to establish a large off-campus laboratory suitable for close industry collaborations. The laboratory soon developed its own business model with industry and also invited a substantial amount of undergraduate and graduate students to do solution and utility-oriented work while also pursuing their degrees. EECL attracted faculty interested in working collaboratively with industry and in building a multi-disciplinary and interactive culture. Commissioned research developed into more long term contracts with industry partners. Research results with strong innovative potential but without clear industry recipients, resulted in EECL faculty initiating venture creation. Developments at the CSU level together with regional actors resulted in a new model for moving research to the market – trademarked by the university as "Superclusters". Apart from having special financial arrangements with CSU, and employing significant amounts of students in the laboratory, establishment as one of the three Superclusters provides EECL with specialized mechanisms and support in setting up and legitimizing commercial structures – such as contracts and licensing deals with industry or new ventures – processes previously conducted as activities in the local environment. EECL can be seen as a successful local university environment in which research, education and innovation is almost seamlessly integrated within the laboratory and is substantiated within the larger university setting through the university's own model representing the integrated missions at the university – the Supercluster™.

4.3 Schools of Entrepreneurship at Chalmers University of Technology

The third case originated as a local environment of education. Chalmers School of Entrepreneurship and Gothenburg International Bioscience Business School (CSE/GIBBS) –

the latter a joint venture with the medical school at University of Gothenburg – have been, first and foremost, educational programs. The core operational focus of the schools is educating future entrepreneurs by engaging in the venture creation process, contractually linking invention disclosures to master-level student teams and providing seed-funding. The CSE/GIBBS environment has continued to effectively attract regional development money and seed financing, contributing to a portfolio of 35 graduated companies, valued at 100 million USD in 2009. The schools, in concert with two sister programs, after a peer review in 2009, were ranked number one in Sweden by the Swedish government for their achievements in venture creation through education using a venture creation approach (Ollila and Williams-Middleton, In press).

CSE since 1997 and GIBBS since 2005 utilized the framework of an educational program to initiate integrating innovation and university research development. The program director used the core responsibility of educating sequential classes of students as a mechanism for matching inventions stemming from university research with entrepreneurial energy.

> *[We] wrote an application to [a funding agency] … about an idea, the crude idea about the school, which was … increasing commercialization through an action-based education. […] we applied in the spring of '96 and we got, I think, two years of financing to start a project and eventually also start a school. […] we also asked the rector and the top management for permission to take these steps. They weren't initially necessarily understanding what we wanted to do, but they didn't say no, and they were, as far as I understand, allowing us to do this experiment. … So we had a project team and everything set up and we formulated our goals.*

The basic structure of CSE is a facilitated one year partnership between idea providers (university professors disclosing an invention and others) and a specially selected student team. In the partnership each actor champions his/her perspective and the balance is negotiated through contractual arrangements and board meetings. During the first three years of CSE, idea providers often felt entitled do what they wanted and saw the students as free help (consultants). There was no set structure of empowering the students to become entrepreneurs afterwards. The challenge became enabling students to become engaged actors (instead of following rules put forth by authority figures). In order to structure the relationship

and also attract more regional development money a holding and incubation function was founded.

> *Initially we had more relational breakdowns. Today, the brand […] signal to [professors and other idea providers] that they will be treated fairly, and that they have to give away [ownership and control]. Everyone knows that you will have less than 50% of the company so you do not even come here unless are willing to give away more than half your [potential] company, so we have automatic selection. It weeds out the ones that are too possessive. Those who come to us are only the ones that are willing to allow to have other people take over.*

The results in terms of new ventures created every year were substantially higher after the incorporation of a Chalmers-owned incubator in 2001. Several developments enabled this creation of an incubator being highly integrated with the education.

> *It would never be possible to create [the incubator] […] without A) a new vice president for [the newly established function of] innovation at Chalmers… one of his first things was to help craft and legitimize [the incubator the new formalized collaboration agreement contract], and also to allow there to be this formation of a fund and all the structural dimensions needed to allow the risk taking of Chalmers actually engaging into something that can be sued, … This could never have been done on a departmental level or research-group level.*
>
> *…*
>
> *B) the [university president] who was appointed '98, immediately saw the potential in Chalmers School of Entrepreneurship. He used it as a way of marketing Chalmers … the main reason to support these kind[s] of risks and entrepreneurial development, were the fact that we produced results that could be communicated. … we're still a small, little, little piece of Chalmers, but we are a big piece of what the president and others are proud of when the talk about what Chalmers is about, and what it does … I personally also, in 2000, took on a role as a vice dean [at the department…] [That role helped…] legitimize, protect and also enable the sometimes delicate developments that were needed around this relatively radical way of doing education.*

With the start of the bio-entrepreneurship sister school GIBBS in 2005 (in joint venture with the medical school at University of Gothenburg) and subsequent integration of school and incubator activities into a stronger research group setting, the environment around CSE/GIBBS has now fully integrated the activities conducted around education, innovation and research.

CSE/GIBBS started as a relatively radical new education. Chalmers allowed the set up of a new final-year education, recruiting entrepreneurial talent for action-based graduate studies in which developing a high-tech start up in a student team was the main pedagogy. After some years of initial experimentation, the local environment expanded from education into full commercial responsibility for venture creation, including investing regional and university seed money into the ventures incorporated out of the education. In parallel with these developments, the local environment not only reached out to the various research divisions at the university, but also attracted industry inventions to the university, allowing for research collaborations within the local environment as part of the venture creation. The research mission was not only integrated in this way, but also through engagement and championing of research in the field of entrepreneurship and venture development, studying the processes taking place within and associated to the local environment. Critical components of CSE/GIBBS such as a special admission process, a fully integrated project-based pedagogy, and an integrated incubator, were challenging steps to champion around within the university system. Proof of concept through tangible results such as venture incorporation and employment, local political support during many years and eventual administrative adaptation helped legitimize the integrated approach, such that the local environment now enjoys relative harmony in its co-existence with more traditional educational and research environments.

5. Discussion

The three cases illustrate local environments which have established routines for repeated (i.e. not just singular case by case) interaction between research, education and utility creation activities. Despite being in different university environments and having different origins in each of the three different missions, the cases display several specific similarities in the ways new entrepreneurial activities have been legitimized. Firstly, each of the cases place considerable emphasis on developing a collective and collaborative culture including roles and responsibilities not naturally occurring in a more traditionally and bureaucratically

organized university. Secondly, all cases when focusing on utilization also gain external appreciation and produce results that build legitimacy and gain support from the top management of the university. Thirdly, all the cases focus on establishing new routines around the ways they integrate activities in order to legitimize entrepreneurial activity. Thus, they avoid having only "soft bureaucratic" (Styhre and Lind, 2009) ways of managing activities that could easily be questioned. Instead, considerable effort is put into building and legitimizing around activities that are carried out repeatedly, such as educational arrangements, collaborative structures, and new roles around the creation of ventures. The units are thus far from previous accounts of fairly independent research groups as "quasi firms" and other instances of hands-off academic entrepreneurship (Etzkowitz, 2003). Gaining legitimacy through the creation and communication of new organizational routines has thus been a notable key concern for all the three cases.

All of the cases display types of integrated activities that produce outputs towards the multiple missions of the university. High levels of synergy seem to compensate for the increased coordination costs related to the collaborative environments. Although synergy around education, research and utility creation also can be obtained by the individual professor operating under a relative autonomy of a more traditional university structure, the nature of synergy in the three cases is that not obtained by individuals and their autonomy but through specially established organizational routines. In this sense, all the cases break with a mode of bureaucratic organizing normally attributed to universities (Styhre and Lind, 2009). The identified alternative – establishing new organizational routines – do not need to be something static; the routines can be dynamic in that they 'acquire and shed resources, integrate them together, and recombine them' (Eisenhardt and Martin, 2000, p 1107) and thus seen as something flexible in accordance with recent theorizing around organization routines (Feldman and Pentland, 2003). In sum, the three cases can be said to demonstrate instances where local environments, integrate all activities of the university through the building of new organizational routines, thereby mutually reinforcing each mission through synergy around specific activities.

Judging from our three cases, there seems to be promise not only in terms of improved multiple outputs stemming from synergized activities. The integration of utility creation into education and research also seems to have a sustaining effect thus generating a stronger platform around an initiative. Had utility creation not been integrated, the environment

arguably would not gain as much legitimacy as they now have. In comparison with a traditional university bureaucracy where synergized behavior often remains informal and at an individual level, the cases provided – in building organizational routines around reoccurring relatively similar situations – arguably sustain and strengthen promising initiatives, especially if policies and university leadership support and appreciate such developments. Given the similarities around some of the routines in the three cases (combining education and innovation development as well as university-facilitated launching of research-based ventures) there is reason to further investigate an understanding of organizational routines at universities in term of being relatively communal rather than highly idiosyncratic. Perhaps further research can prosper along the same lines as recent strategy research into business firms, having identified other but yet generic and communal organizational routines (albeit labeling them "dynamic capabilities") in business firms (Eisenhardt and Martin, 2000). Such identification of general organizational routines at universities would emphasize what Feldman and Pentland (2003) calls their ostensive side. One example of such a routine occurring in all the cases presented is student engagement in entrepreneurial activity integrated into an educational course or program. Another example is how venture creation, including venture incorporation, among faculty and students is facilitated by the university; a routine that among other things deals with delicate conflicts of interests.

6. Conclusions

This article has investigated examples of entrepreneurial activity at universities striving for utility creation as well as integration with the activities of research and education. The purpose has been to understand how entrepreneurial activity in terms of utility creation at the university can be integrated with research and education, in comparison to remaining a hands-off or an add-on process. Three selected empirical cases display integrative entrepreneurial activities resulting in improved utility creation, education and research as well as new and legitimized organizational routines.

Despite their diverse context and different origins in each one of the three missions, the cases display several commonalities: they develop a collective and collaborative culture including roles and responsibilities; they focus on doing repeated utility creation thereby gaining appreciation externally and from university management; and they focus on building and legitimizing new organizational routines.

Two main conclusions can be drawn from the research conducted. First, a third mission, understood as universities engaging in systematic and direct utility creation, through collaborations, licensing and venture creation, can be seen as a distinct on-going task to be integrated routine-wise with the other missions. As such, utility creation does not need be seen as singular or serendipitous occasions of invention disclosure, academic entrepreneurship, etc., nor as indirect effects (externalities) stemming from education or research. Second, the legitimization of entrepreneurial activity at universities can be obtained through focusing on the local building of organizational routines that – often synergistically – integrate activities accomplishing the different missions and on how university top management support environments that produce repeated tangible utilities while also doing appreciated research and education.

Universities have the potential to be, and in certain cases are already, involved in the nascent phase of entrepreneurship in multiple formats. In regards to utility creation, there is often a gap between disclosure and transaction in which transformation takes place. Transformation can be facilitated through integrated educational activities (Siegel et al., 2005) equivalent to action-based entrepreneurship and venture creation (through incubation or education programs) (Rasmussen and Sorheim, 2006) as the period of development between conception and venture 'birth' or incorporation (Reynolds et al., 2004; Reynolds and Miller, 1992). It is during this period of time (of development, which could also be called transformation or gestation) that the (synergized) activities are taking place and becoming routinized as acceptable (entrepreneurial) behavior.

Policy implications from the current study are in line with other research emphasizing the role of management and leadership at universities (Adler et al., 2009), as well as supporting more endogenous and entrepreneurial (bottom-up) developments (Jacob et al., 2003). The recent European policy discussion around "knowledge triangles", emphasizing research-education-innovation in interaction hopefully can be given a more operational meaning, through the current study, helping both policy-makers as well as university managements relate to promising bottom-up developments. Support from university top management and external stakeholders appreciating innovation, entrepreneurship and the repeated creation of utility (along with education and strong research) is most likely crucial for an often tedious process of building organizational routines to persevere. The current cases thus offer hope that establishing routines around often synergized activities can be worthwhile – for the persons

partaking in such collectively coordinated action as well as for the policy-makers on different levels offering their support.

With the current study we hope to stimulate further research around the importance of operative organizing and routine-building when considering performance in all three of the university missions. Hopefully, further research into innovation and research policy can show increased attention to operative management and organizing aspects having promises and perhaps specifically explore opportunities around “dynamic routines” also in university environments (Eisenhardt and Martin, 2000; Feldman and Pentland, 2003) This study has not included the organizational change efforts and entrepreneurial behavior behind building the environments and routines in the current cases. Instead focus has been on the accomplished organizational routines. Further research, should focus also on processes of driving change in complex multi-mission environments, such as universities. In particular, research into a more collective “institutional entrepreneurship” (Czarniawska, 2009) seems to hold promise.

References

2008. Financial Accountability Report Fiscal Year 2008. Colorado State University, Fort Collins.
Acworth, E.B., 2008. University-industry engagement: The formation of the Knowledge Integration Community (KIC) model at the Cambridge-MIT Institute. Research Policy 37, 1241-1254.
Adler, N., Elmquist, M., Norrgren, F., 2009. The challenge of managing boundary-spanning research activities: Experiences from the Swedish context. Research Policy 38, 1136-1149.
Arcari, S., 2007. The 2007 Annual Report. University of Pennsylvania, Philadelphia.
Arcari, S., 2008. The 2008 Annual Report. University of Pennsylvania, Philadelphia.
Bercovitz, J.E.L., Feldman, M., 2008. Entrepreneurial Universities and Technology Transfer: A Conceptual Framework for Understanding Knowledge-based Economic Development. Journal of Technology Transfer 31, 175-188.
Bijker, W., Hughes, T., Pinch, T., 1987. The Social Construction of Technological Systems. MIT Press, Cambridge, MA.
Bozeman, B., 2000. Technology transfer and public policy: a review of research and theory. Research Policy 29, 627-655.
Brennan, M.C., Wall, A.P., 2005. Academic entrepreneurship: Assessing preferences in nascent entrepreneurs. Journal of Small Business and Enterprise Development 12, 307-322.
Brown, S.L., Eisenhardt, K.M., 1997. The art of continuous change: linking complexity theory and time-paced evolution in relentlessly shifting organizations. Administrative Science Quarterly 42, 1-34.
Carlsson, B., Fridh, A.-C., 2002. Technology transfer in United States universities. Journal of Evolutionary Economics 12, 199-232.
Chalmers, 2008. Chalmers - för en hållbar framtid: vision, mål och strategier 2008-2015 med utblick mot 2020, in: Technology, C.U.o. (Ed.). Chalmers, Göteborg, pp. 1-20.
Clark, B.R., 1998. Creating Entrepreneurial Universities: Organizational Pathways of Transformation. Pergamon Press, New York.
Collins, L., Smith, A., Hannon, P., 2006. Applying a synergistic learning approach in entrepreneurship education. Management Learning 37, 335-354.
ColoradoStateUniversity, 2010. Superclusters, p. University online informational website.
Cote, M., 2009. Engines and energy at CSE - the lab with solutions, in: Cote, M. (Ed.), Planet Profit Report. Colorado Biz, Fort Collins, p. Editor Mike Cote visits CSU's Engines & Energy Conversion Lab to talk with Director Bryan Willson about how they're turning their discoveries into products that can impact people's lives.
Czarniawska, B., 2009. Emerging Institutions: Pyramids or Anthills? Organization Science 30, 1-19.
Debackere, K., Veugelers, R., 2005. The role of academic technology transfer organizations in improving industry science links. Research Policy 34, 321-342.
Deem, R., 2001. Globalisation, New Managerialism, Academic Capitalism and Entrepreneurialism in Universities: is the local dimensions still important? Comparative Education 37, 7-20.
Eisenhardt, K.M., Martin, J.A., 2000. Dynamic capabilities: What are they? Strategic Management Journal 21, 1105-1121.
Etzkowitz, H., 2003. Research groups as `quasi-firms': the invention of the entrepreneurial university. Research Policy 32, 109-121.
Etzkowitz, H., Leydesdorff, L., 1997. Universities in the Global Economy: A Triple Helix of Government-Industry and Government Relations. Croom Helm, London, UK.
Feldman, M.S., Pentland, B.T., 2003. Reconceptualizing Organizational Routines as a Source of Flexibility and Change. Administrative Science Quarterly 48, 94-118.

Flick, U., 2006. An Introduction to Qualitative Research. Sage Publications, London, UK.
Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., Trow, M., 1994. The new production of knowledge: The dynamics of science and research in contemporary societies. Sage, London, UK.
Goldfarb, B., Henrekson, M., 2003. Bottom-up versus top-down policies towards the commercialization of university intellectual property. Research Policy 32, 639-658.
Hyenstrand, P., Fröberg, J., Karlsson, S., Lundberg, E., 2008. Finansiering av forskning inom den svenska högskolan 1995-2006. Vetenskapsrådet, Stockholm, pp. 1-49.
Jacob, M., Lundqvist, M., Hellsmark, H., 2003. Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology. Research Policy 32, 1555-1568.
Jain, S., George, G., 2007. Technology transfer offices as institutional entrepreneurs: the case of Wisconsin Alumni Research Foundation and human embryonic stem cells. Industrial and Corporate Change 16, 535-567.
Jain, S., George, G., Maltarich, M., 2009. Academics or entrepreneurs? Investigating role identity modification of university scientists involved in commercialization activity. Research Policy 38, 922-935.
Kenney, M., Goe, W.R., 2004. The role of social embeddedness in professorial entrepreneurship: a comparison of electrical engineering and computer science at UC Berkeley and Stanford. Research Policy 33, 691-707.
Key, P., 2007. For Penn, the reason to hire is Cleare - new official said to bring 'sheer talent and energy' to technology transfer, Philadelphia Business Journal. American City Business Journals Inc.
KPMG, 2006. Colorado State University System Financial Statements. KPMG, Denver.
Laredo, P., Mustar, P., 2004. Publich sector research: a growing role in innovation systems. Minerva 42, 11-27.
Laukkanen, M., 2003. Exploring academic entrepreneurship: drivers and tensions of university-based business. Journal of Small Business and Enterprise Development 10, 372-382.
Libecap, G.D., 2005. University Entrepreneurship and Technology Transfer. JAI Press, New York, NY.
Lundqvist, M., Williams-Middleton, K., 2008. Sustainable Wealth Creation beyond Shareholder Value, in: Wankel, C., Stoner, J. (Eds.), Innovative Approaches to Global Sustainability. Palgrave MacMillan, New York, NY, pp. 39-62.
Markman, G.D., Phan, P.H., Balkin, D.B., Gianiodis, P.T., 2005. Entrepreneurship and university-based technology transfer. Journal of Business Venturing 20, 241-263.
McMullan, W.E., Long, W.A., 1987. Entrepreneurship education in the nineties. Journal of Business Venturing 2, 261-275.
Mowery, D.C., Nelson, R.R., Sampat, B.N., Ziedonis, A.A., 2001. The growth of patenting and licensing by U.S. universities: an assessment of the effects of the Bayh-Dole act of 1980. Research Policy 30, 99-119.
Mowery, D.C., Sampat, B.N., 2005. The Bayh-Dole Act of 1980 and University-Industry Technology Transfer: A Model for Other OECD Governments? Journal of Technology Transfer 30, 115-127.
Ollila, S., Williams-Middleton, K., In press. The venture creation approach: integrating entrepreneurial education and incubation at the university. International Journal of Entrepreneurship and Innovation Management Special Issue on Innovative University Programs in Technology Business Incubation.
Phan, P.H., Siegel, D., Wright, M., 2005. Science parks and incubators: observations, synthesis and future research. Journal of Business Venturing 20, 165-182.

Rasmussen, E.A., Sorheim, R., 2006. Action-based entrepreneurship education. Technovation 26, 185-194.
Regestad, U., Larsson, L., 2006. Årsredovisning 2006. Chalmers University of Technology, Gothenburg, Sweden.
Regestad, U., Larsson, L., 2007. Chalmers 2007. Chalmers University of Technology, Gothenburg, Sweden.
Regestad, U., Larsson, L., 2008. Chalmers 2008 Årsberättelse. Chalmers University of Technology, Gothenburg, Sweden.
Reynolds, P.D., Carter, N.M., Gartner, W.B., Greene, P.G., 2004. The prevalence of nascent entrepreneurs in the United States: Evidence from the Panel Study of Entrepreneurial Dynamics. Small Business Economics 23, 263-284.
Reynolds, P.D., Miller, B., 1992. New firm gestation: conception, birth and implications for research. Journal of Business Venturing 7, 405-417.
Rothaermel, F.T., Agung, D.S., Jiang, L., 2007. University entrepreneurship: a taxonomy of the literature. Industrial and Corporate Change 16, 691-791.
Santoro, M.D., Gopalakrishnan, S., 2001. Relationship Dynamics between University Research Centers and Industrial Firms: Their Impact on Technology Transfer Activities. Journal of Technology Transfer 26, 163-171.
Siegel, D., Thursby, J., Thursby, M., Ziedonis, A., 2001. Organizational issues in university-industry technology transfer: an overview of the symposium issue. Journal of Technology Transfer 26, 5-11.
Siegel, D., Waldman, D., Link, A., 2003. Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. Research Policy 32, 27-48.
Siegel, D.S., Phan, P.H., Libecap, G.D., 2005. Analyzing the Effectiveness of University Technology Transfer: Implications for Entrepreneurship Education, Advances in the Study of Entrepreneurship, Innovation, & Economic Growth. No longer published by Elsevier, pp. 1-38.
Siegel, D.S., Waldman, D., Atwater, L., Link, A.N., 2004. Toward a model of the effective transfer of scientific knowledge from academicians to practitioners: qualitative evidence from the commercialization of university technologies. Journal of Engineering and Technology Management 21, 115–142.
Solomon, G., 2007. An examination of entrepreneurship education in the United States. Journal of Small Business and Enterprise Development 14, 168-182.
Styhre, A., Lind, F., 2009. The softening bureaucracy: Accommodating new research opportunities in the entrepreneurial university. Scandinavian Journal of Management, DOI.
Tuunainen, J., 2005. Contesting a hybrid firm at a traditional university. Social Studies of Science 35, 173-210.
Vetenskapsrådet, 2006. Årsredovisning. Vetenskapsrådet, Stockholm.
Wright, M., Birley, S., Mosey, S., 2004. Entrepreneurship and University Technology Transfer. Journal of Technology Transfer 29, 235-246.
Youtie, J., Libaers, D., Bozeman, B., 2006. Institutionalization of university research centers: The case of the National Cooperative Program in Infertility Research. Technovation 26, 1055-1063.
Youtie, J., Shapira, P., 2008. Building an innovation hub: A case study of the transformation of university roles in regional technological and economic development. Research Policy 37, 1188-1204.

Paper II

CHAPTER 3

Sustainable Wealth Creation beyond Shareholder Value

Mats A. Lundqvist and Karen Williams Middleton

Introduction

The university can be a place for generating returns on investments—returns that are both financial and of other nature. This chapter investigates an approach in which action-based masters-level education is integrated into university-venture creation. The approach is resided at Chalmers School of Entrepreneurship (CSE) and Göteborg International Bioscience Business School (GIBBS) in Sweden. The purpose of the schools is to champion ideas into viable investment opportunities through a combination of venture development and entrepreneurial training. The schools promote the responsible utilization and commercialization of primarily university-based research ideas in the fields of technology and bioscience. They also package ideas stemming from individual inventors or from firms. This approach accommodates promising ideas and research results that are not so "low-hanging" to be championed into start-ups. All this is done while shaping aspirant entrepreneurs during their masters-level education. Many of these aspirants will continue running the venture beyond its incorporation into a firm and often through several rounds of venture capital financing. This approach will be described and analyzed as an innovative way of accomplishing multiple returns on investments that contribute to sustainable development in several ways.

The education provided at these schools is intended to give the entrepreneurial student the opportunity to "test the water"—to go through real-life entrepreneurial and business activities in order to learn by doing, reflect upon the consequences of action, develop decision-making processes, and

prioritize activities. The method for "testing the water" of start-up development is to actually allow students to become collaborating partners in and around ideas that have commercial potential and then to guide and support the venture designed around the idea through the process of building a legitimate business. Students are encouraged and expected to actively seek out and test the skills and tools provided within the real-life context of the joint ventures. The ventures are constituted by the students while the idea provider(s) and the school representatives act as stakeholders, and all parts may be potential future shareholders. This experience of building a real venture empowers students to create value rather than just "earn income," as well as to become driven and motivated individuals or teams that can positively affect or influence society. At the school, entrepreneurship is not only about driving an idea toward economic success, it is also the prime tool for achieving economic, social, and environmental sustainability. This is part of a wider stream of sustainable entrepreneurship research and practice associated with sustainable entrepreneurship (e.g., Cohen and Winn 2007; Dean and McMullen 2007; Marsden and Smith 2005).

Tangible Results

The venture creation approach developed by CSE (for an overview of CSE, see *Innovating Regions in Europe* 2008) and adapted by GIBBS has generated tangible results in the following forms. Regarding formal education, more than 200 students have received masters-level degrees from CSE and GIBBS. More than half of the graduate students are now engaged in start-up companies. Nearly all of the remaining students engage in various forms of business development in established firms (often beginning as trainees), as business consultants, or within the so-called innovation system (i.e., as incubators, seed-financiers, etc.).

The so-called preincubator fund, operative since 2001, currently includes a portfolio of twenty-five graduated companies built from the idea-based ventures developed during the course of the education at CSE and GIBBS. The preincubator takes a 20 percent share in the potential start-up company. Within this share, the investors in the preincubator have a right to half of the capital generated, but not access to equity or ownership influence. The portfolio of companies had a market value of U.S.$80 million in the spring of 2007 and includes start-ups based in bio- and nanotechnologies, applied materials, medical diagnostics, and information and communication systems, among other things. In 2006, CSE and GIBBS portfolio companies attracted a collective U.S.$7.5 million in financing—primarily through equity investments. The 25 companies together employ more than

160 persons, with yearly turnover in excess of U.S.$20 million. The companies contribute to regional commerce through taxable revenue, collaboration with and use of regionally located partners and distributors, and volunteer contributions to their former educational institutes through lecture presentations and mentoring. A total of five companies founded at CSE and owned by the preincubator have made a successful exit from the portfolio. In recent years CSE and GIBBS have piloted ventures with companies such as Volvo, Saab, and StoraEnso and collaborated with researchers from universities in other cities, such as Stockholm and Oslo. Another measure of this success are the awards that graduated companies continue to receive; for example, CSE and GIBBS graduate companies have received one-third of the total twenty-four medals awarded through the Venture Cup West business plan competition thus far.

Going Beyond Traditional Shareholder Value

Developing schools that incorporate individual and venture development, with both educational and commercial ambitions, poses challenges. This chapter will focus on two questions that begin to address these challenges:

1. How do you secure educational objectives while also building ventures?
2. What returns on investments, other than financial, result from the approach?

To answer these questions, we first clearly present the educational structure and surrounding framework, giving concrete examples of how the structure affects the intention of the schools. Next, we give a short history of the evolution of the schools. Finally, we present illustrative cases showcasing the similarities and differences of some of the individuals from and companies developed through the schools in order to demonstrate how sustainable value can be generated. (An alternative approach, the Invention to Venture Entrepreneur Bootcamp held in Massachusetts, is discussed in Halpern and Plano [2006]).

The substantiating elements of the CSE and GIBBS approach can be organizationally understood in terms of the following:

1. a **masters-level program**—situated in an interdisciplinary and practical innovation system environment
2. a **preincubator**—a group of people who finance and manage the extraordinary efforts needed to recruit future entrepreneurs and develop innovation projects

3. a **venture team**—a group of key stakeholders
4. an **entrepreneurial network**—with alumni, with researchers, with innovation system and investment actors, etc.

These four elements are intertwined into the combined educational and venture creation approach. In part, the educational and preincubation contributions are depicted in figure 3.1.

Masters-Level Program

Providing the approach at the masters level is a conscious choice. At the masters level, students generally intend to pursue a commercial career upon graduation, whereas once engaged in doctoral studies, as the situation currently stands, individuals have often entrenched themselves into academic careers. Specially selected masters-level students also have sufficient education and legitimacy to generate interest around an early-stage venture.

The program emphasizes science-based entrepreneurship and business creation through real-life ventures, project assignments, IT-based simulations and role-plays, teamwork, and interplay with the university, its innovation system, and the surrounding knowledge-based industry. In short, the program offers the student a laboratory for simulated and real-life action learning (course structures are depicted in figure 3.1). This laboratory was built around CSE since 1997, with contributions from the Center for Intellectual Property studies (CIP) since 2000 and with the addition of GIBBS in 2005. Both CIP and GIBBS are joint ventures with Göteborg University, specifically with its business school and medical school, emphasizing development toward more interdisciplinary environments.

CSE and GIBBS stem from high-technology ideas/inventions, with GIBBS specializing in bioscience. CSE and GIBBS students are expected to have a high level of motivation for and interest in technology-based innovation projects, including interaction with idea providers (inventors and researchers), fellow students, and international experts. Students with backgrounds in engineering, science, business, and law attend the program. The balance between engineering and science on one side, and business and law on the other, is approximately 50-50, if you include industrial engineering students in the latter category. This diversity provides an environment with opportunities for students to constructively learn from one another while enhancing their specific strengths in innovation and venture creation.

Since its start, CSE (and later GIBBS) has continuously developed its specialized student recruitment process. Student applicants go through three stages of selection: a review of base criteria, a written application that includes

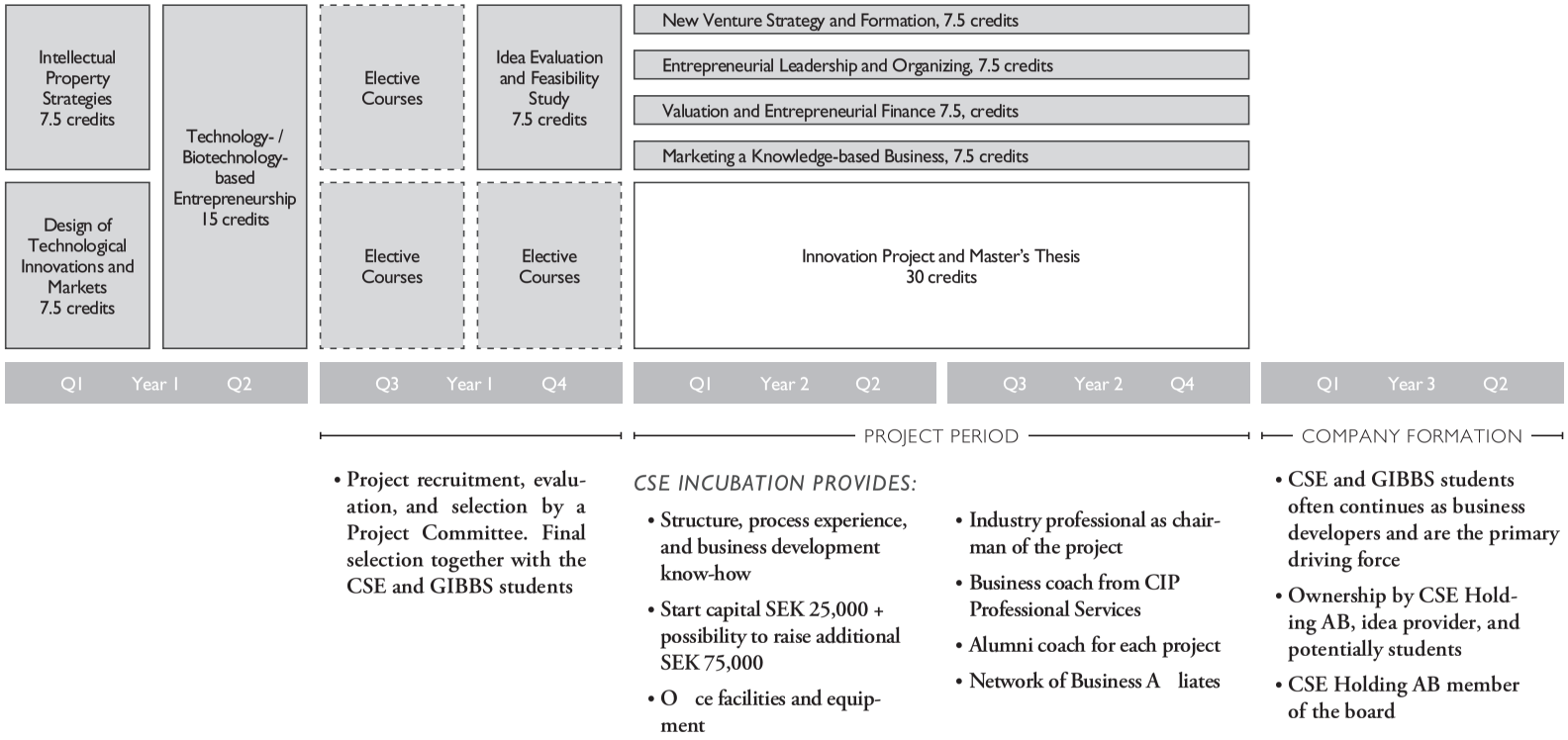
Intellectual Property Strategies 7.5 credits
Design of Technological Innovations and Markets 7.5 credits
Technology- / Biotechnology-based Entrepreneurship 15 credits
Elective Courses
Elective Courses
Idea Evaluation and Feasibility Study 7.5 credits
Elective Courses
New Venture Strategy and Formation, 7.5 credits
Entrepreneurial Leadership and Organizing, 7.5 credits
Valuation and Entrepreneurial Finance 7.5, credits
Marketing a Knowledge-based Business, 7.5 credits
Innovation Project and Master's Thesis 30 credits
Q1 Year 1 Q2
Q3 Year 1 Q4
Q1 Year 2 Q2
Q3 Year 2 Q4
Q1 Year 3 Q2
PROJECT PERIOD
COMPANY FORMATION
• Project recruitment, evaluation, and selection by a Project Committee. Final selection together with the CSE and GIBBS students
CSE INCUBATION PROVIDES:
• Structure, process experience, and business development know-how
• Start capital SEK 25,000 + possibility to raise additional SEK 75,000
• O ce facilities and equipment
• Industry professional as chairman of the project
• Business coach from CIP Professional Services
• Alumni coach for each project
• Network of Business A liates
• CSE and GIBBS students often continues as business developers and are the primary driving force
• Ownership by CSE Holding AB, idea provider, and potentially students
• CSE Holding AB member of the board

Figure 3.1

essay questions, and interviews. Base criteria ensure that the applicant has fulfilled the required undergraduate education within accepted areas of education and shows sufficient English and computer skills. The accepted areas of education are relatively broad but have some restrictions because of the fact that the venture projects are based on high-technology research ideas. Essay questions, together with other supplementary information, including a letter of recommendation and CV, are used to test the applicant's ability to communicate ideas, accomplishments, decisions, and experiences in a reflective and structured way. Questions used have been benchmarked with other essay questions used by comparable entrepreneurial educations and are designed by behavioral scientists/psychologists to provide a forum in which the applicant can communicate the following traits:

- Motivation and commitment to the unique action-based learning process
- Personal responsibility and awareness
- Ability to handle risk and complexity
- Leadership
- Ambition
- Effective communication skills

In addition, a student should also be characterized in at least one of the following roles:

- Visionary
- Team builder
- Efficient user of resources
- Analyst

Student applicants who fulfill the initial base requirements and effectively communicate a majority of the characteristics and skills listed above are then required to attend interviews with selection committee representatives. Applicants are interviewed both individually and in case format (to observe their reaction to team dynamics and their individual identity within a team). Individual interviews consist of questions to ascertain information regarding motivation, experience, leadership, teamwork, risk and uncertainty, creativity, independence and responsibility, and decision-making processes. At the same time, the interviews are a forum for student applicants to pose any questions they may have regarding the structure and format of the program as well as an opportunity for interviewers to communicate expectations

and requirements of the program. In the final selection meeting all of the above aspects are weighed before a decision of admittance is made. Notes are made with a synopsis of the reasoning behind each decision.

Preincubator

The preincubator has operated since 2001 and consists of two fully owned daughter companies of the Chalmers University of Technology. This construction avoids conflicts of and balanced interests in order to minimize risk, particularly on the individual level, especially during the innovation project year period. The main duties of the preincubator are to manage the recruitment and development of ventures that could be future companies for CSE and GIBBS, to provide initial seed financing to accepted ventures with secondary financing should the ventures prove qualified, and to eventually own stakes in the companies started from the ventures. This preincubator is fully integrated operatively with the educational program. The preincubator also facilitates long-term development of the ventures and companies, additional procurement of resources, support of alumni activities, business development opportunities, marketing and outreach programs, and other activities that benefit the students, companies, and schools.

To produce start-ups, the preincubator screens more than one hundred ideas every year. Of these, more than ten per year are selected to run as an innovation project in the combined preincubator and education structure, with additional ideas held in reserve should one or more of the ventures be terminated. Figure 3.2 illustrates the recruitment and idea-flow process for CSE 2005, during which projects were terminated and replaced, thus allowing for a total of thirteen ideas to be thoroughly pursued as ventures and eventually five companies to be founded at the end of the educational period.

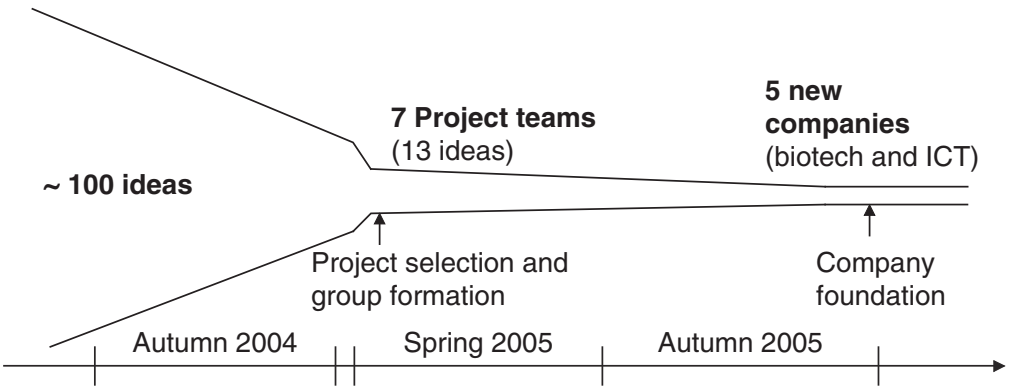

Figure 3.2 CSE 2005 idea recruitment deal flow

Venture Team

Five types of stakeholders constitute the CSE and GIBBS venture team: students, educators, idea providers, representatives of the preincubator, and the venture board chairperson. The students constituting the venture team are, of course, key stakeholders and drivers in the learning and venture creation process. They are both guided and empowered by the other stakeholders, while partnering with these same stakeholders to pursue entrepreneurial processes and potentially to build the venture into a company.

Educators come in two main forms: those directly linked to the school, working at the school on a day-to-day basis with a cognitive understanding of the complexity in which the students act, and those that are partners to the school, operating in other educational departments or in industry, and who are thus capable of providing experience- or academic-based knowledge in specific areas. Among the direct educators three have three or more years' experience in start-ups, three have ten or more years' experience in organizational development and leadership, three have four or more years' of legal experience, and two have ten or more years' experience in strategy and marketing.

To fulfill the ambition of creating high-tech companies, the students are formed into teams and are linked with an idea provider, the third key stakeholder in the school. Idea providers are contractually conjoined to the school on a case-by-case basis, ensuring both their participation in the venture and student development while also protecting their interests in the ideas they initiate. Idea providers often provide deep technical insight and often cosupervise technical studies in the students' theses, thereby being key bridges in integrating science, technology, and business.

Supporting this structure is the fourth stakeholder in the process, the different representatives of the preincubator. These individuals are active on the management board of the venture during the educational program with the purpose of supporting the best interests of the venture and upholding the perspective of the incubator. Each venture establishes a board, including the fund representative and idea provider, and selects a chairperson of the board, the fifth key stakeholder. The chairperson is chosen on the basis of industry expertise, as it relates to the project, business development experience, and program interest (i.e., the individual is willing to allocate time and energy to the management processes because he or she is associated with an educational process).

Entrepreneurial Network

Extenuating from these key stakeholders is then a network of other actors, with various degrees of connectivity to the schools, for example, business

angels, international advisors, mentors, and other incubation actors. This group provides information and support, through which the progress of the students and the potential companies is accessed and advanced. Currently CSE and GIBBS students, apart from tapping into an extensive network, also receive systematized coaching from an alumni coach, advice in intellectual asset and property management from collaborative consultants, and legal as well as accounting advice from Göteborg accounting firms and law firms that offer pro bono time to the students, with expectations of gaining them as customers in the future.

Historical Background

The inspiration for CSE grew from the assumption that a great number of good ideas fail to become business ventures and thus are lost to society. Of all the components needed to start a new venture—including good business ideas and venture capital—start-up entrepreneurs were assumed to be the greatest scarcity. Researchers and academics are found to rarely champion their own ideas to the market, even though they are entitled to them through the so-called teachers exemption, giving ownership of research results to professors, if not otherwise agreed upon. CSE identified its position in the gap between invention and a viable investment opportunity (see figure 3.3). Within this gap, selected entrepreneurial students and selected ideas are brought together through the approach previously described.

In the late fall of 1995, Mats Lundqvist and Sören Sjölander, of the department of technology management and economics at Chalmers, decided to create a school that would arrange for partnerships between inventors with ideas and students with the drive to become start-up entrepreneurs. It became apparent that most existing entrepreneurship programs

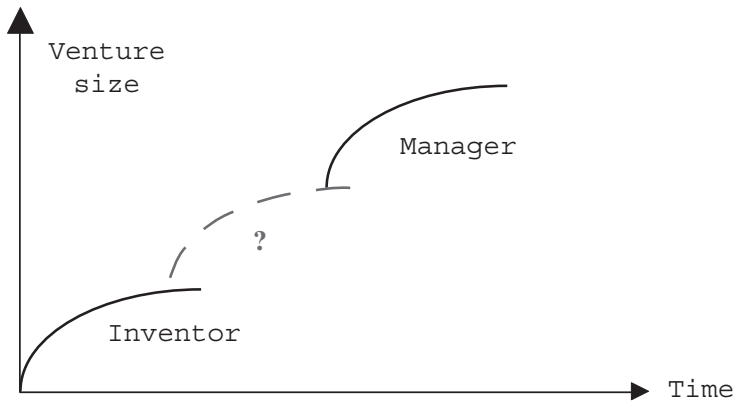

Figure 3.3 Reason for starting Chalmers School of Entrepreneurship in 1997

were focused on teaching entrepreneurship rather than on actually developing entrepreneurs. Since its start in 1997, CSE has had the double mission of developing entrepreneurs while simultaneously creating technology ventures. At Chalmers, a good breeding ground for such an organizational innovation existed thanks to a constructive engineering culture combined with a high appreciation of research commercialization, pioneered by Torkel Wallmark and others as early as the 1960s.

The program at CSE can be seen as a continuous development that has involved hundreds of committed contributors. Learning from each year of activities has resulted in three main stages of core development, distinguished as follows:

- Version 1 (1997–2000), in which special project and student recruitment processes were developed along with a project-based pedagogy located in Chalmers Innovation incubator environment. This version was a final-year program for engineering students at Chalmers.
- Version 2 (2001–2004), in which CSE became a one-and-a-half year masters-level program recruiting broadly from all over Sweden, and a special holding and incubation company was started together with AB Chalmersinvest.
- Version 3 (2005–2007), includes the starting of the sister school, GIBBS, and a first semester integration, called Business Design.

Within each version, certain challenges have caused changes in the approach, as have accomplishments that reinforced the design. In the following section, specific cases of individuals and companies that have graduated from CSE and GIBBS are presented to illustrate the experience and development provided through the approach. Examples presented in the cases will enable discussion around the two questions posed earlier in the chapter.

Cases from CSE and GIBBS

Anna

In 1997, Anna Weiner responded to an invitation to apply to the first class of what was to become CSE. She and eleven other students, with various backgrounds from Chalmers University of Technology, embarked on a year-long journey of entrepreneurial learning. Teamed up with two other students, Anna took the lead position in the venture idea provided. Throughout the year, Anna faced challenges in gaining authority regarding the venture.

At the end of the program, the venture was incorporated with Anna acting as CEO.

Still an inspired entrepreneur in 1999, Anna teamed up again, this time with a biochemist who had developed a specialized probiotic gel, to help found the company ELLEN AB. At the time the company was founded, initial clinical trials had been conducted and a patent filed. Additional trials were conducted in 2001, and the first products were launched one year later. ELLEN expanded to other Nordic countries in 2004, and internationally one year later. Once its CEO, Anna now works part-time at ELLEN; her main responsibilities are in research and development and strategic business development. Apart from her duties at ELLEN, she also advises multinational corporations on intellectual property, management, and financially related issues. The story of ELLEN, and Anna, is commonly used in the CSE and GIBBS courses as an example of the birth and growth of an entrepreneurial company with its beginnings in university technological research that carved out market space from well-established, multinational brands through the provision of a biologically conscious product.

Vasasensor

Vasasensor AB came to CSE in 2003 as a spin-off from the Imego (Institute of Microelectronics in Gothenburg) research institute. The student team was presented with a sensor patent application, which had several possible for applications. The students were given the challenge to find and develop the best possible application and market space within one year at CSE. There were multiple potential markets that the team could readily identify, but they were searching for the application with the largest market potential within a short period of time, building on the competencies of the team. After only a few months, the decision was taken in mid-March 2003 to aim the company toward the paper manufacturing industry and its requirements. The core team presented the decision to the board and never looked back. By the end of the year, Vasasensor AB, together with actors in the paper industry, had focused on developing a wireless sensor system for process optimization in paper mills. Their success has drawn interest in the technology from several other industries as well.

The company continues to work toward bringing innovative technology to a more traditional industry (paper manufacturing), saving money and also time and energy sources. Vasasensor AB continues to work with local factories to develop additional prototypes, which may eventually be licensed to other parts of the world (but allows for the know-how to be developed within western Sweden. At the same time, the management team travels to

other parts of the world (e.g., to Asia last fall), spreading the story of a company that was started through CSE. Sofia Johnsson, CEO of Vasasensor AB, and fellow CSE classmate, teammate, and Vasasensor management member, Brodde Wetter, regularly contribute to the further development of CSE and GIBBS, both at the masters level and in continuing educational programs developed for entrepreneurial alumni.

Denator

Most often, the ideas from which the ventures are based come from university researchers, independent of the students. However, the idea behind Denator AB, stemmed from research conducted in part by a family member of one of the CSE 2005 students. The family dynamic helped to fuel the growth of Denator during the educational year of the venture, with the team and support system striving to meet and champion developmental needs. Denator utilizes a patent-pending physical method to completely stop the degradation process in biological samples that enables a clearer picture of the proteome. The company created a chain of products that ensure quality preservation of biological samples for protein analysis. The company also developed a biomarker for sample quality on the protein level, which is now being developed as the first sample quality control method in the proteomics field. The products are designed to enhance proteomic research in academic and pharmaceutical research, with further aims to implement the products at hospitals in order to improve diagnostics.

Recognizing the challenging and time-consuming time to market of bio-based ventures, attracting financing has been critical. As of January 2007, Denator has managed to receive approximately SEK 1 million in grants and competition financing, as well as two rounds of capital financing—SEK 5 million in the first round from one company and SEK 15 million in the second round from a mixture of private and venture-capital resources. Capital is utilized to expand operations, including the opening up of an additional office in Uppsala (where the idea originated), as well as on fueling production development.

Denator is utilized as an introductory case in the first semester of the program to present the complexity and challenges of a biotechnology start-up to new students; the management team visits to speak about the journey and the steps at the end of the case study. The core entrepreneur experienced several challenges during his year at CSE, resulting in development of additional coaching support being implemented into the education. At the same time, the entrepreneur has continued to seek out coaching and advice from some of the educational staff, a practice that perpetuates

mutual learning and facilitates additional understanding of the entrepreneurial needs of the students into the educational pedagogy.

Ecoera

Based on an industrial idea but developed through collaboration with university-research arenas, Ecoera provides solutions for second-generation biomass heating fuel: agropellets. The current problems associated with gases released during the combustion of residual biomass are minimized through the use of specialized pellet formulations. The reduction of undesirable by-products combined with the use of an alternative and abundant resource stands to help standardize agropellet formulations and enables a new era of biomass utilization.

Ecoera AB was a latecomer to the CSE environment in 2006, starting in the early fall as a new venture for a team that had terminated its previous project. The student team had only four months of official incubation (compared with the common one-year incubation period). In fact, the team was able to remain in the educational incubator space until the following spring, though the full network support provided by the educational platform was diminished in order to focus attention on the next generation of ventures. The extension past the "graduation" date also facilitated a management transition in the project team, where one of the original CSE teammates left the project and another graduate from the same year, but from the GIBBS program, took the vacant position. With limited incubation time available, the team was in critical need of research validation and the resources to carry out such validation. Network connections at Chalmers enabled adaptation of the project into another EU-research-funded project, which could be utilized as a unique early-stage financing method that encouraged the technical development of the agropellet.

Termination or Restart

While company formation does not occur in every case, the intention is to always provide value at some level. There are essentially three alternatives to incorporation of a venture into a company: noncommercial development, restart, and termination.

With early-stage ideas and ventures, analysis often shows immediate residual commercial value. In some cases, the venture is not currently adaptable to a commercial end but can be structured instead as a research or information platform. One project at GIBBS—the Chemical-Biology platform—is an example of such a venture (project). The ChemBio-project basically aims

at creating a laboratory for medical research, focusing on high throughput screening of new substances. Although such a research platform might eventually have revenue-building intellectual property, its main benefit is in its enabling researchers, companies, and others to increase the efficiency of their research and innovation processes.

In other cases, the venture appears to have commercial value, but it is still too early in development to legitimize incorporation. Thus an idea-based venture might "walk over" from one team and project-year to the following year. The framework of the schools allows this to be possible, because no one—not even the first student team—lays any claim to the venture and the idea provider most often wants to extend the collaboration.

Even in the cases where a venture is going to be terminated, the venture can still provide residual value. Student teams are required to perform proper due diligence when providing reasons for termination, thus facilitating additional learning from the expected lack of potential of the venture—for example, the venture may be technically but not financially viable. Effective communication of the reasoning behind termination of the venture may allow an idea to be returned to the researcher in a way that facilitates further development and leaves open the possibility of commercialization at a later stage. Such due diligence also builds trustworthy relationships with idea providers, enabling further contacts for additional ideas or advice toward other ventures.

Securing Educational Objectives and Investigating Different Benefits

Earlier in this chapter, we presented substantiating elements of the approach represented by CSE and GIBBS, as well as examples of the outcomes, continued development, and evolution of the approach. The approach recognized the value of getting a financial return on investments in venture creation and goes beyond traditional shareholder value toward sustainable creation of wealth—economic, social, and environmental. We will first discuss how educational values are secured during venture creation (Question 1). Then we will analyze return on investments in four main categories (Question 2): financial, development of an entrepreneurial ecosystem, characteristics of companies created, and the professionalization of entrepreneurs educated to uphold sustainable development.

Question 1: *How do you secure educational objectives while building ventures?*

Securing educational objectives while building ventures requires insight into both the university arena and the business-development arena. The founders

of the schools understood that there was a gap between idea development and the formation of these ideas into business models or companies that would be accepted by the marketplace. This gap required the simultaneous development of individuals and companies so that the learning was intrinsically linked with the idea of development. However, the development process needs to be controlled and regulated to ensure that learning takes place. The founders realized they needed to establish school policies for the types of business ideas that would facilitate learning and for the structures and practice that would ensure learning was protected and championed during the development process.

The first step to ensuring educational objectives is to communicate the learning process as early as possible. Hence the philosophy is presented to potential students even before they are admitted to the schools through the specially designed application process. Through the written essay questions, potential students can communicate their intent and interest in entrepreneurial development. Interviews provide students with the opportunity to verbally communicate their intentions and for interviewers to discuss and steer expectations about schools, their format, and education prior to engagement. The essays and interviews help create a rapport between students and school staff which helps them find flexible solutions to conflicts between education and venture creation. This relationship is nurtured during the introduction to the schools when developing the social contract between the students and other stakeholders is emphasized. The social contract process is repeated at each major milestone within the education.

The general learning outcomes that students are expected to achieve on having completed CSE or GIBBS are that they are able to

1. **construct knowledge-based business** in interplay with complementary competences, thereby integrating technological, economic, managerial, and legal skills into innovations, products, ventures, and market offerings;
2. **analyze, construct, and use tools to design innovations**, such as different intellectual property tools (patents, standards, contracts, designs, trademarks, databases, copyrights, etc.), in interaction with research, market assessment, and product development;
3. **communicate, reflect, and manage group dynamics and responsible leadership** as applied to real-life and simulated complex situations;
4. Consider **citizenship and entrepreneurship for sustainable development; and**
5. **create** and manage **start-up** ventures.

In the first half year, theory is mixed with simulation exercises, under the requirement that the students build a basic entrepreneurial skill set prior to the action-based learning within the ventures and the venture teams. This first half-year mirrors more traditional and generally accepted methodologies of teaching. The schools have attempted to pioneer ways in which to examine learning outcomes that are not so easy to assess with traditional pedagogy, such as written exams. The examination of learning outcomes related to the application of skills and "reflection in action" has turned out to align with recent developments in European higher education, called the Bologna process. In this process, not only is higher mobility achieved by conforming bachelors and masters degrees to a three-year or two-year format, respectively, but learning outcomes that emphasize more vocational skills are also emphasized, hopefully contributing to employability.

During the innovation-project year, several mechanisms for school-level learning are utilized at CSE and GIBBS. Each of the mechanisms is intended to link venture learning to classroom learning, supporting the following objectives set out by the school.

1. **Role plays** in which the students act and "negotiate" with their classmates, with alumni, or with invited business people, provide a strong learning mechanism for CSE and GIBBS, particularly in relation to the activities of the venture creation process. Role plays allow for practice and for reflection upon actions carried out when acting in the venture.
2. Two **Project Reviews** and two **Business Reviews** are conducted during the innovation-project year. These arenas for presenting venture applications, business models, market segments, plans of action, and company value function as a "convergence point" for the holistic venture-based learning. The Project Reviews are internal, in that documents, business plans, and discussions are assumed to be more open and problems can be discussed. The Business Reviews are more open arenas where students are expected to be able to communicate and convince people such as future investors, of the values of their ventures.
3. Individual and team-based **assignments** are often applied on or inspired through the venture activities. A great deal of the rhythm of the education is driven by assignments, which can often bridge the gap between courses and, because of the nature of the real-life learning provided through the ventures, between theory and practice.
4. In the **school project** the whole school class organizes, finances, and executes a joint project, often including outreach to industry and secondary school education as well as school marketing, study tours, and other activities. In 2007 the CSE school project included a trip

to Uganda on which the class together with the Red Cross helped start a solar-panel-driven incubator. The GIBBS school project involved touring bioscience and biotechnology business, incubator, and university programs in California. The classwide project, like the open-office environment, provides for cross-venture learning. At the same time, the project allows the students to develop as entrepreneurs, by talking about their ventures, acting as ambassadors for the ventures and the school as a whole, and expanding their network.

Most instructors draw upon the above activities to demonstrate certain learning outcomes. In addition, each course adds its own measures, such as exams, course-specific assignments, and presentations. Another aspect of securing educational quality is the large amount of coordination done at the program level and not only at the course level. This coordination is partly IT-based through the adaptation of an open-source software facilitation platform, in which students and educators can deliver assignments and feedback; write journals; pose questions, answers, clarifications, and administrative information; present grading; and other learning facilitation activities. In addition to these, learning is facilitated through the following nongraded mechanisms, which still provide critical links between learning objectives and venture activities.

1. The **open office preincubator environment,** provided by CSE Incubation, enables cross-venture and cross-school (CSE and GIBBS) learning, as well as offering all the tools (phone, Internet, fax, meeting rooms, etc.) necessary to drive a start-up. Often the original venture teams of three students multiply in this environment with theses students and other potential key persons joining the venture during the innovation project year.
2. In three personal and three team-based **development talks** group dynamics, venture dynamics, learning, well-being, and other challenges are put forward by either the students or the educator. These talks are not graded in order to provide a safe and open forum for the students (the level of openness determined by the students and student teams themselves) to discuss and deal with issues they may face.
3. **Board meetings** are held in which school and preincubator staff document or reflect on how students prepare and execute the meetings, while students test their ability to communicate strategic direction of the venture to a board.
4. **Alumni activities** and "inter-year" learning. CSE and GIBBS have an active alumni association—Elumni. With regional development funding

beginning in 2005, CSE has leveraged the spontaneous networking among alumni by providing alumni leadership courses and linking alumni into the current program. As a result, CSE—alumni and later GIBBS alumni—are provided with continuing and strengthening support to help them develop a sustainable and appreciative leadership. Developments discovered through the course of the alumni's education are implemented back into the schools, in part through alumni acting as mentors for current venture teams.

Specific elements that secure learning objectives, should they conflict with business interests, are:

1. **venture-team formation** conducted by educational and preincubation staff to facilitate complementary and supportive skills within the venture team;
2. **unilateral right to venture termination** by the school, should the learning objective of using the venture become counterproductive to learning (such as the venture idea being determined as not having commercial potential); and
3. **investment restrictions** so that investment is limited to nonequity investments until the education is complete, to prevent, for example, conflict of interest.

A sophisticated team-formation process matches students to teams, and teams with a venture idea provided by the preincubator and selected by the class as a whole. The class selects projects through a process established independently by the class. Then the students individually list and rank ideas and competencies they would prefer to work with during the innovation-project year. This process balances the students' need for self-commitment with the construction of teams with complementary competencies, while utilizing all of the venture ideas selected by the class as a whole in the formation of the venture teams. It is within the team construct, and the different and often complementary perspectives of the team members, that much of the personal developmental learning takes place.

A three-party contractual agreement between key shareholders ensures their engagement and continued contribution to development (such as board meeting participation), and guarantees that venture activities will not fundamentally undermine educational objectives. The students, researcher(s), and preincubator all own shares in the venture, with the shares allocated to the chair through the preincubator should the venture be incorporated into a company after graduating from CSE/GIBBS. No single party owns a share

greater than 49 percent. This clearly and contractually agreed-upon division of shares in the initial collaboration contract helps secure that only limited time is spent on negotiations between the future shareholders during the educational period. Many university incubators also appreciate the degree of structure and transparency the CSE and GIBBS preincubation process has in its current form and see it as a role model even from a strict business-creation perspective. The contractual agreement also requires a specific minimal-time engagement between the idea provider and the venture/team that ensures critical knowledge transfer is provided to the venture, so the idea can indeed be explored and developed to the full extent possible within the school period. Finally, the agreement clearly communicates that the school has the unilateral right to terminate the venture, should there be circumstances that are counter to the learning objectives. Taken together, these policies and measures have, throughout the years, proven to be critical in securing educational quality.

Question 2: *What returns, other than financial, on investments result from the approach?*

Because educational development and venture development are linked, the returns on investments expand beyond the direct financial gains to include other returns, such as building an entrepreneurially minded culture and a network, willing to give back in kind to the schools. These indirect returns contribute substantially to the development of CSE and GIBBS and to their larger university and business environments, that is, their entrepreneurial ecosystem. Beyond this, the ventures at CSE and GIBBS yield societal returns by commercializing innovations that contribute to sustainable development but that are too "high-hanging" for market and other actors to realize. At the very least, the experiences and competences gained by CSE and GIBBS students will provide returns to society beyond the potential formation of a company. The life-long entrepreneurial careers that CSE and GIBBS students pursue will arguably result in critical returns to society in the sense that they have developed the confidence and mindset to drive change and innovation for sustainable development. The launching of professional entrepreneurial careers, instead of traditional careers as employees in established structures, can be expected to have an important impact on wealth and welfare creation in knowledge-based economies.

The approach described in this chapter has built upon expectations and mechanisms for traditional financial returns on investments. By taking a share in every venture incorporated into a company, CSE and GIBBS control a slice of the financial value creation of the venture. Idea providers and students, having invested "sweat equity," will also become shareholders in the

company formed. In addition, other individuals identified as key actors for the venture during its incubation at CSE and GIBBS will be compensated with shares of the newly formed company.

CSE and GIBBS have chosen to take equity in the ventures incorporated into companies for the following reasons:

- **To secure the operation and development of CSE and GIBBS.** In the short term, this is done by utilizing the investment money coming in from regional actors in the preincubator. In the long term, some of the companies formed will hopefully have a high rate of return when making an exit, thereby bringing back to CSE and GIBBS, and its investors, substantial financial return on investment.
- **To build relationships and learning with the financial community.** By being an active owner of the company portfolio, CSE and GIBBS are forced to be constantly responsive to the demands of the financial market, especially that of the venture-capital market. While CSE and GIBBS have strategically chosen to avoid having private investors in its core business, the schools—as stakeholders—still need to monitor their investments and ensure continuous, financial attractiveness until the companies become cash-flow positive. Linking up to the financial community legitimates that CSE and GIBBS are living up to their missions to create viable investment opportunities.

The building of entrepreneurial ecosystem is a critical indirect return on investment into CSE and GIBBS. School staff not only focus on the dynamic internal development of the functional aspects of the school but also engage in multiple external arenas of entrepreneurial development. They do this not only at the university, the regional, and the national levels, but also at the international level through research, by sharing best practices, and through developmental projects. These activities, conducted in collaboration with the students and the CSE and GIBBS networks, enable the ecosystem to continually evolve. A critical portion of CSE and GIBBS staff's time is spent on networking and coordination activities. Throughout the years of developing CSE and GIBBS, the return on such investments can be measured in several ways:

- Concrete partaking of the entrepreneurial network actors in the coaching of new students and ventures
- Alumni and other network actors returning to the schools as idea providers
- An entrepreneurial culture development from one year's class to the next, partially measured in terms of how attractive the ventures are for

investment and what is accomplished marketwise, technologywise, and otherwise in the ventures during the program.

During the ten years of operations, persons associated with CSE and GIBBS have taken on roles in virtually every part of the emerging "innovation system" of Gothenburg. Concretely, this means that the schools have been more or less crucial, contributing to and supporting initiatives such as business-plan competitions, business-angel networks, incubators, seed and venture capital. Apart from these structures being important for CSE and GIBBS and their ventures, the structures are critical for the overall innovativeness of the region. In 2005, Gothenburg was recognized as the most innovative region in Sweden by the major Swedish technical newspaper *NyTeknik.* This was partly because of the developments at and around CSE and GIBBS. It was also due to large R&D intensive firms such as Astra Zeneca, Ericsson, and Volvo. These large multinationals still contribute in a more substantial way to the economic development and welfare of the region than do the companies from CSE and GIBBS. However, the increased ability of politicians, journalists, regional developers, and others to appreciate incremental as well as more radical innovations, is a notable aspect of the region today. In less than ten years, regional development authorities have diversified their investments to include company formation and entrepreneurial developments.

The examples and cases mentioned in this chapter provide evidence of how the entrepreneurial ecosystems functions. Alumni contribute directly to the education as lecturers, coaches, board members, and so on. Their companies are cases for new students to learn from, such as the Denator case presented here. Alumni, when seen in news and media, also contribute to the sustainability of entrepreneurial culture and ecosystem development as role models and as proof of concept for not only CSE and GIBBS students and CSE/GIBBS investors, but hopefully for others as well.

Beyond the local effects of the entrepreneurial ecosystems, CSE and GIBBS companies contribute to sustainable development by commercializing promising but "high-hanging" ideas. This is a societal return on investment, in that not only research results but also promising ideas from multiple segments of society are eventually brought to the marketplace (commercial or otherwise). As awareness in society increases in regard to the adoption of more sustainable technologies, CSE and GIBBS are an additional mechanism enabling such technologies to become more viable.

The case of Ecoera (http://www.ecoera.se/), which deals with agro biofuel, constitutes one example of how the barrier of abandoning fossil fuels in favor of more environmentally friendly alternatives can be lowered. In this case, CSE has the ability to develop something that the idea-providing

company has no resources to do itself. CSE also connects the idea with academic research at Chalmers Department of Chemistry, which in turn could help prove and legitimize the sustainable technology.

Many other ventures at CSE, such as the above-mentioned Vasasensor, contribute to sustainable development in more indirect ways. As described in the Vasasensor case study, the wireless sensor technology allows the paper-pulp companies to increase their economizing in energy-consuming processes. In analogous ways, CSE ventures Vehco and Avinode help economize truck and business-jet transport using Information and Communication Technologies (ICT) technologies. Vehco is Sweden's current market leader in truck telematics, allowing truck drivers and truck owners to communicate, measure, and improve fuel consumption, among other things. Avinode is the leader on the European market for brokering and optimizing business jets for small and medium-sized companies.

CSE and GIBBS ventures constitute clear examples of how investments in education and venture creation can generate sustainable development. Arguably, the most important returns on these investments are the careers that the alumni pursue. Although it may still be too early to judge, indications are that alumni from CSE and GIBBS take responsibilities beyond running a single start-up. The indications include the following observations:

- Some alumni, such as Anna, have pursued several ventures as presented in the cases.
- Alumni are trained to argue for the public-good aspects of their ventures. This is partially done in order to attract soft loans or research money, as in the Ecoera example.
- The "school project" at CSE and GIBBS includes aspects of outreach and citizenship that over the years have become a central part of the school identity.

These indications build the argument that the approach described in this chapter has substantial and long-lasting effects on the professional identity of those graduating from the school. This combined with sustained collaborations and activities with the alumni assures that an entrepreneurial-professional identity concerned with innovation, change, and sustainable development will prevail.

Sustainable Wealth Creation

This chapter has investigated a university-based approach that combines education and venture creation around promising ideas. The approach has

been developed over more than ten years. Tangible results as well as the daily operating of the two schools—CSE and GIBBS—have been accounted for. Two questions have been analyzed: (1) How do the institutes secure educational qualities while dealing with real venture creation? And (2) what different returns does the approach offer to shareholders in the specific ventures and beyond?

While venture creation and creating viable financial investment opportunities are at the core of the approach, it is not only financial returns to the shareholder that are relevant. Returns of a different character have been obtained thanks to the careful integration of educational and venture-creation activities. The approach has been critical to building an entrepreneurial ecosystem around the schools, which affects the academic as well as business environment in the region and beyond. Today this ecosystem is also critical for the development and running of CSE and GIBBS. Instead of education producing students who engage with society in a linear way, CSE and GIBBS are in constant mutual exchange with society both businesswise and learningwise. Unlike traditional education that often collects evidence from the real world and reproduces it through cases and theories in the classroom, CSE and GIBBS, in collaboration with their partners, constitute and create real-life cases that generate both value and learning (cf. Pretorius, Nieman and van Vuuren 2005).

Beyond the financial returns and the returns from mutual exchange within the entrepreneurial ecosystem, this approach also produces sustainable development on two levels. First, the ventures themselves are built on ideas that generate sustainable development, either directly, through commercializing new and more environmentally friendly technologies, or indirectly, by helping established technologies and processes become more efficient and monitored. Second, and perhaps most importantly, the graduates from CSE and GIBBS will likely continue to contribute to sustainable development through innovation well beyond their first or second venture, and as role models to others.

Ten years of experimentation has provided substantial learning and evidence about the benefits of the approach. Nevertheless, it is still in its early stages. Although substantial energy and time have been spent spreading the approach outside the university, traditions of teaching, research, and university management are still far from changed. Today, many entrepreneurship programs are applying an action-based pedagogy, more or less linked to the technology-transfer activities of the university. The trend is clear. CSE and GIBBS are examples of how far a reinvention and integration of education and venture creation can be taken. Some proposals for future steps conclude this investigation.

- How should policies at the national and university levels help the development of such approaches?
- How can this approach be developed to take care of ideas that are even more radical and less low-hanging?
- How can we more readily assess and measure the indirect qualities and values provided by the schools, and the entrepreneurs and ventures they develop?

References

Cohen, B., and Winn, M. I. 2007. Market Imperfections, Opportunity and Sustainable Entrepreneurship. *Journal of Business Venturing* 22 (1): 29–49.

Dean, T. J., and McMullen, J. S. 2007. Toward a Theory of Sustainable Entrepreneurship: Reducing Environmental Degradation through Entrepreneurial Action. *Journal of Business Venturing* 22 (1): 50–76.

Halpern, J., and Plano, L. 2006. $125,000 Ignite Clean Energy Business Presentation Competition Under Way; Invention to Venture Workshop to Train Entrepreneurs February 24. *Business Wire* (February 26): 1.

Innovating Regions in Europe. 2008. Chalmers School of Entrepreneurship, CSE: The Aim of CSE Is to Educate Future Entrepreneurs by Encouraging Students to Pursue Technological Business Ideas. http://www.innovating-regions.org/schemes/scheme.cfm?publication_id=3115&display=byTopic (accessed February 28, 2008).

Marsden, T., and Smith, E. 2005. Ecological Entrepreneurship: Sustainable Development in Local Communities through Quality Food Production and Local Branding. *Geoforum* 36 (4): 440–451.

Pretorius, M., Nieman, G., and van Vuuren, J. 2005. Critical Evaluation of Two Models for Entrepreneurial Education: An Improved Model through Integration. *International Journal of Educational Management* 19 (4/5): 413–28.

Paper III

The venture creation approach: integrating entrepreneurial education and incubation at the university

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Abstract: University entrepreneurial activity strives to deliver commercial value from university research. Entrepreneurial education, while having the same fundamental purpose, focuses on the stimulus of the individual. Recognising a gap in the literature between the fields of university entrepreneurship and entrepreneurial education, this paper proposes a venture creation approach to learning within an integrated environment. A study of Chalmers School of Entrepreneurship shows how university entrepreneurship, in the form of incubation, and entrepreneurial education, can be integrated. This integration provides both opportunities and challenges, both of which are addressed by utilising conventional problem-oriented and solution-focused learning philosophies in tandem. The venture creation approach builds upon combined learning philosophies in order to allow students to 'test the water' while reflecting upon real-life situations and explore entrepreneurial behaviours when creating new ventures. The paper concludes that actors engaged in combined entrepreneurial education and venture creation need to recognise, adapt to, and appreciate the tension and dynamics of the integrated environment.

Keywords: university entrepreneurship; entrepreneurial education; venture creation; incubation; entrepreneurial learning; problem-orientation; solutions-focus.

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1 Introduction

Universities are gaining an increasingly important role towards innovation development, going beyond the core responsibilities of conducting research and teaching, to include a *third mission* of delivering, to society, economic development of research (Etkowitz, 2004; Etkowitz, et al., 2000; Mowery and Sampat, 2005; Tassey, 2005). The activities of the universities engaging in the third mission can include technology transfer, patenting, venture creation, regional development, incubation and science park development, among others. After a substantial review of literature, these are recognised as broadly defined under the term university entrepreneurship, structured into four sub-streams: entrepreneurial research-university, productivity of technology transfer offices, new firm creation, and environmental context including innovation (Rothaermel et al., 2007). Even with such a broad definition, there still exists a gap in the literature, where entrepreneurial education is not included as a contributing stream of research to the field of university entrepreneurship.

In parallel, the growth of entrepreneurial education programs at colleges and universities illustrates the increasing importance of educating and developing new entrepreneurs (Finkle and Deeds, 2002; Katz, 2003; McMullan and Long, 1987; Solomon, 2007). Menzies (2004) discusses a recent development in university-level entrepreneurial education as an emphasis towards venture creation. Thus, entrepreneurial education with a focus on venture creation has implicitly the same intent as the third mission of the university – to contribute to future economic development stemming from new innovations. What has not been explored in depth is the utilisation of entrepreneurial educational platforms as a mechanism for university entrepreneurship (Pittaway and Cope, 2007), particularly in the form of venture creation and incubation. However, this is perhaps due to the potential challenges encountered when combining academic and business perspectives and objectives.

In Sweden, university researchers hold, independently, the responsibility of commercialising their research, differing from the large majority of university regulation around the globe, particularly the conceptual models developed in the USA[1] and copied in other industrialised countries. However, regardless of who owns the responsibility for commercialising research, there is an additional challenge to overcome the situation that the majority of university researchers are not interested in championing their ideas in the market place, as the entrepreneur, because they already have a decided career path within academia (Bosma and Harding, 2007).

Drawing upon the case of Chalmers School of Entrepreneurship (CSE), a combined masters-degree entrepreneurial education and incubator at a technical university in Sweden, this paper will address the challenges mentioned. Since 1997, CSE has successfully educated more than 250 aspirant entrepreneurs and, since 2001, incorporated more than 25 companies with a current market value of approximately 66MEUR[2]. The case of CSE is used to illustrate how education can be incorporated into university entrepreneurship activity in the form of incubation. It also helps to explore how entrepreneurial education can, in turn, benefit from integration into real-life venture creation.

Research regarding action-based entrepreneurial education at selected Swedish Universities, including Chalmers University and CSE, has been conducted in the past (Rasmussen and Sørheim, 2006; Jacob et al., 2003; Rasmussen and Sørheim, 2006). However, as pointed out by scholars (Pettigrew et al., 2001) more longitudinal, in-depth research is needed. As actors involved in the daily operations of CSE, we both recognise the need of the external evaluation conducted by other researchers, but also recognise the lack of more in-depth outcomes and effects of the education, which could perhaps be difficult for an outside researcher to assess or even identify. Thus, this paper will investigate the case of CSE from an insider's perspective, using insider action research methodology (Coghlan and Brannick, 2005; Roth et al., 2007).

This paper has two aims. The first aim is empirical, showing an academic environment that incorporates the creation of new ventures into a masters-level entrepreneurial education. Given the challenge of integrating these two, we feel that the empirical material merits discussion. The second aim is to address the gap in literature between university entrepreneurship and entrepreneurial education. Drawing upon existing research into entrepreneurial education, and building upon various learning philosophies, we formulate the following research question: What approach is needed to facilitate learning that integrates entrepreneurial behaviour and venture creation? Thus, the theoretical contribution of this paper is to show how entrepreneurial education contributes to the field of university entrepreneurship.

In the paper, we first present teaching approaches and learning philosophies to be utilised in combination when integrating entrepreneurial education with venture creation. Next, the methodology of the study is explained, followed by the empirical material. Finally, we discuss an approach to venture creation, from which conclusions and implications are drawn.

2 Entrepreneurial education: philosophies and approaches

Many scholars agree that higher entrepreneurial education has to have an experiential learning perspective together with some kind of interactive pedagogy in order to enhance learning and innovative capacity (Barrett and Peterson, 2000; Collins et al., 2006; Honig, 2004; Johannisson et al., 1998; Lundström and Stevenson, 2002; Vinten and Alcock, 2004; Yballe and O'Connor, 2000). Heinonen and Poikkijoki (2006) explore an entrepreneurial-directed approach that seems to be well suited for teaching entrepreneurial behaviour in a university setting, as it encourages students to broaden their perspectives, and also develop the entrepreneurial skills and behaviour required for their studies. This approach represents an experiential learning challenge to teachers and

students in that it decreases the predictability and control of the teaching situation, while increasing the interest in learning and teaching.

Gibb (1996) proposes an enterprising teaching approach that he argues as being essential for connecting conceptual knowledge to a range of entrepreneurial behaviours. Some of the key elements Gibb proposes are: a focus on process delivery, ownership of learning by participants, learning from mistakes, negotiated learning objectives and session adjustment and flexibility. Gibb claims this approach is successful because it creates:

a a learning environment which provides ownership, control, autonomy and customer-led rewards

b a holistic management and multi-disciplinary approach to teaching which is project and process-based

c a teaching style employing a wide range of learning processes such as conventional lectures, seminars, and workshops, focus groups, teaching of peers etc.

Overall Gibb (1996) claims that the enterprising approach stresses the importance of a focus upon the 'internalisation' of knowledge and the adoption of a definition for real learning, as stated by Maples and Webster (1980).

We recognise that an experiential teaching approach is essential as it draws focus to the importance of learning the process of acting entrepreneurially. However, we think that more is needed in entrepreneurial education to prepare individuals to start up a business. Even enterprise simulation lacks the sense of urgency and pressure created by real-world business situations, such as having multiple priorities and stakeholders, thus, leaving the student without a true-to-life experience. Thus, experiential teaching, while simulating reality, is still contained within the academic arena. Bringing entrepreneurial education together with incubation at the university and letting students create a venture as a part of their entrepreneurial education is, in this paper, proposed to be a successful way to develop entrepreneurs as well as new companies, because it incorporates the context of the real business world.

However, as mentioned before, integrating entrepreneurial education with incubation creates challenges. Traditional academic learning is strongly related with the ability to rationally identify and analyse situations and problems in order to give a specific answer (Collins et al., 2006; Gibb, 1993). Students are repeatedly tested in noticing when there is a problem, what the problem entails, searching for causes and/or reasons for the problem, and then, based on analysis, proposing answers. Even though there are schools and centres within academe that build on the rationale of bridging theory and practice, the learning philosophy behind most academic educations seems to be problem-oriented. However, it is known that entrepreneurs are action-oriented and therefore many entrepreneurship educations are adapting experiential learning approaches (Barrett and Peterson, 2000; Collins et al., 2006; Gibb, 1996; Lundström and Stevenson, 2002; Vinten and Alcock, 2004; Yballe and O'Connor, 2000).

A challenge educators' encounter in combining entrepreneurial education and incubation could be described by using Glassman's et al. (2003) discussion of balancing the Acropolis and the Agora: the Acropolis being the temple of accepted approaches to university [structure] and scholarship and the Agora representing the market of materialistic pursuits led by ungodly commercial interests. Acropolis is comparable to a learning philosophy focusing on traditional academic learning, as strongly connected

with problem-oriented thinking processes. What is needed is a learning philosophy that stimulates entrepreneurial behaviour, described by Glassman et al. (2003) as the Agora. A solutions-focus philosophy is proposed to fulfil this need since it stimulates behaviour that is commercially oriented (Caird, 1993; Gibb, 1996).

2.1 Solutions-focus learning philosophy

The solutions-focus philosophy is starting to be widely used in different settings such as therapy, management and education. This philosophy values simplicity and practicality. The focus on solutions rather than on problems, the future instead of the past and what is going well rather than what is going wrong, leads to a positive and applicable way of learning how to act entrepreneurially. Thus, the commercial-oriented behaviour necessary for business creation is recognised.

The solutions-focused brief therapy (SFBT) approach was founded by Steve de Shazer (Trepper et al., 2006) and focuses on client strengths resiliencies. There has been an increased interest in applying this approach to school settings (Franklin et al., 2001). In most cases, solutions focused philosophies and skills are used to engage the students in taking responsibility for their own learning process.

David Cooperrider (1990) differentiates between problem solving (PS) and appreciative inquiry (AI). PS includes identification of the problem, analysis of the causes, analysis and possible solutions and action planning. AI includes appreciating and valuing the best of what is, envisioning what might be, and dialoguing around what should be. Cooperrider (1990) argues that positive images, e.g., ideals and visions have a 'heliotropic effect' that is they energise and orient human behaviour toward the realisation of the ideal. People seem to put more energy and action when directed towards exploring what works rather than what does not.

Yballe and O'Connor (2000) present a pedagogical adaptation of AI called appreciative pedagogy (AP) by transferring AI's basic values into the classroom, in organisational behaviour and management classes. When faculty stay focused on inquiring into the success stories of students, highlight factors that made things work, identify the skills and know-how needed to repeat successful episodes and encourage students to focus on developing a few skills and acquiring the knowledge critical to success, the 'heliotropic' power of positive imagery leads to positive action. Yballe and O'Connor (2000) believe that AP has generated a number of good results regarding student learning, i.e., they have observed more energised and sustained interactions between students, students have a fuller and more hopeful view of the future and images of what they (students) can be, and students gain a greater trust in self and heightened confidence in their experience.

Barrett and Peterson (2000) claim that in the post industrial era, it is critical to have an organisational culture that promotes learning, renewal and innovation. The challenge is to promote the capacity to learn while doing, to jump into action without a pre-scripted plan, and to improvise new solutions to ill-formed problems. Barrett and Peterson (2000) present generative learning as different from adaptive learning that relies on traditional skills of problem solving. Generative learning involves an appreciative approach, an ability to see radical possibilities beyond the boundaries of problems as they present themselves. Typically, high performing systems understand and value this capacity. They transcend the limitations of what looks like reasonable solutions and consider

possibilities that cannot be considered when using a conventional analysis as in a problem solving approach. Barrett and Peterson (2000) state that when living in an appreciative framework, human systems develop this capacity. It is the challenge of teachers to facilitate the creation of such a culture for learning.

Accordingly this paper argues that by adopting a solutions-focused philosophy, educators support the aspirant entrepreneur to develop behaviours associated with venture creation [as proposed by Caird (1993) and Gibb (1996)] such as opportunity seeking, taking independent initiatives, actively seeking to achieve goals, coping with and enjoying uncertainty, taking risky actions, solving problems creatively, commitment to making things happen, flexibly responding to challenges and persuading others. Thus, balancing the two learning philosophies – *problem-oriented and solutions-focused* – enables educators to integrate entrepreneurial education and incubation.

3 Methodology of the study

This study has been based on the principles of insider action research (IAR) described by Coghlan and Brannick (2005) and Roth et al., (2007) as the generation of new scientific knowledge through the utilisation of contextual-based insights while simultaneously enabling continual and additional organisational capabilities. IAR concerns taking action and studying that action as it takes place, while also being part of the organisational setting in which the action is taken (Coghlan and Brannick, 2005). It is not just one single methodology, but rather includes a wide range of methods (Reason and Bradbury, 2001).

IAR was chosen in order to capture the in-depth dynamic of the integration of entrepreneurial education and incubation, recognised as not yet observed by outside researchers. As insiders, we have access to the broad spectrum of information that due to sensitivity, degree of trust, articulation, and other contextually-based challenges, outsiders would not have access to, and as such, we are not reliant upon espoused-theories (Argyris, 1991).

Common critique of insider action researchers is that they are too close to the data which they utilise in their studies, and as such, are potentially incapable of objective evaluation the data. This kind of critique is based on a historical model of research, in which the experimenter completely controls the variables that affect experimental outcomes and thus, is irrelevant in research were the contextual basis is part of the design (Shani et al., 2008).

This paper is based on a study that may be characterised as a case study (Yin, 1994) due to the rich empirical descriptions provided through a variety of sources for collecting data. The case can act independently as an analytic unit (Eisenhardt, 1989), contributing to emergent theory through the patterns of relationships and underlying logical arguments it provides, thus, bridging from qualitative evidence to deductive research (Eisenhardt and Graebner, 2007). Case study research is applicable as the intention is not to test existing theory, but develop a new learning approach based on the specific relationships and logic of the CSE environment.

3.1 Data collection and analysis

Data was collected over a period of time spanning from the Fall of 2005 through the Spring of 2007. During this period of time, three specific classes of students were present

at CSE: CSE05, CSE06 and CSE07. Specific information about these classes is presented as follows (see Table 1). During this same period of time, faculty associated to CSE included two incubation staff, two education specific staff (for the marketing and finance courses), and five core staff (engaged in school management, education, incubation and research) and one administrative staff.

CSE has an average class size of 18, and essentially the same amount of staff, except for the inclusion of the incubation staff in 2001. As researchers, we have been engaged as core staff in CSE since 1997 and 2004.

The main means for collecting data have been *participative observations*, individual interviews – a combination recommended by scholars such as Atkinson and Coffrey (2003), and *written documentation*. The participative observations provided general contextual-based knowledge of CSE and the interviews and written documentation provided specific reflections from the staff and the student perspectives. Quotes 1, 3a, and 3b are written documentation representing reflections from students. Quotes 2 and 4 are interviews, providing reflections from staff. The data is illustrated through selected quotes.

Table 1 Subject-base for study

Year	*Number of students*	*Men*	*Women*	*Number of teams (projects)**
CSE 2005	20	15	5	7 (13)
CSE 2006	23	20	3	8 (10)
CSE 2007	21	20	1	7 (12)

Note: *Sometimes, the venture on which the teams are working is not commercially viable, and thus the venture is shut down, and the teams start a new venture.

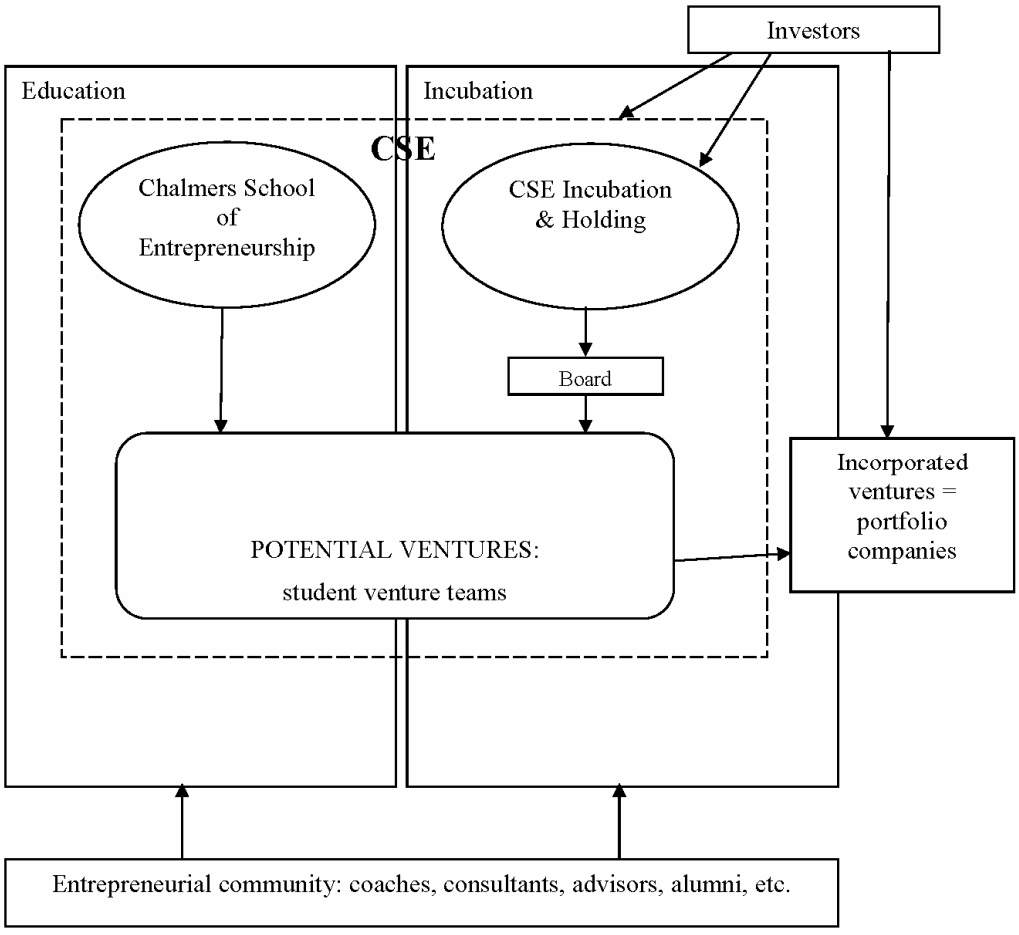
Participative observations are selected from multiple arenas, including but not limited to: staff meetings, school meetings, classroom activities (lectures, seminars and workshops), informal interactions within CSE, and specialised development conversations. Informal interviews have been conducted with staff members that have been engaged in coaching and debriefing meetings with students at CSE. Representative written documentation is taken from emails and assignments, which are part of a broader collection of documentation including written educational assignments, journals, newsletters, and emails (between both student and staff, and staff and staff).

Based on the method of insider action research, data is collected from the daily conduct of CSE, instead of being specifically designed. We analysed the data available to us and selected quotes from students and staff that illustrate and exemplify the dynamic and integration between incubation and entrepreneurial education. One perceived limitation could be that data is specific to the defined period of study: Fall 2005 to Spring 2007. However, as researchers acting also as core staff at CSE since 1997/2004, we are able to confirm that the period is representative of the entire historical period of CSE, particularly since 2001, when the specialised incubator was introduced.

4 Integrated entrepreneurship education and venture creation – the case of CSE

In the mid-1990's, individuals at Chalmers University of Technology[3] recognised the need for stimulating entrepreneurial activity and bridging the gap between inventors with ideas and the marketplace. It became apparent that most existing entrepreneurship programs were focused on teaching about entrepreneurship, rather than actually developing entrepreneurs. The result, in 1997, was the creation of CSE: a combined masters-level education and incubator, added in 2001, environment developing both entrepreneurs and ventures. The core design at the inception of CSE was aligning a team of students, specifically admitted due to an expressed predisposition and/or interest towards entrepreneurial activity, with technology-based ideas, recruited to and contractually conjoined with CSE with the purpose of being developed into ventures. The education is based on action-based learning, where students are given a foundation in theoretical and practical knowledge which they utilise while creating their real-life ventures, in which they have an ownership stake[4]. The student teams are supported by educators, practitioners, coaches, investors and business advisors, collaborating to fill the needs of both student and venture.

Figure 1 CSE organisational structure



Due to legal requirements, there is a need for certain structural designs that establish some boundaries between academic and business organisations, in this case, Chalmers University of Technology and the business organisation that owns the portfolio of CSE companies (presented as the education and incubation 'boxes' in Figure 1). However, actors associated to these organisations are co-located in a single working and teaching environment, co-contribute, and have a shared responsibility for CSE (presented as the dashed line 'box' in Figure 1). The student team ventures have incubation office space located next to the CSE working and teaching environment, thus, allowing for education to be conducted simultaneous to the incubating of the ventures. The masters-level degree education, delivered over 1½ years[5] utilises the venture as a core stimulus for learning. Common entrepreneurial education and incubation practices are utilised as a foundation for integration activities, and then adapted due to their specialised needs.

The introductory year is preparatory, mixing theory with simulation exercises, under the pretext that the students build a basic entrepreneurial skill set prior to the action-based learning within the ventures and the venture teams. The mixture of theory and application, particularly during the first one-half year, mirrors more traditional and 'accepted' approaches to teaching entrepreneurship. Grading is based on a combination of individual and group assignments, tests, and presentations. However, even at this early stage of the education, there is an attempt to integrate real-world aspects through role play exercises, lectures and cases based on companies previously incubated through CSE, and writing a business plan on a former CSE venture idea.

At the same time that the students are in the introductory year period, incubator focused staff of CSE have the main responsibility of recruiting and screening ideas that could be formed into ventures during the project year. There are multiple criteria used to assess the potential ventures, most of which are to ensure fit with the holistic design of CSE, including the joining of student teams to the ventures to enable learning about technology-based entrepreneurship and business creation, ensuring ownership potential, and commercialising research. This makes the screening critical for the integration of entrepreneurial education and incubation.

In the beginning of the project year, the first critical integration activity takes place, when the students, as a class, select their venture ideas and are formed into venture teams of two to three students. The team formation process is conducted over a two week period. During this period, the students are presented the finalised group of ventures that have been screened by the incubator staff. Knowing that the class will be divided into teams of two to three persons, the class as a whole selects a certain number of ventures to be incubated. The students then, individually, communicate their three preferred ventures, and the individuals within the class with whom they would like to work with for each venture. Based on this, the staff forms venture teams, taking into account both the communicated interest of the students, but also, equally as important, the needs of the venture. Team formations are final. Once teams are formed, contractual agreements are set in place.

There are multiple agreements necessary to enable incubation integrated with education, including agreements regarding intellectual property, disclosure and ownership. One of the critical agreements is a contractual trilateral agreement binding the researcher providing the idea to the venture, both as a means to ensure engagement to the learning process for the venture team and continued contribution to development of the venture idea, such a board meeting participation, and to define ownership, both of the

venture and the background intellectual property. Each venture/student team is provided with a business developer from the incubator, representing the ownership share of the incubator. The students, researcher(s), incubator, and sometimes chairman of the board all own shares in the venture, should it be incorporated after 'graduating' from CSE, with no single party owning greater than a 49% share of the venture, and with a certain percentage of shares allocated for future engagement of professionals. The structure of the agreements ensures both professional handling of the information and to ensure the learning position for the students. Should a venture be terminated, the idea is returned to the idea provider, and the student team is provided with a short-list of new potential ventures from which to select their next venture to incubate during the project year.

The incubator provides certain support and services to the ventures. First the venture teams are provided with seed-financing to facilitate initial start-up activities, such as verification of the idea's technology, prototype development and/or patent application. The students are given an initial amount of capital at the beginning of the project year, with the potential to apply for additional seed-capital, should they be able to attract matching funds to the venture. Office space and services are provided for by the incubator and located adjacent to the education and staff environment. Space and services include printing, copying, fax, telephone, utilities, computer support, working and meeting space, etc. The student venture teams are responsible for the office space and facilitates allocated to them.

During the project year, education is delivered mainly through four courses, focused on strategy, finance, marketing and leadership. The grading differs slightly from course to course, but again is mainly based on individual and group assignments and presentations. The finance course may also include testing. The main shift from the introductory year education is that deliverables are based, as much as possible, upon the current or future requirements of the real-life venture – i.e., deliverables are for both educational and venture creation purposes. Using the ventures as the core learning object is one of the key integration activities, because it integrates the incubation of the venture with learning about the entrepreneurial process of developing the venture. Integration also takes place through the delivery of a Master thesis. The Master thesis is broken into three main sections – a technology study, a market study and a business plan.

5 Challenges for students and educators

Creating new ventures extends beyond the conventional activities often presented in entrepreneurial educations. Integrating education and incubation presents challenges for both students and educators, such as determining which activities should take precedence, designing classroom lectures that balance academic requirements with commercial needs, or balancing stakeholder needs, among others. Periodically this means that students have both academic and business deliverables during the same period. In the following excerpt from a student diary the student reflects upon an assignment:

> "I do think that (assignment X) would have done more good if the feedback got back before the (Business Plan) hand-in ... For me, however, (assignment X) was a hand in that forced me to focus on important stuff that I wouldn't have prioritised since we have a lot of other things to do. When I think of it in that way the feedback is of less importance because the important part, forcing me,

> is already done and a lot of the thoughts ended up in the (Business Plan) anyway." (Quote 1)

The educator requires the student to perform an assignment about the venture that the student felt 'forced' to do and otherwise 'wouldn't have prioritised'. The educator's objective is to *facilitate a learning process* where the academic assignment aligns with the business plan, and in turn, the student comes to appreciate the value of the assignment as contributing towards the business plan. Thus, instead of being perceived as achieving separate goals, the assignment and the business plan are seen as integrated and supporting one another.

Integrating education and incubation means that one can have *multiple stimulators of learning* besides the educator and the student. The following quote from a teacher describing a discussion with a venture team regarding the technology section of their Master thesis:

> "Students from project alpha came to me to discuss a strategic decision they wanted to make for their company. The technological functionality, upon which the innovation was based, while critical to the product outcome, was not the core customer value to be communicated. The way in which the team felt they needed to conduct their business was based upon an approach towards customers that did not necessarily care about how the product was actually created (and thus the technology behind that creation), instead of an approach that directly communicated the value of the project's IP and technology. This essentially changed the strategic direction of the business model for the company from the educational norm, which meant that many of the academic as well as real-world exercises had to take a dramatic shift. The student team communicated that they felt this was critical to the success of their project, though they wanted to find some security in going forward with a plan of action that would deviate from much of the advice they received from various stakeholders, though aligning with advice from other stakeholders. I sensed I had to, in a way; give them the push on the shoulder that they needed to proceed." (Quote 2)

The above quote shows how the student team had already recognised the need to change the business strategy based on interaction with their stakeholders before coming to talk to the educator. While the students take the initiative to request changing the direction of the Master thesis, they are not comfortable taking the risk to enact the change independently. The educator recognises the need to give the students more confidence in taking risks, thus, supporting behaviour associated with business creation. The students are *seeking and co-creating knowledge* together with the educator.

Sometimes activities related to the venture clash with lectures or other classes. The next excerpt is from a student that missed a negotiations lecture in order to attend a venture related meeting, and instead was required to submit a two-page assignment of descriptions and reflections based upon the real sales 'negotiation' conducted with the company in the meeting.

> "During the start of the meeting, we did our 15 minute presentation and got some questions during the time but mainly the people from Company X sat quiet. After the presentation the first reflection we got was that we need to rearrange our presentation in order to get a sell on something. There should be a focus on the things we actually came down to discuss, not on our education as such and the project we are running. When they mentioned this it felt more or less obvious still before the negotiation we thought it would be best to give a thorough background description about why we where there but apparently this

> is not as valuable as one would think. … Here it is easy to reflect upon that we as a team from CSE might have been a bit naïve about how we interpreted Company X. …We should of course have thought about different turns that the negotiation could take and discussed how we should act during the different circumstances." (Quote 3a)

Because the activities of the venture creation are organic and linked to the realistic development of a commercial-able idea, *learning outcomes can emerge from real experiences* encountered by the students in the context of the ventures, thus, *creating new learning opportunities*. It is in these situations that the teacher needs to support learning from the emerging situation and re-define a pre-defined exercise.

The next situation shows another specialisation of the integration of education and incubation. Not only is the value experience from the education integrated into a real-world situational learning, but the experiential learning from the student provides an educational opportunity for the educator. The real time application made the learning process more contextual for the student, as seen in a written assignment:

> "The (educational) exercise took its start from our (venture) project and the contact we have taken with Company X ... The class was divided into two teams, us and Company X, and the arguments and goals for the role play negotiations was decided individually by the two teams. The exercise showed in a powerful way the meaning of thinking in the ways of the opponent and try to see what they are aiming at and the values they have. We will for sure use this in upcoming situations, where much is at stake. Just knowing about it is a start." (Quote 3b)

The quotes regarding the negotiation with Company X illustrate a series of learning processes, where a student applies classroom learning to a real experience in order to fulfil missing a classroom lecture. The supplementary assignment becomes a relevant item for a future teaching tool, and is incorporated into a negotiation role play exercise. The ability to relate to the role play situation and test multiple situations through the exercise leads to an appreciated learning and reflection.

Sometimes the students take on the entrepreneurial challenge themselves, reaching out to industry partners and contacts to help develop the venture, the challenge sometimes then is to balance the venture focused activity of the students with a re-anchoring to the educational foundation, providing some time and space for analysis and reflection. As one teacher expressed this regarding a male student:

> "John was the core driving force behind project delta – there was no question of his entrepreneurial drive and vigour for the progression of the project. He was quite talented in networking and bringing together key personnel and really understanding the needs of making the business grow. However, he was so caught up in driving the project that it was consuming him. He became increasing reliant on his team-mates, Mary and Steve, to anchor his activities, help him capture and organize in written and illustrative form the critical needs, next steps, and longer term objectives of the project. We had countless talks through the course of the education, both one-on-one and in a group about how to attempt to balance activities, allow time for reflection and summarization while at the same time increasing efficiency and effectiveness of the project and educational activities. All the educators had to find ways to help project delta, with John in particular, align their daily deliverables to educational assignments, sometimes in specialized formats, with the hope that this allowed for some reflection and longer-term thinking without killing the entrepreneurial drive." (Quote 4)

The environment is designed to allow students to take the *chance to make mistakes, and even encourages mistake to be made*, in order to push boundaries, and otherwise test set limitations of current thought, while supported by a network of classmates, alumni, staff and external partners. As illustrated by the case of John, the *educator needs to increase the tension*, restraining the student from focusing too much on the entrepreneurial opportunity, to the detriment of developing the venture, through adapting more traditional academic learning and illustrating the value of theoretical knowledge. At the same time, the educator has to determine how to align the education deliverables to John's heightened focus on the venture to ensure that he completes the education. The risk the educator takes is that the student does not in fact gain enough academic-based learning, such as the application of particular known and proven business theories, as is required in order to receive a degree. This requires recognising when flexible mechanisms for learning assessment can be utilised and adapted to situations, and when the more established methods of assessment, such as exams, are still to be enforced.

6 The venture creation approach to facilitating learning

A perspective on facilitating entrepreneurial behaviour through academic education is highly relevant. Existing literature on entrepreneurial education suggests that teaching entrepreneurs requires an enterprising approach (Gibb, 1996). However, we argue that in order to go beyond stimulating entrepreneurial behaviour to also include venture creation, and thus, support sustainable entrepreneurial behaviour, a real-life oriented teaching approach is needed. Building on Gibb's (1996) ideas, we propose a venture creation approach, based on empirical material from the study of the CSE case.

The quotes and reflections presented above can be interpreted in multiple ways, offering several possibilities. First, the quotes and reflections illustrate the opportunities and challenges that emerge when integrating university entrepreneurship and entrepreneurial education. The core opportunity provided is the use of educational platforms to stimulate university entrepreneurship activities, such as the development of new ventures from university research, with the core challenge being to ensure that tangible results are produced and sustainable. Next, the quotes illustrate how academic and business perspectives are utilised to support learning. Educators are using the traditional academic problem-oriented learning philosophy (Collins et al., 2006; Gibb, 1993) to promote reflection, analysis and understanding, as well as the creative solutions-focused learning philosophy (Barrett and Peterson, 2000; Cooperrider, 1990; Yballe and O'Connor, 2000) to promote students to seek opportunities, take initiatives, take risks, and flexibly respond to challenges. These promoted actions support behaviour associated with business creation, as described by Caird (1993) and Gibb (1996). The study suggests that through a balance of these two learning philosophies, both educational and incubation activities can be supported, allowing for integrated development of entrepreneurs and new ventures.

Our analysis of the data has led us to key elements, formulated into a venture creation approach (Table 2). This approach is allowing the entrepreneurial student the opportunity to 'test the water' – to go through real-life entrepreneurial and business activities in order to learn by doing, reflect upon actions taken, develop decision-making processes and prioritise activities, all with the intent of successfully creating new ventures. At the same

time, students are constantly directed and coached towards reflecting upon their real-life incubation experiences by means of theoretical concepts that they have learnt, hence considering both problems to avoid and opportunities to create in social situations (Barrett and Peterson, 2000). By improving their ability to use theory to reflect while being in situations, i.e., *reflection-in-action*, the students are becoming reflective practitioners (Schön, 1983) utilising reflective leadership (Ollila, 2000). It could also be argued that a venture creation approach is enabling 'internalisation' of knowledge (Maples and Webster, 1980).

A venture creation approach demands a learning environment that is 'reality', but, that reality must still allow room for reflection. Allowing too much flexibility in the education, i.e., letting the student too loose in Glassman's et al. (2003) Agora, takes away from the credibility of the education system accrediting the educational degree. Too much flexibility could also limit the availability of future entrepreneurial opportunity because of the need to attract additional ventures to the educational environment, hold credibility among the stakeholders supplying the ideas, and provide guidance to the venture. If the venture only operates towards business objectives, not allowing for 'academic' reflection and problem analysis, there may be missed learning and development opportunities. As a result, the venture could fail in the long-term.

Table 2 Combining and building upon conventional and enterprising approaches to develop a venture creation approach to learning

*Conventional approach**	*Enterprising approach**	*Venture creation approach*
Major focus on content	Major focus on process delivery	Major focus on reflection-in-action
Led and dominated by teacher	Ownership of learning by participant	Learning facilitated by integrated environment
Expert hands-down knowledge	Teacher as fellow learner/facilitator	Multiple learning stimulators
Participants passively receiving knowledge	Participants generating knowledge	Participants seeking and co-creating knowledge
Sessions heavily programmed	Sessions flexible and responsive to needs	Sessions emerging from venture related activities
Learning objectives imposed	Learning objectives negotiated	Learning objectives emerging through reflection
Mistakes looked down upon	Mistakes to be learned from	Mistakes encouraged
Emphasis upon theory	Emphasis on practice	Emphasis on creation
Subject/functional focus	Problem/multidisciplinary focus	Combination of problem-oriented and solutions-focused

Source: *First two columns from Gibb (1996)

The study also shows that to apply the learning approach needed for integration, educators must understand how the tension exists in reality. This means that educators facilitate and/or partake in real-world activities while also *bringing in complementary actors*, such as different academics, investors, idea providers, practitioners, etc. from other arenas other than merely differentiated educational disciplines. The same holds true for the incubators – that they must understand and continually take into account the

learning requirements to fulfil not just the development of the venture, but of the individuals that will drive the venture forward.

Barrett and Peterson (2000) also discuss that humans create an ability to see radical possibilities beyond the boundaries of problems when an appreciative framework is established. As the empirical material illustrates, learning gained from creating a venture involves not always knowing from the start what the learning objectives of a certain activity are to be. Rather the *learning objectives emerge* from the reflections that the students have themselves and discuss with educators. The ability to gain from emerging situations requires that both students and educators recognise, believe in, and appreciate knowledge, sometimes developed outside of pre-determined structures. The venture's need to gain commercial credibility through market interaction facilitates the environment in which these situations can emerge.

A venture creation approach is just one potential for integration of university entrepreneurship and entrepreneurial education activities. Certainly, other forms of integration are possible, such as innovation system environments and understanding financial valuation or technology transfer activities and developing licensing models. Regardless of the integrating elements (incubation, licensing, etc.), all actors involved must take an active role in developing and upholding the integration, in order to ensure that the approach utilised reinforces the activities they are attempting to achieve. Also, it is important to align the entrepreneurial education focus with the intended outcome of the university entrepreneurship activity. In the case of CSE, venture creation was the common objective.

The way in which the integration is viewed is highly dependent upon the position from which the perspective is taken (i.e., recognising integration will be different for a regional development officer, compared to a faculty member). Thus, it is important for further research to address the potential integration of university entrepreneurship and entrepreneurial education from multiple stakeholder perspectives, such as the university innovation system, university management, regional development agencies, and investors, in order to create more knowledge about how the venture creation approach is contributing to closing the gap between the two.

Our findings build from the case of CSE, created in one particular context. However, we assume that this approach could be applied in other educational settings were the objective is to both develop theoretical knowledge as well as drive change. Future research could focus on other examples of integration to further develop the ideas of this paper.

7 Conclusions

This paper contributes both independently to theory within entrepreneurial education, but also reduces the gap between university entrepreneurship and entrepreneurial education. Reporting from a study of a Swedish master-degree entrepreneurial education, the paper suggests that integrating university entrepreneurship and entrepreneurial education contributes to economic development by creating both ventures and stimulating entrepreneurial behaviour. The challenges encountered when combining academic and business perspectives need to be carefully handled by the actors facilitating learning in such an integrated environment. The paper argues that the existing approaches, focusing

on traditional lectures or simulating enterprising, are not sufficient for this matter. The study suggests that a venture creation approach, adding reality as well as reflection-in-action to the education, is essential when having the objective of creating both entrepreneurs and ventures. In addition, the findings show that the venture creation approach manages this because it supports both conventional problem-oriented academic thinking and commercially oriented solutions-focused thinking.

References

Argyris, C. (1991) 'Teaching smart people how to learn', *Harvard Business Review*, May–June, pp.99–109.

Atkinson, P. and Coffrey, A. (2003) 'Revisiting the relationship between participant observations and interviewing', in Gubrium, J.F. and Holstein, J.A. (Eds.): *Post Modern Interviewing*, pp.109–122, Sage, London, Thousand Oaks, CA and New Delhi.

Barrett, F.J and Peterson, R. (2000) 'Appreciative learning cultures: developing competencies for global organizing', *Organization Development Journal*, Vol. 18, No. 2, pp.10–20.

Bosma, N. and Harding, R. (2007) 'Global entrepreneurship monitor', GEM 2006 Results, Babson College and London Business School, London, retrieved from the web, available at www.gemconsortium.org.

Caird, S.P. (1993) 'What do psychological tests suggest about entrepreneurs', *Journal of Management Psychology*, Vol. 8, No. 6, pp.11–20.

Coghlan, D. and Brannick, T. (2005) *Doing Action Research in your Own Organization*, Sage, London, UK.

Collins, L.A., Smith, A.J. and Hannon, P.D. (2006) 'Applying a synergistic learning approach in entrepreneurship education', *Management Learning*, Vol. 37, No. 3, pp.335–354.

Cooperrider, D. (1990) 'Positive image, positive action: the affirmative basis of organizing', in Srivastva, S. and Cooperrider, D.L. (Eds.): *Appreciate Management and Leadership: The Power of Positive Thought and Action in Organizations*, pp.91–125, Jossey-Bass, San Francisco.

Eisenhardt, K. (1989) 'Building theories from case study research', *Academy of Management Review*, Vol. 14, No. 4, pp.532–550.

Eisenhardt, K. and Graebner, M. (2007) 'Theory building from cases: opportunities and challenges', *Academy of Management Journal*, Vol. 50, No. 1, pp.25–32.

Etkowitz, H., Webster, A., Gebhardt, C. and Terra, B.R.C. (2000) 'The future of the university and the university of the future: evolution of ivory tower to entrepreneurial paradigm', *Research Policy*, Vol. 29, No. 2, pp.313–330.

Etkowtiz, H. (2004) 'The evolution of the entrepreneurial university', *International Journal of Technology and Globalisation*, Vol. 1, No. 1, pp.64–77.

Finkle, T. and Deeds, D. (2002) 'Trends in the market for entrepreneurship faculty, 1989–1998', *Journal of Business Venturing*, Vol. 16, No. 6, pp.613–630.

Franklin, C., Biever, J., Moore, K., Clemons, D. and Scamardo, M. (2001) 'The effectiveness of solution-focused therapy with children in a school setting', *Research on Social Work Practice*, Vol. 11, No. 4, pp.411–434.

Gibb, A.A. (1993) 'Enterprise culture and education: understanding enterprise education and its links with small business, entrepreneurship and wider educational goals', *International Small Business Journal*, Vol. 11, No. 3, pp.11–34.

Gibb, A.A. (1996) 'Entrepreneurship and small business management: can we afford to neglect them in the twenty-first century business school?', *British Journal of Management*, Vol. 7, No. 4, pp.309–321.

Glassman, A.M., Moore, R.W., Rossy, G.L., Neupert, K., Napier, N., Jones, D.E. and Harvey, M. (2003) 'Academic entrepreneurship: views on balancing the acropolis and the agora', *Journal of Management Inquiry*, Vol. 12, No. 4, pp.353–374.

Heinonen, J. and Poikkijoki, S-A. (2006) 'An entrepreneurial-directed approach to entrepreneurship education: mission impossible?', *Journal of Management Development*, Vol. 25, No. 1, pp.80–94.

Honig, B. (2004) 'Entrepreneurship education: toward a model of contingency-based business planning', *Academy of Management Learning & Education*, Vol. 3, No. 3, pp.258–273.

Jacob, M., Lundqvist, M. and Hellsmark, H. (2003) 'Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology', *Research Policy*, Vol. 32, No. 9, pp.1555–1568.

Johannisson, B., Landström, H. and Rosenberg, J. (1998) 'University training for entrepreneurship – an action frame of reference', *European Journal of Engineering Education*, Vol. 23, No. 4, pp.477–496.

Katz, J. (2003) 'The chronology and intellectual trajectory of American entrepreneurship education 1876–1999', *Journal of Business Venturing*, Vol. 18, No. 2, pp.283–300.

Lundström, A. and Stevenson, L. (2002) 'One the road to entrepreneurship – Vol. 1 of the entrepreneurship for the future series', *Forum för Småföretagsforskning, FSF 2002*, p.2.

Maples, M.F. and Webster, J.M. (1980) 'Thorndike's connection', in Gasda, G.M. and Cossins, R.J. (Eds.): *Theories of Learning: A Comparative Approach*, F.E. Peacock, Itasca, IL.

McMullan, W.E. and Long, W.A. (1987) 'Entrepreneurship education in the nineties', *Journal of Business Venturing*, Vol. 2, No. 3, pp.261–275.

Menzies, T.V. (2004) 'Are universities playing a role in nurturing and developing high-technology entrepreneurs?', *Entrepreneurship and Innovation*, Vol. 5, No. 3, pp.149–157.

Mowery, D.C. and Sampat, B.N. (2005) 'The Bayh-Dole Act of 1980 and university-industry technology transfer: a model for other OECD governments?', *Journal of Technology Transfer*, Vol. 30, Nos. 1/2, pp.115–127.

Ollila, S. (2000) 'Creativity and innovativeness through reflective project leadership', *Creativity and Innovation Management*, Vol. 9, No. 3, pp.195–200.

Pettigrew, A., Woodman, R. and Cameron, K. (2001) 'Studying organizational change and development: challenges for future research', *Academy of Management Journal*, Vol. 44, No. 4, pp.697–713.

Pittaway, L. and Cope, J. (2007) 'Entrepreneurship education – a systematic review of the evidence', *International Small Business Journal*, Vol. 25, No. 5, pp.479–510.

Rasmussen, E. and Sørheim, B. (2006) 'Action-based entrepreneurship education', *Technovation*, Vol. 26, No. 2, pp.185–194.

Reason, P. and Bradbury, H. (2001) *Handbook of Action Research*, Sage, Thousand Oaks, CA.

Roth, J., Shani, A.B. and Leary, M.M. (2007) 'Insider action research: facing the challenges of new capability development within a biopharma company', *Action Research*, Vol. 5, No. 3, pp.41–60.

Rothaermel, F.T., Agung, S.D. and Jiang, L. (2007) 'University entrepreneurship: a taxonomy of the literature', *Industrial and Corporate Change*, Vol. 16, No. 4, pp.691–791.

Schön, D. (1983) *The Reflective Practitioner: How Professionals Think in Action*, BasiAshgate ARENA, Aldershot, UK.

Shani, A.B., Mohrman, S.A., Pasmore, W.A., Stymne, B. and Adler, N. (2008) *Handbook of Collaborative Management Research*, Sage, Thousand Oaks, CA

Solomon, G. (2007) 'An examination of entrepreneurship education in the United States', *Journal of Small Business and Enterprise Development*, Vol. 14, No. 2, pp.168–182.

Tassey, G. (2005) 'The disaggregated technology production function: a new model of university and corporate research', *Research Policy*, Vol. 34, No. 3, pp.287–303.

Trepper, T.S., Dolan, Y., McCollum, E.E. and Nelson, T. (2006) 'Steve De Shazer and the future of solution-focused therapy', *Journal of Marital and Family Therapy*, Vol. 32, No. 2, pp.133–139.

Vinten, G. and Alcock, S. (2004) 'Entrepreneuring in education', *The International Journal of Education*, Vol. 18, Nos. 2/3.

Yballe, L. and O'Connor, D. (2000) 'Appreciative pedagogy: constructing positive models for learning', *Journal of Management Education*, Vol. 24, No. 4, pp.474–483.

Yin, R.K. (1994) *Case Study Research: Design and Methods*, 2nd ed., Sage Publications, Thousand Oaks, CA.

Notes:

1 See the US enacted the Bayh-Dole act (PL 96-517: The Patent and Trademark Act of 1980, with additional amendments PL 98-620 in 1984). There has been substantial discussion in the *Journal of Technology Transfer* and others.

2 To see a digital version of the report, go to www.entrepreneur.chalmers.se.

3 Chalmers University of Technology was founded in 1857 and houses 16 institutes. Chalmers provides education at the undergraduate, graduate and doctoral levels and has approx. 10,000 students (December 2007), 1,433 faculty and 704 administration.

4 Ownership, in the form of equity, is not enacted until the venture is incorporated, which can take place, at the earliest, after the educational degree is granted. The ownership structure is contractually stipulated in a collaboration agreement at the initiation of the venture (in project form), during the education.

5 In September of 2007, the education was expanded to 2-years, in accordance with the Bologna process.

Paper IV

Entrepreneurial positioning

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Abstract

Purpose - The purpose of the article is to examine the development of entrepreneurial behaviour as individuals engage in the entrepreneurial process.
Design/methodology/approach - Interactions between nascent entrepreneurs and surrounding actors (role-set) are used to explore development of entrepreneurial behaviour. Within a select environment, two teams of nascent entrepreneurs are studied for a period of 15 months, as they incubate a potential new venture. A narrative approach is used to analyze data collected through participant observation, documentation and interviews. Positioning theory is used as an analytic approach to explore social interaction.
Findings - Entrepreneurial behaviour is developed as rights and duties around the creation of a venture are negotiated through positioning. The series of positions taken, accepted, rejected and/or refined develops the behaviour of the individual in establishing legitimacy towards the entrepreneurial role.
Research limitations/implications - The research is defined to a specific contextual setting, but provides insight into the process of entrepreneurship as it is on-going, an area of research not well understood.
Practical implications - Evaluation of what is being said and done, as compared to an assigned role, allow for focus on entrepreneurial behaviour which distributes capability of entrepreneurial action beyond those individuals initially deemed entrepreneurs. Policies and investment into entrepreneurial training can address a broader spectrum of individuals, with returns not only from those taking on entrepreneurial roles, but from those who have learned to behave entrepreneurially, applied to other settings.
Originality/value - The paper is based on process study research, investigating micro-behaviours and impact of interaction with surrounding stakeholders as a venture is being formed, complementing existing large-scale studies.

Keywords Entrepreneurs, Development, Discourse, Start-ups, Narrative

Paper type Research paper

1.0 Introduction

Entrepreneurial behaviour can be defined as an individual phenomenon developed over time, through a process of organizational emergence (Reynolds, 1997), resulting in the creation of a new venture (Gartner and Carter, 2003). Successful achievement of entrepreneurial behaviour is considered to be impacted by the dynamics of the environment (Ensley et al., 2006). Recognizing the importance of environment, it is argued that facilitating an 'in-process' transition from role to reality, where 'words become deeds' (Gartner, 1993), helps nascent entrepreneurs shape their reality of becoming an entrepreneur (Fletcher and Watson, 2007). If this is so, the development of entrepreneurial behaviour ought to be viable through dynamically engaging with an environment that involves actively pursuing an entrepreneurial process.

While understanding the process is considered the 'key' to understanding entrepreneurship (Bygrave and Hofer, 1991), is not clearly understood (Aldrich and Martinez, 2001, Gilbert et al., 2006). Entrepreneurship is often not recognized until a result is achieved (Aldrich and Ruef, 2006), thus investigating entrepreneurial activity as it occurs has also proven difficult. Empirical studies into the process are somewhat limited, with exceptions including Bhave (1994), Reynolds with various colleagues (Reynolds and Miller, 1992, Carter et al., 1996, Reynolds et al., 2004), Baron (2002, 2007), and Liao and Welsch (Liao and Welsch, 2008). Research has shows that the process does not follow one concise or particular path (Katz and Gartner, 1988, Gartner and Carter, 2003, Alsos and Kolvereid, 1998), and authors like Aldrich and Van de Ven and Engleman call for event-driven research (Van de Ven and Engleman, 2004) in order to understand not only the outcomes of the process, but also actions taken as the process is on-going.

However, a growing stream of research is attempting to investigate and better understand nascent entrepreneurship as it occurs (Chandler and Lyon, 2001), mainly through large-scale, systematic studies, such as the Panel Studies of Entrepreneurial Dynamics, also known as PSED (Reynolds et al., 2002, Reynolds, 2007). Argument for these kinds of studies claim that understanding the development of on-going venture creation and/or incubating firms, if statistically representative samples are used and evaluated over time, is a central development in entrepreneurship research (Davidsson,

2006). However, investigations into these studies are often challenged by heterogeneity, under coverage, time frame between assessments, attrition (Davidsson, 2006) and random walks (Henderson et al., 2009). Results which are often marked with limitations such as survival bias (Gartner and Carter, 2003) and hindsight-bias (Cassar and Craig, 2009), and it is recognized that these results have not captured understanding about the micro-behaviours of the situational context, including impact of interaction with surrounding stakeholders (Gartner and Carter, 2003).

The purpose of the article is to examine the development of entrepreneurial behaviour as individuals engage in the entrepreneurial process. Interactions between nascent entrepreneurs and surrounding actors (defined as a role-set), are analyzed by means of positioning, as a new venture is created. The intention is to complement existing large-scale longitudinal studies through qualitative investigation into micro-behaviours of a selected environment, claimed as operating in a nascent phase and engaging in the entrepreneurial process, here defined as new venture creation. Positioning, defined as discursive construction of social acts in relation to rights and duties, is used as a tool for understanding interactions that influence behaving entrepreneurially. A narrative approach is used to analyze data collected through participant observation and interviews of nascent entrepreneurs and their role-sets. Analysis of the interactions is used to illustrate how the acceptance, refinement, and dismissal of positions granted and claimed, through negotiated rights and duties, influences legitimacy towards the role of entrepreneur. Understanding the impact of positioning experienced by the nascent entrepreneurs in relation to others could allow for mechanisms to facilitate development of entrepreneurial behaviour in various settings.

2.0 Theory

2.1 Developing Entrepreneurial Behaviour

Behaviour is considered as the most basic human action, dealing only with what can be seen or manipulated and can be defined as a function of individual and environment (Lewin's Equation [1939] in Sansone, Morf and Panter, 2004, p 119). Human behaviour is mainly developed through observation, imitation and modelling, and, in a social context, is based on continuous interaction between the individual and the

environment in which she operates – a phenomenon described as Social Learning Theory (Bandura, 1977). In a social context, according to Albert Bandura's concept of reciprocal determinism (1978), an individual's actions can affect her surrounding environment, which in turn can influence behaviour (and vice versa), expectations regarding outcomes within certain situations can impact an individual's decisions and attempts to change actions, thus impacting self-efficacy (Bandura, 1982). It is generally accepted that understanding behaviour in an organizational context can improve the ability to more accurately predict what may occur and explain what does occur, and thus can facilitate decision making (Bratton et al., 2010). In entrepreneurship research, this aligns with the decision making process discussed in Creation Theory (Alvarez and Barney, 2007) that the entrepreneur engages in when bearing uncertainty. The entrepreneur tests hypotheses in the marketplace in order to gain feedback, informing onward going decision making until the opportunity pursued is successful. The knowledge gained from going through the process of testing and decision making results in the differentiation that is recognized between individuals who are considered entrepreneurial and those who are not, conceptually understood as effectuation (Sarasvathy, 2001). The experience of being entrepreneurial – actions that lead to achieving entrepreneurship - is considered critical to import some of the knowledge, skill and attitude of an entrepreneur (Fletcher and Watson, 2007, Souitaris et al., 2007).

Carsrud and Johnson's (1989) propose that entrepreneurial behaviour is determined by social context and situations, including role-sets (Aldrich and Zimmer, 1986) and patterns of social interaction in relation to specific resources. According to Carsrud and Johnson (1989) the entrepreneur's role-set may include family members, financiers, partners and distributors. In this article, the role-set defined to include advisors and coaches as well. Descriptions of the role-set are presented in Table 1 (section 3.1).

2.2 Entrepreneurial learning

Reynolds (2007) found that both business classroom learning and practical experience are factors common both to entering the nascent process and to creating a new firm. Heinonen and Poikkijoki (2006) propose that university entrepreneurial education can be utilized to integrate the learning of entrepreneurial skills and attributes with

behaviour. Experiential learning (Kolb, 1984) and learning by doing (Cope and Watts, 2000) are fundamental processes of knowledge development for individuals striving to become entrepreneurs (Gibb, 1996, Vinton and Alcock, 2004).

A specific method for entrepreneurial learning by doing, proposed by Ollila and Williams-Middleton (In press) integrates education and incubation activities. This is seen as a way to introduce risk, opportunity recognition, marshalling of resources and other subjects common to entrepreneurial learning (Mwasalwiba, 2010), as well as incorporating the relationships of the role-sets, such that experiential learning involves co-participation through on-going negotiated decision making resulting in entrepreneurial learning (Taylor and Thorpe, 2004).

2.3 Positioning theory

According to Katz and Kahn (1966), role behaviour is "a process of learning the expectations of others, accepting them and fulfilling them" (p 188) in a repetitive and stable pattern. Harré and van Langenhove (1999) explain that "positioning can be seen as a dynamic alternative to the more static concept of role" (p 14) where "the assignment of fluid 'parts' or 'roles' to speakers in the discursive construction of personal stories make a person's actions intelligible and relatively determinate as social acts" (ibid, p 17). As the communicative process continues, a mutually understood structure for interactions or instigating dialogues evolves in which the roles presented are negotiated, refined or dismissed such that repositioning takes place. This leads to the unfolding of a conversation in which actors determine their own and each other's actions in a social sense through their joint action and narrative (Davies and Harré, 1990). The process can be understood through the notion of a 'positioning triangle' (Figure 1): the interplay of the actors' positions, the social force of what they say and do, and the storylines of each interaction (Davies and Harré, 1990, Harré and van Langenhove, 1999). A shift in one aspect of the triangle can affect the others: for example if an actor changes the topic during a conversation, a verbal social force, and the others engaged in the conversation adapt to the change and discuss the topic further, then a shift in the storyline has occurred, and the actor that made the change has established a position in relation to the topic.

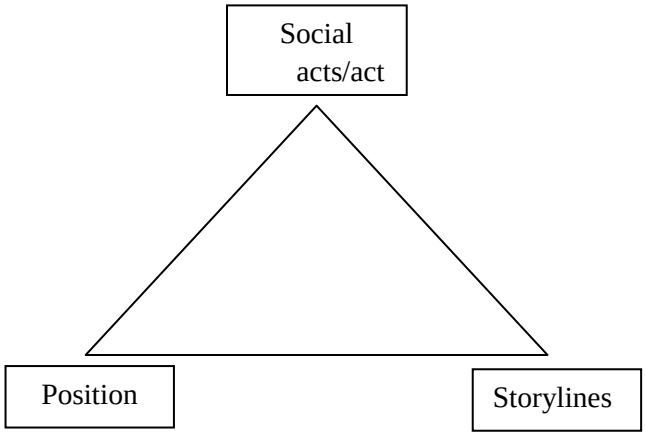

Figure 1. Positioning Triangle – a mutually determining triad

As "within a conversation each of the participants always positions the other while simultaneously positioning him or herself" (Harré and van Langenhove, 1999, p 22) positioning theory can be utilized as a tool for understanding the social interactions related to the development of entrepreneurial behaviour. Recognition in the role of 'entrepreneur' is accepted, rejected, improved upon and/or in other ways socially determined through the interplay of positions. Rights and duties, social force, and storylines, either presented or claimed, are developed and championed within conversations in relation to others in the role-set in order to illustrate social influence. These various behavioural strategies are utilized as the individual attempts to fill the aspired role. Thus, positioning theory allows us to examine the conversations of the individuals studied, highlighting how these individuals communicate their rights and actions in relation to others. Rights and action taken evolve into a storyline, which is then referred to in order to secure behaviour taken, and then negotiate future action. It is in this way that positioning theory can be utilized to examine the development of entrepreneurial behaviour in individuals engaging in an entrepreneurial process.

3.0 Method

3.1 Methodology

Investigating entrepreneurial behaviour as it is developing requires access to an environment in which the entrepreneurial process is on-going. Recognizing the

university as an institution able to facilitate venture activity (Etzkowitz, 2003, O'Shea et al., 2007, Wright et al., 2007), the context utilized in this study builds upon access to an environment combining entrepreneurial learning and incubation of ideas within a technical university at a stage prior to incorporation, i.e. before a legal entity has been created, but based upon a contractual agreement for future ownership. This environment is called a venture creation sub-unit (VCS) and is recognized as a learning space (Kolb and Kolb, 2005) in which experiential learning is impacted by the context of the environment. As a member of the VCS since 2004, the author has had continual access to the general environment under study as well as access to documentation and archival evidence, allowing for multiple phases of participant observation (Spradley, 1980). In order to investigate how development emerges, an event-driven approach (Van de Ven and Engleman, 2004) is taken, including narrative explanation (Czarniawska, 2004). Narratives are used to illustrate negotiated rights and duties from the interactions between nascent entrepreneurs, in team format, and their associated role-set.

3.1.1 Relating to Large-scale Longitudinal Studies.

Large-scale longitudinal studies such as PSED I and II (Gartner et al., 2004, Reynolds, 2007) have been designed to identify individuals that have initiated engagement in new firm creation and investigate the factors that influence these individuals as they engage in the venture creation process. Findings have illustrated that it is the actions taken by the individual(s), and not their characteristics, that impact new firm creation, and in particular, actions toward productivity of goods or services, establishing firm presence, and developing an organizational and financial structure (Reynolds, 2007).

In this study, individuals are identified as nascent entrepreneurs and considered to enter the entrepreneurial process based on application and acceptance to the VCS, where application requires written and oral communication of entrepreneurial intent. Furthermore, upon acceptance, the individual chooses to physically enter the environment and engage in an entrepreneurial process. Large-scale studies often under-represent ‘high-growth potential’ ventures (Siegel et al., 1993). University commercialization offices, and innovation and technology networks (among others) are recognized as potential arenas to collect data on ‘high-growth potential’ ventures (Senyard et al., 2009).

As the VCS incubates technology-based ideas stemming from university research and integrates actors from local innovation and technology networks, it is considered as an environment targeting 'high-growth potential' ventures. Continual access to the VCS, in which the observed process of new venture creation is bounded by clear entry and exit during the incubation period, allows for observation of failure, drop-out and random walks.

3.1.2 Design Elements.

The VCS was initiated in 2001 by actors at a management department at a technical university in Sweden. An earlier form of the VCS was started in 1997, but lacked the contractually anchored incubation function. Between 2001 and 2005, 20 individuals were accepted into the VCS each year on average; this increased to an average of 32 for 2006 and 2007, after a specific bioscience focus was introduced to the VCS in 2006. Accepted nascent entrepreneurs formed into teams by VCS staff and are matched with a technology-based patented or patentable idea. The VCS facilitates access to a role-set for each team of nascent entrepreneurs. The role-set descriptions and initial rights and duties as outlined by the contractual agreements and VCS polices are presented in Table 1. The nascent entrepreneurs are supported by their role-set throughout the one-year incubation period as the engage in creating a new venture.

Table 1. Description and rights and duties of the nascent entrepreneur and role-set

Role	Description	Duties	Rights
Nascent entrepreneur (NE)	Student communicating entrepreneurial intent and engaging in venture creation	learn how to create a new venture and apply learning to developing venture with intention to incorporate, including fulfilling educational requirements; attract financing, develop business, represent venture towards market	3,33 to 5% initial ownership claim; skills and knowledge as part of packaged education; support including access to staff, advisors and coaches
Idea provider (IPr)	professor, researcher or industry actor providing an idea or invention with perceived commercial value	provide the idea and associated intellectual property; 8 hrs per week of advice and support to the team, often particularly regarding technical development	up to 45% ownership claim; considered expert in field and allowed to continue research/work activities as primary focus
Incubator (Inc)	business actors providing initial investment and resources for the ventures	initial screening of ideas; team formation; investment and management of incubated ventures; partial management of incorporated ventures up to point of exit	20% ownership claim; manages 10% used for attraction of additional competencies; can reject termination request (from nascent entrepreneurs) if argumentation not valid or can enact termination based on policy issues; controls seed-capital distribution
Education management (EM)	university actors and educators responsible for the program structure, through which the new ventures are to be developed	team formation; facilitate and assess learning at individual and team level; scheduling activities; general guidance, advice and support	design of overall process; can enact termination if project negatively influencing educational objectives
Board member, including chair (BM)	individual with business, industry or research expertise; idea providers and incubator (see above) are specialized board members	guide the venture towards incorporation by meeting at regular intervals and approving key decisions, including approving budget allocations	oversee decisions regarding direction of venture, including selection of nascent continuing with venture should it be incorporated; no initial ownership claims
Advisor (Adv)	coach or consultant that provides specialized information to the team	general or specialized advice regarding business development information, sometimes provided at specific structured points through the incubation period	freedom to disengage; no initial ownership claims

Ideas provided to the nascent team are based in general technology and biosciences, stemming mainly from university research[1] and are reviewed by the incubator using selection criteria such as freedom to operate and willingness to align with ownership policies required, in line with initial rights and duties. After an initial screening process, 20-30 of the approximate 100 ideas are presented by their providers to the nascent entrepreneurs accepted into the VCS. The nascent entrepreneurs collectively select the ideas that will be incubated and then individually rank the ideas, providing written motivation for their choice. This information is used by members of the VCS to match nascent entrepreneurs into venture teams. Initial screening and final selection does not guarantee venture success, and thus venture teams may incubate more than one idea during the incubation period. The core formation of the nascent team does not change, but certain members of the role-set, such as the idea provider, are linked to the idea, and thus can be removed from the role-set, should the idea fail or leave the incubation space. Ideas can shift at any time during the incubation year, but the teams still follow the general framework provided by the VCS, as presented in Table 2.

[1] For the most part ideas are provided by university researchers at the technical university of the VCS. However, minority of the ideas are provided by actors from the surrounding innovation networks, such as industry research that is deemed as not core to the industry's main business and thus 'spun-in' to the university (and VCS) environment. The two examples illustrated in this study stem from university-based research. See www.encubator.se for an overview of VCS companies.

Table 2: Designed Events of Incubation Period at Venture Creation Subunit

January	Nascent entrepreneurs, having completed initial educational training, are interviewed by VCS staff to assess their skills/interest prior to entering the VCS incubation period. Entire group of nascent entrepreneurs collectively selects ideas to be incubated in the VCS.
February	VCS staff forms teams of nascent entrepreneurs and matches to idea to create a venture team. Ventures teams receive initial financing from incubator. Educational courses begin.
March	First internal presentation of venture (VCS members only, though idea providers may attend upon invitation), including first draft of business plan. Ventures begin to seek additional financing from innovation system (process continues through remainder of incubation period).
April	
May	First external presentation of venture (including actors outside the VCS), including delivery of a written business plan.
June	Educational courses break.
July	
August	
September	Educational courses resume. Second internal presentation of venture and delivery of business plan.
October	
November	Second external presentation of venture and delivery of business plan.
December	
January (following year)	Decision to incorporate or terminate venture. Incubation period ends; ventures must vacate incubator in preparation for next group of nascent entrepreneurs.

3.2 Data Collection

The main means of data collection utilized was participant observation, including individual and group interviews (Atkinson and Coffrey, 2003) of nascent entrepreneurs and members of the role-set, as indicated in Table 3, using the labels (for example NE for nascent entrepreneur) in Table 1, as well as documentation and introspection (Denzin, 1989). Participant observation was conducted in phases (Spradley, 1980): the author's long-term employment in the VCS, allowed for orientation to the complexity of the field of study, while focused and selective observation of the VCS incubation period took place between January and December 2007, with additional data collected through to April 2008, as ventures transitioned out of the VCS. Embeddedness in the VCS as staff as well as a member of one of the role-set categories facilitated primary access, pre-understanding, and awareness of organizational politics. At the same time, a position

outside the nascent entrepreneurial team allowed for a necessary degree of separation from the primary research object. This small degree of separation made the inquiry less susceptible to too much assumption. Written documentation from VCS staff meetings and board meetings complemented specific reflections from the perspectives of the nascent entrepreneurs and the role-set collected during interviews. In most cases, interviewees were provided with general questions a few days prior to the interview. Interviews were recorded and then transcribed. Utilization of data taken from multiple perspectives upon the same event counters some of the challenges of role-duality.

The 2007 incubation year included 30 nascent entrepreneurs (20% women) formed into eleven teams: seven focused on general technology and 4 focused in the biosciences. Of the eleven teams, six (55%) experienced at least one failure and re-started with a new idea and associated role-set during the incubation period, which is slightly higher than the average of 41% from 2001 to 2007. Six of the eleven teams incorporated ventures into firms, slightly less than the average rate of incorporation (69%) from 2001 to 2007. Two of the eleven teams were randomly selected for focused study; one technology-based team and one bioscience-based team, both with ideas stemming from university research. Each team included three nascent entrepreneurs with differentiating backgrounds based on gender, race, education and experience. Teams agreed to interviews at regular intervals during the incubation period in the VCS and provided access to documentation. The technology-based team is identified as Team A: Ray, Kris and Jo. The bioscience-based team is identified as Team B: Calvin, Erin and Gordon. In all cases, pseudonyms are used in order to provide anonymity.

3.3 Data Analysis

As positioning takes place 'in-action' or 'in-the-moment', an approach is needed that can somehow capture some of the experience of positioning. Czarniawska (2004, p 17) describes a narrative as "a spoken or written text giving an account of an event/action or series of events/actions, chronologically connected." The study utilizes narratives and complementary data regarding two teams of nascent entrepreneurs (and associated role-set) selected from the VCS, as presented in the last column of Table 1. Narratives allow us "to see conversations as dramatized stories, in which the participants are actors, authors, directors, and producers" (Czarniawska, 1997, p 13) thus providing us a "way of

understanding human action" (ibid, p 14). Uses of narratives can include collection of stories, provocation of stories, interpretation and analysis of stories and even setting one story together or against another (Czarniawska, 2004). Previous research using narrative methods has demonstrated connections between, for example, identity emergence, learning as a social process, and the negotiated activity of venture formation (Downing, 2005, Dyer, 1994, Rae, 2005).

The study blends historical, observational and interview methods when gathering and interpreting evidence from excerpts, segments of documents and descriptions (Hammersley, 1990). A narrative approach allows for methodological steps. The first is the provocation of story-telling by the nascent entrepreneurs that can be set against observation of how the story is made. Narratives are collected in interviews with the nascent entrepreneurs. These are interpreted by the researcher while also placed in comparison with competing or complementing narratives from the other actors in the role-set, including documentation and archival evidence. The collected narratives presenting the understanding of human action are placed together with a chronological outline, which presents what is happening and then described in a way to make sense of the events, a process called emplotment (Czarniawska, 2004). Excerpts from the collected narratives are utilized to illustrate what is observed.

Table 3 presents the chronological series of events and collected narratives for the entrepreneurial process period of the two teams, including designation of the role-set members engaging in each event. The combined data of the two teams engaged in an entrepreneurial process over a period of one year is presented in two stories. The story of each team is analyzed in order to examine position-making and position-taking through roles, dialogues, actions and storytelling by different actors as a process of developing entrepreneurial behaviour. Excerpts from transcribed interviews provide highlighted observations of behavioural development. The stories illustrate the process of positioning through negotiated rights and duties that the nascent entrepreneurs undertake as they create a new venture.

Table 3: Chronology of Events for Teams A&B in Venture Creation Subunit (2007)

Month	Date and Event	Excerpt
January 2007	22nd: Individual venture formation interview [NE, EM]	Excerpt 1
February 2007	2nd: Selection of ideas to be incubated (documentation) 5th: VCS staff forms venture teams (participatory) [Inc, EM] 7th: Education introduction (participatory) [NE, EM] 22nd: VCS staff meeting (participatory, documentation) [Inc, EM] 26th: Participatory observation of team A [NE, EM] 28th: Participatory observation of team B [NE, EM]	Excerpt 2
March 2007	9th: VCS staff meeting (participatory, documentation) [Inc, EM] 21-22nd: Venture present. (participatory, documentation) [NE, Inc, EM, Adv] 23rd: VCS staff meeting (participatory, documentation) [Inc, EM]	
April 2007	13th: VCS staff meeting (participatory, documentation) [Inc, EM]	
May 2007	7th: VCS staff meeting (participatory, documentation) [Inc, EM] 10th: Interview team A [NE] 11th: Participatory observation of team A and team B [NE, EM] 15th: Interview team B [NE] 28th: VCS staff meeting (participatory, documentation) [Inc, EM] 31st: Ext. presentation of venture (participatory, documentation) [all]	Excerpt 3 Excerpt 9
June 2007	5th: Educational courses break. 13th: VCS staff meeting (participatory, documentation) [Inc, EM] 20th: Interview role-set member [Adv] 29th: Interview role-set member [Adv]	Excerpt 4, 10
July 2007	5th: VCS staff meeting (participatory, documentation) [Inc, EM] 7th: Board meeting team B (documentation) [NE, IPr, Inc, BM]	
August 2007	10th: Board meeting team B (documentation) [NE, IPr, Inc, BM]	
September 2007	5th: Educational introduction (participatory) [NE, EM] 7th: VCS staff meeting (participatory, documentation) [Inc, EM] 21st: Presentation of venture (participatory, documentation) [NE, Inc, EM, Adv] 25th: Interview team B [NE] 26th: Participatory observation of team A and team B [NE, EM]	Excerpt 11, 12
October 2007	1st: VCS staff meeting (participatory, documentation) [Inc, EM] 3rd: Interview team A [NE] 17th: Board meeting team B (documentation) [NE, IPr, Inc, BM] 24th: VCS staff meeting (participatory, documentation) [Inc, EM]	Excerpt 5
November 2007	14th: Board meeting team B (documentation) [NE, IPr, Inc, BM] 15th: VCS staff meeting (participatory, documentation) [Inc, EM] 22-23rd: Final external venture presentation (participatory, documentation) [all]	
December 2007	6th: Participatory observation of team A [NE, EM] 7th: Participatory observation of team B [NE, EM] 14th: Board meeting team B (documentation) [NE, IPr, Inc, BM] 20th: Education end	
January 2008	10th: VCS staff meeting (participatory, documentation) [Inc, EM] 25th: Board meeting team B (documentation) [NE, IPr, Inc, BM] 29th: Interview with Jo; Interview with Ray [NE] 31st: Interview with Kris [NE]	Excerpt 7, 8 Excerpt 6
February 2008	1st: VCS staff meeting (participatory, documentation) [Inc, EM] 2nd: Informal interview with Erin (not recorded) [NE] 7th: Interview with Gordon [NE] 11th: Interview with Calvin [NE] 22nd: VCS staff meeting (participatory, documentation) [Inc, EM] 28th: Board meeting team B (documentation) [NE, IPr, Inc, BM]	Excerpt 14 Excerpt 13
March 2008	14th: Board meeting team B (documentation) [NE, IPr, Inc, BM] 26th: Board meeting team B (documentation) [NE, IPr, Inc, BM]	

4.0 Entrepreneurial Narratives

4.1 Team A

At the beginning of the incubation year, January 2007, nascent entrepreneurs take part in individual interviews to discuss their potential contribution to a venture team.

> *Excerpt 1: "(Kris): One's role in a group is very much dependent on the situation and the people involved."*

At the same time, the nascent entrepreneurs collectively evaluate ideas and select eleven ideas, upon which to base the ventures, into the VCS.

> *Excerpt 2: "(Ray): A lot of the idea providers that come here right now just see three [beginners] ... a lot of them are testing us, and seeing if we hold ... they start to ask us questions like 'okay, what's your background, what have you been studying' ... and then you have to prove that you are up for a task. And then we start to measure them – 'what have you been doing, what's your idea, who have you been talking to', and we put them on the spot."*

The ideas are selected and the VCS members form the nascent entrepreneurs into venture teams. By April, there are concerns about the viability of the Team A venture, in part based on discussions with an advisor. These concerns prove valid as an incubator representative reports Team A venture shut-down at the May 7th VCS staff meeting. During an interview on May 10th, the team talks about shutting down the project.

> *Excerpt 3: "(Ray): When we started [the venture], we thought that it was going to be the idea provider in power – the management power. The idea providers had the research power. They always had the control over the idea, they had the expertise. Then when meeting with [an advisor], seeing the other potential applications, we felt that we got hold of the team because we were outside the idea providers' range of expertise. Then it was about how we used our position as the management team; took the ideas into the management jargon. At first this did not work, but finally in the last few weeks, we really assessed and put the idea, through our own management experience, into the business world instead of the research world. This was a dramatic shift – we did not act as the management team until we took on the idea and internalized it for ourselves.*
> …
> *in the beginning, you pretended to be an entrepreneur, or you pretended to be an owner of a venture. You were telling [the role-set] this and this. And now you can actually put it down in a couple of words and say, this is what we do ... I feel more like an entrepreneur now than I did 4 months ago."*

In the end of June, after the end of the first term, a team advisor discusses opinions formed regarding the team.

> *Excerpt 4: (Team A Advisor): "Ray I would say is an entrepreneur in some way. He makes things happen. He is passionate about what he does. Yes I would say that has an entrepreneurial spirit … Jo I think is an entrepreneur or he has the desire. He wants to do something on his own and to not go into existing structures and believing in what he does in the bigger perspective."*

Each of the team members work part time with the venture during the summer, while also working part time in other employments in order to gain some earnings and additional experience. The team deals with negotiation of ownership with one of the shareholders in order to secure intellectual property claims, as reported on the July 5th VCS staff meeting. Ray and Kris start to work independently on a separate idea outside the team venture together with another nascent entrepreneur from the VCS. During participant observations and in an interview the team reports about the frustration they have regarding the venture.

> *Excerpt 5: "(Jo): even if I would say that the [venture] is maybe more fun, I still have that I am here due to an education ... we want to do a really decent or good market study, even though we don't really care about it, because it is nothing that we use [in the venture] at the moment.*
> *...*
> *(Ray): I present myself as an entrepreneur always, I think. ... I never talk to my friends about: 'oh, it's hard now because I have an exam.' No! I say like: 'oh, it's really hard for us because we have to find somebody who does this for us, and we haven't got hold of it.' And so, to my friends, when I'm talking to them, it's like, you're not in school anymore. You're actually having a company."*

The team struggles with their idea providers and their control position. Kris talks about his role during an interview.

> *Excerpt 6: "[in the first venture] I was responsible for like the technical type of questions, and ... I had no problem with that, so it was fine, and I guess I was the most suited on for those types of problems. But with [the second idea], it was quite hard to get that responsibility, because there were no technical developments, so [you had to] scratch your head and look around. So that was quite a hard responsibility to get."*

By January, Jo is the only one continuing with the VCS venture, but he is still struggling with the one of the idea providers, and by the end of January, the venture is terminated. In an interview, Jo talks about the roles in the team in the second venture.

> *Excerpt 7: "I think we made a mistake when we discussed what group roles to have [with the second idea], and we said 'Kris, we think based on your background that you should have the development of the mechanical machine'... And he said yes, but I think that he didn't really like that role. We just took our roles ... and [I] didn't really reflect upon how well Kris and Ray feel. And that's a shame, both for [the venture] and for Kris also because maybe he didn't have as fun a fall as I had. Because I had a really fun fall ... and therefore I learned a lot."*

In the final interviews, both Ray and Jo express an interest to be an entrepreneur in the future. Jo starts working in the industry-sector while also becoming the chairman of a non-profit organization. Ray starts as a trainee in a telecommunications firm and then, during an informal interview in 2008, reports a promotion into a new role as business developer. Kris works as a consultant, but communicates aspirations for future entrepreneurial activity.

4.2 Team B

Only a few weeks into their period of incubation, Team B experiences an initial but critical conflict with their idea provider. Their first venture is shut down by the beginning of March. The team searches for a new idea, and starts a new venture by April. At the April 13th VCS staff meeting, the team is reported to be working on patent applications. During an interview, the team talks about what they learned.

> *Excerpt 9: "(Erin): The first time we were going to meet our first idea provider, we sat down and did not know what we were supposed to be doing … when we met [our new idea provider], we knew what we were doing and we could show that, and he could then say – 'yes, you are an asset', and we felt more in control.*
> *…*
> *(Gordon): For me it is obvious that we are going to become the control figures in [the venture] … because whoever has the information will be the ones that controls it … the more we engage in the process the more we gain this advantage"*

Excerpt 10 illustrates how an advisor views the team.

Excerpt 10: (Team B Advisor); "I think Erin wants to be an entrepreneur very much. And Calvin wants it too, but he is more outspoken about it. I can see, Erin's more of a person that's grown into it and found something that she's good at.
...
Calvin has definitely taken on the role, I mean he loves to call himself an entrepreneur. In my mind, he's one of those amazing, crazy entrepreneurs that just runs around doing whatever, and does so many things right, but more seldom [has] reflections upon what he's doing. ... He thinks up new ideas and new areas of application, while Gordon, whose main strength is to analyze ... or to turn Calvin's ... visions into something concrete. ... Erin is the one that packs it down and implements it in the end."

During the summer, the team is preparing for clinical trials and interviewing persons for the chairman position in the board. By September, the team is working on prototyping. Calvin and Gordon worked with the venture during the summer, while Erin gained intellectual property experience during an internship in the UK. The team discusses on-going changes in the developing venture, both towards the role-set and each other.

Excerpt 11: "(Calvin): right now we are following this path ... but, we haven't had a real board meeting with [the chairman] yet; with a discussion with all the idea providers. ... we have to get them engaged also, so that is one [aspect] that could influence the decision that we have right now [in the team].
...
[we] have to have certain knowledge to be able to ask certain questions. And from that perspective, it is not lack of trust in them as persons; it is to be able to get the right answers that we would like to check out.
(Erin): And also that they think that we are a confident management team ... of course we want them to perceive us as the brilliant management team which we are, yes."

Excerpt 12: "(Erin): I think that we are, all of us, are more open. If I don't like something, I have started to tell my side of the story too. And I, I hate being like that, but I realize it's better to be, just be honest about it and everything.
(Calvin): Yes, that is a difference. And it's a great one.
(Erin): Yeah, I don't think it's so great. I hate myself. When I come home I just think – oh what have I done. But yeah, I'm more open, because I realize that they [Calvin and Gordon] are, so I have to be as well."

VCS staff meetings in October and November report that the team is on-track and focusing on patenting claims. At the final presentation in the end of November, the team wins awards and garnering attention from external investors. A board meeting on December 14th includes discussing financing options. In the January 2008 VCS staff meeting, it is reported that Calvin and Gordon will continue with the venture, working towards a critical milestone in April, after which the decision about incorporation will take place. Calvin and Gordon talk about next steps in individual interviews in the end of January 2008.

> *Excerpt 13: "(Calvin): We have talked a little bit because there is the question if we incorporate, who will be the CEO. ... Gordon should have the first go for the CEO place I guess. ... The most fun things to work with I think, operationally and controlling wise, are working with production and marketing. That is where I feel, and then being near customers, that is where I feel I fit in very good. ... the CEO has more of a reporting role and more of the responsibility side ... when I look upon us as a team, I think that Gordon would feel that that was so fun to have that position that he would do it really, really, really good. And my thing is being out there with the customers and getting the response from them so I feel that I would probably do that work better than him."*
>
> *Excerpt 14: "(Gordon): Our job is to do the financing and also try to coordinate and monitor and follow-up with the prototype development. Make sure that is going to be on time for our big deadline which is the workshop sometime in April.*
> *...*
> *from the beginning we wanted to keep all the doors open for development, personal development. So we didn't want to: 'you do this only; that's it'. We haven't done that. I think at the point when we start understanding what we are good at, recognizing it in the other person, that he is better at doing this; that's when I think we are going to do that. Hopefully it will come natural, all the different roles.*
> *...*
> *Calvin's started to realize the thing that I felt, that to the idea providers, you really need to be hard-handed with a soft-hand. You have to be very structured with them. Very (pause) follow-up with them rigorously, to a point where it is almost harassing, but try to do it in a good way all the time. So the relationship is starting to change, more that I think that we are leading ... [the Chairman] helps us a lot. He is on our side, that's how we see it. And I think the idea providers also see it that way too, which is not that positive actually but hopefully that will change over time when the idea providers become more aligned in the way we are thinking. It is*

happening currently, so I think the deadline in April will help show how everything works out."

The venture is incorporated in July 2008, with Gordon as CEO. Calvin works part time with the firm while also pursuing research. Erin does not continue with the incorporated venture. After working in professional position at an established firm, Erin takes on a role as key developer of a new venture in June 2009. In early 2010, Erin becomes CEO of a biotechnology start-up.

5.0 Analysis

5.1 Team A

In Excerpt 1, Kris reports that nascent entrepreneurs aspiring to the role of 'entrepreneur' are already cognizant of establishing a position, both in relation to the others in the team and the environment. Rays show in Excerpt 2 that the importance of establishing rights and duties in relation to the idea provider starts even before this actor is engaged in the role-set. The nascent entrepreneurs are aware of being perceived as beginners and start by fulfilling the rights and duties expected of them by the idea provider when the potential idea is presented to them. At the same time they are also trying to establish legitimacy with the idea provider proving that they are 'up to the task' of driving the idea forward. However, after answering the idea provider's questions, the nascent entrepreneurs shift the storyline by putting the idea provider 'on the spot'. The nascent entrepreneurs behave in relation to an intended future role of responsibility and engagement to the potential firm based upon the idea. The intention is to prove that they are 'up to the task' by demonstrating their ability to ask informed questions about the idea to determine its potential. Thus, even before the nascent entrepreneurs have officially been placed into a venture together with the idea provider and the incubator, solidified by a signed collaboration agreement, they are attempting to position themselves in the role of 'entrepreneur' by the way in which they interact with the idea provider.

After the start of the project, Ray talks about how the use of language and action changed their position in relation to the idea providers in Excerpt 3. Shifting the context of the idea from research to business enables a shift into the position of the management team. The team is able to first test this with an advisor. Through this experience they

learn how to 'get hold' and 'use our position' which allows them to behave as the management team. It is not until they internalize the idea that they are able to act this way towards the idea providers. As a result, instead of pretending to be in the role of the entrepreneur, Ray associates to the role based on how he can say his actions are fulfilling the role. He claims to behave 'like' an entrepreneur. The recognition of a role is mirrored in how the role-set advisor starts to associate the actions of Ray to his perception of the entrepreneurial role. Ray and Jo are allocated the term entrepreneur – a position that is over time reinforced or redefined through storylines in settings such as VCS staff meetings by others in the role-set. Lack of enthusiasm noted in Ray and Kris during the summer and their engagement in other activities are raised as concerns, by members of the role-set during July and September VCS staff meetings, that Ray and Kris are not fulfilling their duties as nascent entrepreneurs. In the October VCS staff meeting, an incubator representative states that Jo takes the most initiative, representing an increased perception of Jo as engaged, while commenting on Ray and Kris's continued involvement in a separate activities and questioning how much that is effecting the motivation in the team venture. This is reflected in Excerpts 6 and 7, where Kris and Jo explain how the positioning into certain roles in the second venture impacted the motivation. Rights and duties around a role considered as fun, for Jo, triggered learning and were appreciated by the role-set, while positioning into an 'empty' role, for Kris, decreased engagement.

Members of the team also discuss how they manage the ambiguity of multiple responsibilities in Excerpt 5. Jo feels constrained by the combination of education and venture creation, trying to find a balance between learning objectives and venture needs, while Ray chooses to position himself as an 'entrepreneur' to everyone, explaining the challenges he has in relation to running a company.

5.2 Team B

Discussion about shutting-down the venture is initiated during the February 22nd VCS staff meeting based on the rights to enact termination. However, the nascent team does not even mention the situation during a session with an educator on the following day, and instead talk about being in a honeymoon phase of venture development, possibly signalling their concern about how failure may impact how they are positioned. By the

next VCS staff meeting on March 9th, the incubator representative of the role-set reports termination but explains that the decision was taken together by the team, the incubation representative, and an education management representative, but not the idea provider. The enacting of rights by members of the role-set is based on duties to uphold learning.

Interactions with the role-set illustrate positioning and development of storylines. The ability to 'know' and 'show what we do' communicated in Excerpt 9 illustrates how the experiential learning from the process of the first venture changes how the team negotiates rights and duties around control when interacting with the new idea provider. They interpret the reaction of the idea provider as validation that they are 'an asset', establishing legitimacy. Reporting from the team advisor in Excerpt 10 shows how the actions taken by individuals in the team, impacts the advisor's descriptions of the team members, including how they are positioning venture duties in relation to one another: Calvin brainstorms, Gordon structures Calvin's ideas and Erin implements Gordon's structure. In particular, through interactions with the advisor, Calvin has created a storyline of an entrepreneur.

Having built new competencies during the summer, the team wants to renegotiate rights and duties, proposing a change in direction to members of the role-set, illustrated in Excerpt 11. The team discusses the united position they want to present towards the board. However, positioning also takes place between each of the nascent entrepreneurs within the team. In Excerpt 12, Erin discusses how she is renegotiating her rights, in order to match the behaviour of Calvin and Gordon. Calvin's reaction can be seen to illustrate the storyline he wants Erin to have, even though Erin reports that she does not like positioning in the way that Calvin expresses appreciation around.

Excerpts 13 and 14 illustrate that positioning around the formal role of CEO is already taking place even though the decision is taken to maintain venture status until at least April 2008. When discussing the role in their separate interviews, neither Calvin nor Gordon specify that Gordon has been formally positioned as the CEO, but both recognize that he is acting in that position at present, and is likely to in the coming months. Gordon is very outspoken about how he acts in relation to the idea providers, imposing duties on them in order to move the venture forward, and enlisting the support

of the chairman, to help in legitimizing his rights relative to other members of the role-set.

6.0 Discussion

The social interactions between the nascent entrepreneurs and the role-set illustrate how positioning, through negotiated rights and duties and communicated storylines, is used towards establishing legitimacy in the role of entrepreneur. Behaviour development of the nascent entrepreneur builds upon observation, modelling and guided action in relation to environmental influences (Bandura, 1977), particularly through the role-set, as they are observed to possess initial rights and duties regarding decisions impacting the venture. As experiential learning is gained, the nascent entrepreneurs negotiate their rights and duties in various situations, not only towards the role-set, but also towards each other. Rights around decision making and control of information are communicated relative to the idea providers. The nascents institute roles or social norms of behaviour within their own team, designating responsibilities towards various areas of operation. These are recognized, for example, by advisors and incubator and education representatives as communicated in interviews or staff meetings. Positioning theory allows for observing the how the nascent entrepreneur establishes legitimacy through continual dialogue around rights and duties as associated to given or claimed positions (Davies and Harré, 1990, Harré and van Langenhove, 1999). The negotiated rights and duties are mainly used to establish legitimacy in the role of the entrepreneur, a behaviour considered critical to the creation of a new venture (Delmar and Shane, 2004, Reynolds, 2007).

An emphasis on behaviour allows for entrepreneurship that is not necessarily reliant upon the initiator of the idea as the driver towards opportunity, allowing others to adopt the entrepreneurial role. The core team of two to three individuals, positioned as nascent entrepreneurs by the environment, are provided with access to the invention and human capital behind the invention, in the form of an idea provider, seed-capital and additional resources, including facilities, administrative services and advice (as structured in the set of actors). The ‘nascent entrepreneurs’ are tasked with the responsibility of determining the feasibility of the idea; determining the market potential, value

proposition and business model appropriate for venture formation; attracting financing for venture creation and development and additional resources; and managing the team dynamic and planned structure for the potential future firm. In return, the nascent entrepreneurs are given an ownership option (Li & Simerly, 1998). The option is issued in the case when the venture is incorporated (into a firm).

Allocating potential future ownership is a critical positioning of the nascent entrepreneurs as it designates the potential of a future role as owner – and important signal to both the nascent entrepreneurs, but also the other actor of the role-set.

> *"[a] signal to them [the idea providers] that they will be treated fairly, but they have to give away [the control of their idea]. Everyone knows that they will have less than 50% of the company … It weeds out the ones that are too possessive. Those who come to us are only the ones that are willing to allow other people [the nascent entrepreneurs] take over."* VCS co-founder in an interview (June 29th, 2007)

While transference of rights and ownership, initiated through contractual agreements, establishes initial rights for the nascent entrepreneurs, the negotiation of rights and duties through positioning facilitates hypothesis testing (Alvarez and Barney, 2007) and experiential learning (Taylor and Thorpe, 2004) informing decision making.

In the cases presented, initial failure does not necessarily mean that a team will not be able to carry out a venture successfully, but, as we can see in comparing Teams A and B, the ability to position oneself in relation to the rights, duties and responsibilities of certain roles in the venture can affect the way in which a personal storyline is told. In the cases of Calvin, Gordon and Ray, positioning into the role of entrepreneur, and creating a storyline of an individual acting entrepreneurially, developed during the entrepreneurial process, regardless of venture success or failure. For Kris, Jo and Erin, positioning in relation to others in the team, or the duties of a particular role presented challenges that limited or delayed adoption of an entrepreneurially role. However, experiential learning from negotiated rights and duties gained during venture creation may potentially translate to other arenas. In his final interview, Ray discusses how his learning is applied to his new role as an employee in an established firm. Establishing legitimacy through positioning continues within this new role. He associates the development of this behaviour to experiences in the VCS.

Excerpt 8: "I am sitting with people who have had their job for 15 to 20 years and I am telling them, 'no maybe that is not right' and yes, they are listening to me and they are doing [what I say] – and that is only because of the year at [the VCS] – I am that kind of person yes, but I would never [have] known how to do it and when not to get into that fight and choose my battles."

The entrepreneurial narratives from the VCS illustrate how nascent entrepreneurs engaging in an entrepreneurial process develop entrepreneurial behaviour through a series of situational interactions. Entrepreneurial behaviour in the form of established legitimacy is developed as rights and duties around the creation of a venture are negotiated through positioning in relation to others. Interaction affects the way in which the nascent entrepreneurs find confidence that allow them to change their opinion about their rights. Behaviours towards actors change as nascent entrepreneurs realize that different types of experience and expertise can be illustrated and communicated. The series of positions taken, accepted, rejected and/or refined develops the behaviour of the individual, in these cases, in establishing legitimacy towards the entrepreneurial role.

7.0 Conclusion

Positioning theory draws attention to the distribution and acknowledgment of rights and duties of members in a landscape of action. Evaluation of what is being said and done, as compared to an assigned role or title, allow for focus upon entrepreneurial behaviour which distributes the responsibility and capability of entrepreneurial action beyond just those individuals deemed to be entrepreneurs. Policies and investment into entrepreneurship can address a broader spectrum of individuals and expect returns not only from those eventually taking on entrepreneurial roles in newly started firms, but also from individuals behaving entrepreneurially within other roles or settings.

Actively partaking in the process of entrepreneurship can support and facilitate the development of entrepreneurial behaviour. As the process of entrepreneurship is as yet still not well understood, then identifying and accessing the process, as it is ongoing, is difficult, but environments involving incubation of new ideas in university environments are proposed as one potential area for study of new venture creation processes. Further investigation into the micro-behaviours taking place in the 'critical

mess' (Gartner, 2006) of the environmental context around the process of new venture creation as it is on-going can provide further insight into how entrepreneurial behaviour is developed (Gartner and Carter, 2003).

References

ALDRICH, H. E. & MARTINEZ, M. E. 2001. Many are called but few are chosen: an evolutionary perspective for the study of entrepreneurship. *Entrepreneurship Theory and Practice,* 25**,** 41-56.

ALDRICH, H. E. & RUEF, M. 2006. *Organizations Evolving,* London, UK, Sage.

ALDRICH, H. E. & ZIMMER, C. 1986. Entrepreneurship through social networks. *In:* SEXTON, D. & SMILOR, R. (eds.) *The Art and Science of Entrepreneurship.* Cambridge, MA: Ballinger.

ALSOS, G. A. & KOLVEREID, L. 1998. The business gestation process of novice, serial and parallel business founders. *Entrepreneurship Theory and Practice,* 22**,** 101-114.

ALVAREZ, S. A. & BARNEY, J. 2007. Discovery and Creation: Alternative Theories of Entrepreneurial Action. *Strategic Entrepreneurship Journal,* 1**,** 11-26.

ATKINSON, P. & COFFREY, A. 2003. Revisiting the relationship between participant observations and interviewing. *In:* GUBRIUM, J. F. & HOLSTEIN, J. A. (eds.) *Post Modern Interviewing.* London: Sage.

BANDURA, A. 1977. *Social Learning Theory,* New York, NY, General Learning Press.

BANDURA, A. 1978. The self system in reciprocal determinism. *American Psychologist,* 33**,** 344-358.

BANDURA, A. 1982. Self-efficacy mechanism in human agency. *American Psychologist,* 37**,** 122-147.

BARON, R. A. 2002. OB and entrepreneurship: The reciprocal benefits of closer conceptual links. *Research in Organizational Behavior,* 24**,** 225-269.

BARON, R. A. 2007. Entrepreneurship: A Process Perspective. *In:* BAUM, J. R., FRESE, M. & BARON, R. A. (eds.) *The Psychology of Entrepreneurship.* Mahwah, NJ, USA: Lawrence Erlbaum Associates.

BHAVE, M. P. 1994. A process model of entrepreneurial venture creation. *Journal of Business Venturing,* 9**,** 223-242.

BRATTON, J., SAWCHUK, P., FORSHAW, C., CALLINAN, M. & CORBETT, M. 2010. *Work and Organizational Behaviour,* Basingstoke, UK, Palgrave Macmillan.

BYGRAVE, W. & HOFER, C. 1991. Theorizing about entrepreneurship. *Entrepreneurship Theory & Practice,* 16**,** 13-22.

CARSRUD, A. L. & JOHNSON, W. R. 1989. Entrepreneurship: a social psychological perspective. *Entrepreneurship and Regional Development,* 1**,** 21-31.

CARTER, N. M., GARTNER, W. B. & REYNOLDS, P. D. 1996. Exploring start-up event sequences. *Journal of Business Venturing,* 11**,** 151-166.

CASSAR, G. & CRAIG, J. 2009. An investigation of hindsight bias in nascent venture activity. *Journal of Business Venturing,* 24**,** 149-164.

CHANDLER, G. N. & LYON, D. W. 2001. Methodological issues in entrepreneurship research: the past decade. *Entrepreneurship Theory and Practice,* 25**,** 101-113.

COPE, J. & WATTS, G. 2000. Learning by doing: An exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behaviour and Research,* 6**,** 104-124.

CZARNIAWSKA, B. 1997. *Narrating the Organization: Dramas of Institutional Identity,* London, UK, University of Chicago Press.
CZARNIAWSKA, B. 2004. *Narratives in Social Science Research,* London, UK, Sage.
DAVIDSSON, P. 2006. Nascent entrepreneurship: empirical studies and developments. *Foundations and Trends in Entrepreneurship,* 2**,** 1-76.
DAVIES, B. & HARRÉ, R. 1990. Positioning: the discursive production of selves. *Journal of Theory of Social Behavior,* 20**,** 43-63.
DELMAR, F. & SHANE, S. 2004. Legitimating first: Organizing activities and the survival of new ventures. *Journal of Business Venturing,* 19**,** 385-410.
DENZIN, N. K. 1989. *The research act: A theoretical introduction to sociological methods,* Englewood Cliffs, NJ, Prentice Hall.
DOWNING, S. 2005. The Social Construction of Entrepreneurship: Narrative and Dramatic Processes in the Coproduction of Organizations and Identities. *Entrepreneurship Theory and Practice***,** 185-204.
DYER, W. G. 1994. Toward a theory of entrepreneurial careers. *Entrepreneurship Theory and Practice,* 19**,** 2-7.
ENSLEY, M. D., PEARCE, C. L. & HMIELESKI, K. M. 2006. The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *Journal of Business Venturing,* 21**,** 243-263.
ETZKOWITZ, H. 2003. Research groups as `quasi-firms': the invention of the entrepreneurial university. *Research Policy,* 32**,** 109-121.
FLETCHER, D. E. & WATSON, T. M. 2007. Entrepreneurship, Management Learning and Negotiated Narratives: 'Making it Otherwise for Us - Otherwise for Them'. *Management Learning,* 38**,** 9-26.
GARTNER, W. B. 1993. Words lead to deeds: Towards an organizational emergence vocabulary. *Journal of Business Venturing,* 8**,** 231-239.
GARTNER, W. B. 2006. Entrepreneurship, psychology and the 'Critical Mess'. *In:* BAUM, J., FRESE, M. & BARON, R. (eds.) *The Psychology of Entrepreneurship.* Mahwah, NJ: Lawrence Erlbaum Associates.
GARTNER, W. B. & CARTER, N. M. 2003. Entrepreneurial behavior and firm organising processes. *In:* ACS, Z. J. & AUDRETSCH, D. B. (eds.) *Handbook of Entrepreneurship Research.* Dordrecht, NL: Kluwer.
GARTNER, W. B., SHAVER, K. G., CARTER, N. M. & REYNOLDS, P. D. 2004. *Handbook of Entrepreneurial Dynamics: The Process of Business Creation,* Thousand Oaks, CA, Sage.
GIBB, A. A. 1996. Entrepreneurship and Small Business Management: Can We Afford to Neglect Them in the Twenty-first Century Business School? *British Journal of Management,* 7**,** 309-321.
GILBERT, B. A., MCDOUGALL, P. & AUDRETSCH, D. 2006. New Venture Growth: A review and extension. *Journal of Management,* 32**,** 926-950.
HAMMERSLEY, M. 1990. *Reading Ethnographic Research: A Critical Guide,* London, UK, Longman.
HARRÉ, R. & VAN LANGENHOVE, L. 1999. *Positioning Theory,* Oxford, UK, Blackwell Publishers Ltd.
HEINONEN, J. & POIKKIJOKI, S.-A. 2006. An entrepreneurial-directed approach to entrepreneurship education: mission impossible? *Journal of Management Development,* 25**,** 80-94.
HENDERSON, A. D., RAYNOR, M. & AHMED, M. 2009. How Long Must a Firm be Great to Rule out Luck? Benchmarking Sustained Superior Performance. *2009 Academy of Management Conference.* Chicago, IL.

KATZ, D. & KHAN, R. 1966. *The Social Psychology of Organizations,* New York, NY., John Wiley.
KATZ, J. & GARTNER, W. B. 1988. Properties of Emerging Organizations. *The Academy of Management Review,* 13**,** 429-441.
KOLB, A. Y. & KOLB, D. 2005. Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. *Academy of Management Learning and Education,* 4**,** 193-212.
KOLB, D. 1984. *Experiential Learning: Experience as a Source of Learning and Development,* Englewood Cliffs, NJ, Prentice-Hall.
LIAO, J. & WELSCH, H. 2008. Patterns of venture gestation process: Exploring the differences between tech and non-tech nascent entrepreneurs. *The Journal of High Technology Management Research,* 19**,** 103-113.
MWASALWIBA, E. S. 2010. Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators. *Education + Training,* 52**,** 20-47.
O'SHEA, R. P., ALLEN, T. J., MORSE, K. P., O'GORMAN, C. & ROCHE, F. 2007. Delineating the anatomy of an entrepreneurial university: the Massachusetts Institute of Technology experience. *R&D Management,* 37**,** 1-16.
OLLILA, S. & WILLIAMS-MIDDLETON, K. In press. The venture creation approach: integrating entrepreneurial education and incubation at the university. *International Journal of Entrepreneurship and Innovation Management,* Special Issue on Innovative University Programs in Technology Business Incubation.
RAE, D. 2005. Entrepreneurial learning: a narrative-based conceptual model. *Journal of Small Business and Enterprise Development,* 12**,** 323-335.
REYNOLDS, P. D. 1997. Who Starts New Firms? – Preliminary Explorations of Firms-in-Gestation. *Small Business Economics,* 9**,** 449–462.
REYNOLDS, P. D. 2007. New Firm Creation in the United States: A PSED I Overview. *Foundations and Trends in Entrepreneurship,* 3**,** 1-150.
REYNOLDS, P. D., CARTER, N. M., GARTNER, W. B. & GREENE, P. G. 2004. The prevalence of nascent entrepreneurs in the United States: Evidence from the Panel Study of Entrepreneurial Dynamics. *Small Business Economics,* 23**,** 263-284.
REYNOLDS, P. D., GARTNER, W. B., GREENE, P. G., COX, L. W. & CARTER, N. M. 2002. The Entrepreneur Next Door: Characteristics of Individuals Starting Companies in America: An Executive Summary of the Panel Study of Entrepreneurial Dynamics. *SSRN eLibrary.* SSRN.
REYNOLDS, P. D. & MILLER, B. 1992. New firm gestation: conception, birth and implications for research. *Journal of Business Venturing,* 7**,** 405-417.
SANSONE, C., MORF, C. C. & PANTER, A. T. 2004. *The Sage Handbook of Methods in Social Psychology*, Sage Publications, Inc.
SARASVATHY, S. D. 2001. Causation and Effectuation: Toward a Theoretical Shift from Economic Inevitability to Entrepreneurial Contingency. *The Academy of Management Review,* 26**,** 243-263.
SENYARD, J., DAVIDSSON , P., GORDON, S. R. & STEFFENS, P. R. 2009. The comprehensive Australian Study of entrepreneurial emergence (CAUSEE) high potential nascent entrepreneurs: some preliminary findings. *The 6th AGSE International Entrepreneurship Research Exchange.* Adelaide, Australia.
SIEGEL, R., SIEGEL, E. & MACMILLAN, I. C. 1993. Characteristics distinguishing high-growth ventures. *Journal of Business Venturing,* 8**,** 169-180.
SOUITARIS, V., ZERBINATI, S. & AL-LAHAM, A. 2007. Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing,* 22**,** 566-591.
SPRADLEY, J. P. 1980. *Participant Observation,* New York, NY, Holt, Reinhart and Winston.

TAYLOR, D. W. & THORPE, R. 2004. Entrepreneurial learning: a process of co-participation. *Journal of Small Business and Enterprise Development,* 11**,** 203-211.
VAN DE VEN, A. H. & ENGLEMAN, R. M. 2004. Event- and outcome-driven explanations of entrepreneurship. *Journal of Business Venturing,* 19**,** 343-358.
VINTON, G. & ALCOCK, S. 2004. Entrepreneuring in education. *The International Journal of Education,* 18.
WRIGHT, M., CLARYSSE, B., MUSTAR, P. & LOCKETT, A. 2007. *Academic Entrepreneurship in Europe,* Cheltenham, UK, Edward Elgar Publishing.

Paper V

Promises of societal entrepreneurship: Sweden and beyond

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Abstract

Purpose – Several types of entrepreneurship with a societal purpose coincide in Sweden today, some stemming from older domestic traditions, others being more recent foreign influences. This paper aims to interrelate social, civic, community, and other entrepreneurships in search of a more unifying concept of societal entrepreneurship for Sweden and beyond.

Design/methodology/approach – As part of a larger study, Swedish researchers and practitioners promoting some kind of entrepreneurship with societal purpose, are interviewed and asked for examples and literature references. Altogether 176 actors are identified and 59 are interviewed. The main distinguishing factors between different discourses of entrepreneurship are accounted for as well as results from workshops where actors representing different discourses partook.

Findings – Seven societally oriented entrepreneurship discourses are distinguished, with different foreign or domestic origins. Key characteristics for interrelating different discourses are the type of actor (individual and/or collective) and purpose (social/ecological and/or economic) emphasized in a discourse. Interactions documented from workshops indicate a potential in unifying different entrepreneurships within a widened understanding of societal entrepreneurship.

Research limitations/implications – The field of entrepreneurship emphasizing societal utility is fragmented with many parallel discourses. The conceptual analysis and empirical findings imply that there is potential in a more unifying concept. Furthermore, in the limited Swedish setting, collective dimensions of entrepreneurship stand out. This nevertheless implies that collective engagements into entrepreneurship of any kind are worthy of more research and recognition.

Practical implications – Implications are primarily limited to societal entrepreneurship within uncontested welfare states, such as Sweden, where most established societal needs are taken care of through taxes utilized by a public sector. Societal entrepreneurship in such a setting becomes a mechanism for renewal and experimentation.

Originality/value – The paper is original in its approach to identifying and interrelating current discourses in Sweden.

Keywords Entrepreneurialism, Societal organization, Communities, Sweden

Paper type Research paper

Introduction

Entrepreneurship is generally recognized and emphasized as a driver of economic growth and prosperity (Baumol *et al.*, 2007) and a catch-phrase for economic stimulus (Acs and Audretsch, 2003). Although stimulation of entrepreneurship is an important policy in many countries (Bosma and Harding, 2006), the positive societal outcomes are normally seen as indirect (i.e. generating jobs and more tax-money, as well as renewing the economy), rather than direct societal effects stemming from entrepreneurial ventures. Recently, however, entrepreneurship has increasingly come into focus as a potential stimulus for societal value creation as well (Steyaert and Hjorth, 2006). Academic research

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identifies the societal activity through various labels. Social entrepreneurs target concrete social problems using and adapting traditional business venturing tools (Dees, 1998a) while community and civic entrepreneurs engage in networking – outside the box – to rejuvenate the local or regional economy (Henton *et al.*, 1997; Johannisson and Nilsson, 1989; Dupuis and De Bruin, 2003). A mainland-European public entrepreneur (Bjerke, 2005) engages in societally useful cultural or ecological activities, placing minor or no interest in economic motives.

One main stream within entrepreneurship research defines entrepreneurship[1] as the discovery, evaluation and exploitation of opportunities to create future goods and services (Shane and Venkataraman, 2000). When entrepreneurship is also emphasized for societal ends, it is done more or less in alignment with this main stream understanding. Sometimes the importance of market-offerings and profit-making are emphasized even for social and/or ecologically oriented ventures (Leadbeater, 1997). Other times the mainstream understanding of entrepreneurship is more challenged by the emphasis attributed to citizenship, individual networking, pro-bono engagement, etc. (Henton *et al.*, 1997), as well as the intent to explicitly avoid building personal wealth and economic power. The latter is a main concern within a relatively established tradition of social economy (Westlund, 2001).

When increased interest is placed on societal value creation through entrepreneurship, there is an academic need to generate a clearer and more unified conceptual understanding around such developments. There is also a practical need of determining which entrepreneurial components can and should be included into an entrepreneurship that is emphasizing societal utility. A field of study which is too fragmented risks missed opportunities such as hindering policy-making, and the allocation of funding and other resources. Fragmentation also can hamper collaboration due to actor association limited to the boundaries of a particular stream or community. Bounded communication and lack of a shared concept can keep promising societal ventures from realizing their full potential.

Purpose and outline

Several types of entrepreneurship with a societal purpose coincide in Sweden today, some stemming from older domestic traditions, others being more recent foreign influences. The purpose of this paper is to interrelate social, civic, community and other entrepreneurships in search for a more unifying concept of societal entrepreneurship for Sweden and beyond.

A background describing the Swedish "welfare state" is first given as a contextual foundation. The methodological approach used follows. Next, entrepreneurial discourses concerned with societal value creation – traditional, civic, community, social and public entrepreneurship as well as social economy, and corporate social responsibility (CSR) – are identified and described. These are then interrelated on a conceptual four-field map typifying actor and purpose with a specific type of entrepreneurship discourse. Accounts from workshops, with participants engaged in different types of entrepreneurship, indicate opportunities for a more unified concept. Finally, implications are made for both the Swedish context and beyond.

Contextual background

Sweden is a country in which all political parties in the parliament – from left to right – embrace a welfare model in which relatively high-taxes allow for a public sector to

provide healthcare, education and social security to all citizens. For many, the Swedish welfare system has become synonymous with the government driven public sector. However, the social and societal responsibility of the Swedish populous expands beyond the public sector in many ways. In Sweden, the term social economy, based on the 1989 European Union (EU) term, but redefined by the Swedish Government for internal use in 1998, refers to the cooperative associations conducting public sector activities but not considered public sector, i.e. financed by the public money but not "owned" by the government. The Swedish civic society champions volunteer engagement and formation into "associations," (such as politics, sports, and churches), and can be tied to nineteenth century traditions of broad democratic memberships.

The Swedish term "societal entrepreneurship" emerged to describe initiatives taken during the late 1970s to counteract the decline of large corporate and industrial activities in smaller (local) communities. The large corporate and industrial organizations, together with a strong central government, had previously held the main responsibility for economic development in these communities. Thus, in Sweden, societal entrepreneurship initially emerged as a reactive, place-based phenomenon at the periphery of society, rather than at the core (Brunsson and Johannisson, 1983). As local strategies developed, early streams of Swedish research emerged around the phenomenon but were internationally published under the label of "community entrepreneurship". However, the Swedish direct translation of "societal entrepreneurship" was anchored in Sweden as, e.g. a sub-definition of entrepreneurship in the Nationalencyklopedin (2001), and having an emphasis on driving local economic development. Since the late 1990s, Sweden, just as the rest of the world, has taken in strong entrepreneurial influences with other attributes. Recently, it can be seen as a melting pot of entrepreneurship discourses emphasizing, among other things, and societal utilities.

Methodology

As part of a larger study[2], Swedish researchers and practitioners promoting some kind entrepreneurship with societal purpose, were interviewed and asked for examples and literature references. A total of 176 actors were identified through extensive search, of which 59 were interviewed. On March 6, 2007, based upon the interviews, actors interested in entrepreneurship research were invited to an interactive workshop focusing on the conceptualization of a Swedish societal entrepreneurship. Present at the workshop were strong advocators of the identified discourses. In this paper, the outcomes of the workshop are used to indicate unification through documenting interactions between discourse advocators that might never have met previously.

Methodological approach

Discursive pragmatism is presented by Alvesson and Kärreman (2000a) as an approach in which conversations and other discursive outcomes can be studied in order to illuminate interpretations close to the discourses, acknowledging the multiplicity of possible meaning. Thus, interpretation of discourse can be sustained when the task of the researcher is the restructuring of vocabularies, settings and/or relations, provided that the richness of the social realities is recognized. Discursive pragmatism requires the awareness of the contextualization of language, such that language is not used as a mirror, positioned into a complete or exhaustive definition, but instead allows for discourse-context interaction.

In taking such an approach, it is important to clarify the intended use of the word discourse in this study. Alvesson and Kärreman (2000b) present a review of different perspectives, including discourse as a linguistic form of organizational sense-making vs social constructions, and positioned as social context vs literal interpretation (Keenoy *et al.*, 1997); as an arrangement of the social world, informing social practice (Foucault, 1976, 1980); and as language as it is acted upon in social settings (Potter, 1997). For this study, discourse is intended to represent how language is formulated to describe social activity, in relation to perceptions or existing definitions, explained either literally, or through real examples (as compared to metaphors). Thus, collected discourse is not utilized to define what social reality is, but rather to contribute to a constructed concept, which can be reacted upon.

Entrepreneurial discourses concerning societal utility

Seven distinguishable entrepreneurial discourses concerned with societal utility have been identified in the Swedish context. In relating them to literature references, we label them as civic, community, social, public and traditional entrepreneurship as well as social economy and CSR. Although some might not attribute them as entrepreneurial we still include the two latter discourses, due to their concern with taking new initiatives and breaking new ground. Before attending to how these discourses may be unified within a collecting concept of societal entrepreneurship, each movement will first be described independently.

Community entrepreneurship and "old" societal entrepreneurship

In Sweden the term "societal entrepreneur" has a history dating back to the early 1980s (Johannisson, 1985) and is defined by Johannisson in the *Swedish National Encyclopedia* in the following way:

> A person who in a community has contributed to building an entrepreneurial spirit, is called societal entrepreneur[3] (Nationalencyklopedin, 2001).

Such a Swedish understanding of societal entrepreneurship is related to an old civic society tradition of regional or local mobilization for economic development that today some consider forgotten. In an international context, this Swedish tradition has been referred to as community entrepreneurship (Johannisson and Nilsson, 1989). Commonly, community entrepreneurship has entrepreneurial champions mobilizing broadly in the local community, often to counter such challenges as the closing down of an industry. Community entrepreneurs often build upon organized civic society in associations and local folklore societies. Although social motives might drive community entrepreneurship, they are often implicit, with the main aim being economic rejuvenation of a local community.

Civic entrepreneurship

Civic entrepreneurship is a more modern Swedish phenomenon, closely related to community entrepreneurship. Civic entrepreneurship is characterized by regional actors from business, the public sector, and the academy stepping outside their "boxes" and joining forces to enable entrepreneurial activity and regional development. The movement originates from the USA (Henton *et al.*, 1997), particularly from experiences of regional economic revitalization efforts around, e.g. Silicon Valley.

In Sweden, the influence from civic entrepreneurship is promoted through, e.g. the Swedish Agency for Innovation Systems (VINNOVA, www.vinnova.se/In-English/) and through programs that inspire and incentivize triple helix type interactions[4], thereby solving complex problems, such as initiating economic renewal.

The newer civic entrepreneurship differs from an older Swedish community entrepreneurship in regards to how much the civic society is engaged. Community entrepreneurship is paradoxically more oriented towards civic society whereas civic entrepreneurship is more oriented towards the business, public[5], and academic sectors. Civic entrepreneurship is also an approach which more heavily involves societal elites, while community entrepreneurship stems from bottom-up local movements often built around some local entrepreneurial champion (reflecting the Swedish definition of "societal entrepreneur" in the *National Encyclopedia* as stated earlier).

In the UK the term civic entrepreneurship is used in yet another way, mainly to focus upon initiatives revitalizing public sector operations (Goss and Leadbeater, 1998). The translation of such a British type of civic entrepreneurship to a Swedish context is closer to a tradition of social economy, which is discussed further below.

Social entrepreneurship

Of the movements discussed in this paper, social entrepreneurship is currently the most widely recognized, and is utilized both internationally and in Sweden[6]. Naturally, there are many discrepancies regarding how social entrepreneurship is perceived (Peredo and McLean, 2006) and how it is positioned in relation to other entrepreneurial movements when discussing the social sector (Hjorth and Bjerke, 2006).

An Anglo-American movement around social entrepreneurship (Leadbeater, 1997; Catford, 1998; Dees, 1998b; Johnson, 2000) has gained strong ground in the Swedish setting. However, there are clear differences even between the USA and UK versions of social entrepreneurship. American social entrepreneurship typically emphasizes philanthropy – whether traditional "check-book philanthropy" or "high-engagement philanthropy." The latter is a more recent phenomenon, in part due to successful and relatively young IT-entrepreneurs wanting to apply their skills and fortunes towards social motives. The Anglican version of social entrepreneurship stems from experiments in new forms of public-private structures (Palmås, 2003). A basic assumption in the Anglican social entrepreneurship is that the welfare state should remain and not necessarily be replaced by a more charity-based society.

Among the characteristics of social entrepreneurship is the breaking of traditional boundaries of the modern industrial welfare state (Leadbeater, 1997). At its core, civic society is becoming more integrated into the business and public sector. Activist type of interest towards, e.g. fair trade or climate change is built into the "brand" of companies and the concrete offerings of these companies are mechanisms utilized in order to distribute the message. Thus, social entrepreneurship in Sweden can be seen as being influenced by the Anglo-American examples, while allowing experimentation with new organizational forms, including forms generating profit and packaging social good into private offerings.

Public entrepreneurship

Resistance against Anglo-American social entrepreneurship can be seen in advocators of public entrepreneurship (Bjerke, 2005; Hjorth and Bjerke, 2006). Hjorth and Bjerke (2006) promote public entrepreneurship as contrasting to "private entrepreneurship"

and emphasize a Swedish and mainland-European tradition of personal engagement into acts of solidarity without being transactional. Analogous but not in resistance towards the Anglo-American influence, Gawell (2007) instead emphasizes activist dimension entrepreneurship while paying reference to the Attac movement[7].

Public entrepreneurship can be seen as a reaction to the combination of economic motives with social/ecological ones, and is often concerned with preserving culture or embracing diversity through concrete cultural manifestations. Public entrepreneurship thus emphasizes social/ecological motives (including cultural) while avoiding economic motives (Bjerke, 2005).

Social economy

Since 1989, social economy is a recognized concept within the EU, due to the establishment of a special unit concerned with social economic issues (Westlund, 2001). Within the EU, social economy has been demarcated to include four types of organizational structures: cooperatives, mutuals, associations, and foundations. In Sweden, the official definition offered around social economy (Regeringskansliet (The Swedish Government), 2001) is:

> Social Economy includes organized activities that primary have societal purposes, build upon democratic values and are organizationally independent from the public sector. These social and economic activities are primarily operated as associations, cooperatives, foundations, and similar forms. Business within the social economy has common good or membership good, not profit, as primary driving-force.

The social economy community normally prefers to emphasize collective democratic action rather than more individualistic entrepreneurial expressions. In utilizing established (not new) solutions to, for example, day care, schools, and health-care, a large part of this discourse could be seen more as a franchising of democratic governance forms, more than focusing on new entrepreneurial ventures.

Corporate social responsibility

CSR has become a concern for many established firms around the world. Contemporary, CSR includes company activities not necessarily related to core business such as "good citizenship" as well as improvements within core business that positively affect social and ecological outcome (Porter and Kramer, 2006). CSR is mainly conducted within established organizations or settings, instead of in new ventures or in new initiatives, which is reflected in the use of the term "corporate" in the label. However, one way many firms demonstrate good citizenship is by engaging in external initiatives, or encouraging their employees to do so through providing matching funding or support for approved activities. CSR is rarely associated with individual entrepreneurial championing, and has only recently been seen as a tool for economic success, by integrating business and society (Porter and Kramer, 2006). Instead, CSR has been seen by most actors as a means of compensating for a tension between business and society.

Traditional entrepreneurship

As already discussed in the introduction, traditional mainstream entrepreneurship is, by most governments, seen as at least indirectly contributing to society. Traditional entrepreneurship discourse is also heavily associated with individualistic rent-seeking rather than making societal contributions, whether it is its bias towards promoting

white, male, individual success stories (Ogbor, 2000) or the more harsh realities in so-called necessity entrepreneurship being the dominant type of entrepreneurship in the world, according to the *Global Entrepreneurship Monitor*[8] (Bosma and Harding, 2006).

A conceptual map for societal entrepreneurship

Examples of societal entrepreneurship in Sweden often include persons engaging into projects and ventures while at the same time having at least a part-time employment in an established structure. Building upon one's professional role when voluntarily engaging in societal entrepreneurship, is a form of collaboration that is almost unrecognized in the broader social entrepreneurship literature, with its focus on the individual, the business skills, and the "public good." The conceptual mapping of societal entrepreneurship in Sweden (Figure 1) reflects this collaborative and collective side of entrepreneurship.

At the risk of oversimplifying a complex phenomenon, the four field map in Figure 1 allows us to interrelate the identified entrepreneurship discourses along two important dimensions: the type of purpose as well as the type of actor[9]. When positioning the different discourses on the map, they more or less attribute social/ecological or economic purposes as well as collective and/or individual actors.

Civic and community entrepreneurship are primarily focused on economic development. Civic entrepreneurship advocators emphasize regional complex problem-solving, primarily involving the elites and rarely involving dedicated champions (i.e. constituting a more collective rather than individual action).

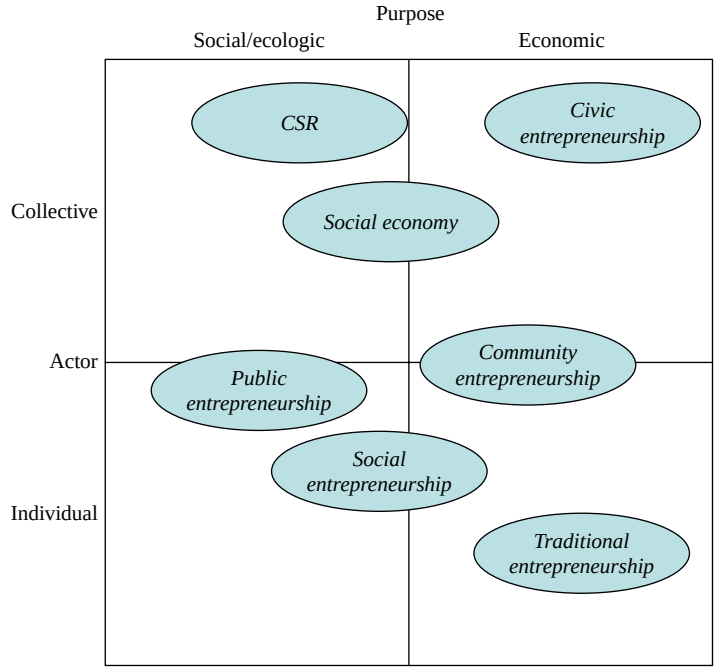

Figure 1.
A conceptual map interrelating entrepreneurship discourses

Community entrepreneurship advocators, in comparison, focus more on bottom-up initiatives involving individual entrepreneurial champions in combination with a collective mobilization.

Public entrepreneurship emphasizes the combination of champions and collective actions, but in its aversion towards business making, it focuses on the social/ecological motives. Social entrepreneurship tends to emphasize the individual champion, driving an independent organization, not paying much respect to collective action, while at the same time forming a bridge between economic, ecological and social purposes.

Social economy, just like social entrepreneurship, combines purposes but emphasizes collective rather than individualistic action. In our conceptual map, CSR is, somewhat misleadingly, positioned close to social economy. In being a secondary activity of corporations that primarily have economic motives as their prime task, CSR is of course, in essence different than social economy ventures, which are specifically setup to meet social demands, often through marketed services. With this distinction in mind, CSR ends up close to both social economy and civic entrepreneurship, being primarily collective entrepreneurial expressions in fairly established settings.

Finally, traditional entrepreneurship is naturally positioned as individual action with economic purposes, although this discourse, as well as all the other discourses today, has strong tendencies towards expanding into something wider, perhaps unifying into a more societally anchored discourse of entrepreneurship.

Expressions of unification

The interactive workshop including Swedish entrepreneurship researchers allowed interrelating of the identified entrepreneurship discourses. Some of the participating researchers represented strong stances within one of these discourses. The following citations give illustration to how unified a Swedish entrepreneurship concept emphasizing societal utility could be:

> I want to avoid Triple-Helix. Instead I look upon it as individuals interplaying (researchers associated with social entrepreneurship).

The above opinion is against civic entrepreneurship and engaging in "intersectoral" (i.e. Triple-Helix) collective action. As a contrast, and proposed at the same workshop, another researcher advocating social entrepreneurship in Sweden is expressing a more positive attitude towards such collective interrelating:

> What I have understood from the workshop day is the inclusion of Triple-Helix aspects. If one wants to develop the concept in a Swedish context, then we are good at triple-helix, and thus we can build upon this (researcher associated with social entrepreneurship).

The following citations collected as part of the workshop dialogue express different types of unifying tendencies beyond the borders of identified discourses:

> The bottom-up entrepreneur and the top-down entrepreneur are different. The interplay between them is interesting.

> The city architect involved in the skateboard park is an example of yet another important role, being part of the entrepreneurship, being an enabler.

> Societal entrepreneurship exists on so many levels: one which is part of the local community, one which comes from the outside as a change agent, etc. There are different roles.

All of the above citations include more collective dimensions into entrepreneurship, broadening the discourse but at the same time emphasizing individual roles and behaviors.

The following citation from a researcher advocating public entrepreneurship shows willingness to appreciate economic motives components although, at the same time, warns about a too business-oriented approach in many initiatives:

> All societal entrepreneurships have in common that they generate more resources than they use – in other words the economizing around the process is important, although far from all societal entrepreneurs are comfortable with a more financial and business oriented control of their projects (researcher associated to public entrepreneurship).

Finally, the following citation from a consultant that has been influential in the broad launch of civic entrepreneurship through governments programs in Sweden, captures reasons to strive for a unified concept of societal entrepreneurship, while also remaining sensitive towards different forms and expressions:

> It is the same as in regular entrepreneurship, but one has an incredible drive to accomplish something without personal gain. Here, the content as such is important. The concept "societal entrepreneurship" is great. It is important [to have] a concept – a joint label – for different things. Otherwise, things easily become fragmented – it has to work in different sectors (civic entrepreneurship advocator).

Altogether, all the citations presented, except one, express positive attitudes towards integrating and combining different aspects of entrepreneurship into a more unifying concept.

Conclusions and future research

The purpose of this paper is to interrelate social, civic, community, and other entrepreneurships in search for a more unifying concept of societal entrepreneurship for Sweden and beyond. As a first conclusion, identified entrepreneurship discourses were possible to interrelate conceptually, in their emphasis towards individual and/or collective action, as well as social/ecological and/or economic purposes. Although entrepreneurship emphasizing societal utility is more multidimensional than our four fielder expresses, there is at least promise that the actors engaging into these processes can be seen as on "the same page" – potentially heading towards a joint discourse – rather than advocating substantially different social phenomena. A second conclusion is that actors, when brought together in an interactive workshop, generally are positive towards a more unifying understanding of entrepreneurship with societal purposes. Considering the current fragmentation into at least seven distinguishable discourses, surprisingly little "separatist" tendencies were identified once the advocators of different discourses were brought together.

The Swedish contextual nature of the study is an obvious limiting factor. Sweden has strong traditions in community entrepreneurship and social economy. Civic entrepreneurship and social entrepreneurship are more recent and, to a large extent, imported from an Anglo-American setting. Public entrepreneurship is a Swedish-based counter reaction towards Social entrepreneurship and is even more recent in its origin (although advocators of public entrepreneurship point at deep roots in Swedish and mainland-European traditions). When looking beyond Sweden, one first needs to note that Sweden is an uncontested welfare state. This positions a societal entrepreneurship

less into solving general social problems in Sweden, as most of these needs are already addressed by the public sector. A typical Swedish feature that may have implications beyond Sweden, is the degree to which the discourses emphasize and include collective action. International literature on social entrepreneurship as well as traditional entrepreneurship is much less appreciative around this component, though civic entrepreneurship (Henton *et al.*, 1997) is an exception.

We thus argue that the Swedish experience might be more sensitive in appreciating collective entrepreneurial actions and we therefore strongly recommend this component to be more consciously looked for and anticipated in future international research into entrepreneurship in general, and into societal entrepreneurship in particular. We argue that entrepreneurship emphasizing societal utility, perhaps more than traditional entrepreneurship, is suited for studying collective entrepreneurship simply since it ought to be more "risk-free" for persons having part- or full-time employments elsewhere to do "good citizenship" than to promote commercial ventures. However, also in traditional entrepreneurship in general and around so-called high-expectancy entrepreneurship and high-tech entrepreneurship in particular, we would argue that there is strong value in better understanding the collective dimensions of entrepreneurship (in terms of engaging academics, businessmen, public servants, etc.). This aspect should thus inspire entrepreneurship research in general.

Implications

The field of entrepreneurship having societal utility is fragmented with many parallel discourses. The paper strongly implies that allowing for further dialogue and interrelation across various discourses holds promise in expanding entrepreneurship discourse into embracing not only societal values but also in combining individual and collective entrepreneurial action.

Another implication, when comparing with an international social entrepreneurship discourse, is that societal entrepreneurship in Sweden should be seen more as a mechanism for renewal and experimentation rather than an alternative to a public sector in taking care of basic human needs.

Those criticizing entrepreneurship for being too stuck in (male) individualistic rent-seeking traditions (Ogbor, 2000) would, if more emphasis was put on collective action as well as social/ecological purposes, arguably become more appreciative towards the field as a whole.

We encourage more research into a more unified societally oriented entrepreneurship discourse, since it seems to hold the promise of becoming one of the main mechanisms for experimentation and renewal of society. This was to some extent recognized already by the early Schumpeter (1934) but since then, and only until recently, this key dimension of entrepreneurship has been hidden in mainstream entrepreneurship discourse.

Notes

1. Capital letters in, e.g. entrepreneurship and social entrepreneurship are in this paper used to emphasize the mobilizing nature of a term, i.e. that there is a community actively interrelating in regards to the meaning of the term. You could also say it is a way of representing a discourse. However, we agree with Alvesson and Kärreman (2000b) that the term discourse has been overused and lost much of its clarity and therefore attempt to avoid its use.

2. The larger study called "Societal entrepreneur" was financed by the Swedish Knowledge foundation (www.kks.se) and included multiple workshops, a study tour, two pilot projects, etc. (Holmberg *et al.*, 2007).
3. All citations in this paper are translated from Swedish and are done so by the authors themselves.
4. The idea of a triple helix interaction between actors from business, government and universities has had a strong impact on programs to stimulate innovation and regional development since 2000 when VINNOVA was formed. Its managing director was inspired by this idea (Etzkowitz and Leydesdorff, 2000), due to his having been a president of a university college that successfully engaged in such interaction with local government and industry.
5. In this paper, public sector includes persons being hired by local, regional or national government to do, e.g. healthcare, teaching, social work, etc. By civic sector we mean voluntary engagement into associations (sports, folklore, etc.) normally unpaid and not commissioned by the government. The academic sector in Sweden with three exceptions (the authors' affiliation being one) is part of the public sector.
6. This can be confirmed by, e.g. a Google-search of the different concepts.
7. The Attac movement can be seen as activist entrepreneurship concerned with global financial markets (Gawell, 2007).
8. For more information regarding the global entrepreneurship monitor (www.gemconsortium.org).
9. We are grateful to Bengt Johannisson who helped simplify the map into this four-field version.

References

Acs, Z.J. and Audretsch, D.B. (2003), "Introduction to the *Handbook of Entrepreneurship Research*", in Acs, Z.J. and Audretsch, D.B. (Eds), *Handbook of Entrepreneurship Research*, Springer, New York, NY, pp. 3-20.

Alvesson, M. and Kärreman, D. (2000a), "Taking the linguistic turn in organizational research: challenges, responses, consequences", *Journal of Applied Behavioral Science*, Vol. 36, pp. 136-58.

Alvesson, M. and Kärreman, D. (2000b), "Varieties of discourse: on the study of organizations through discourse analysis", *Human Relations*, Vol. 53, pp. 1125-49.

Baumol, W.J., Litan, R.E. and Schramm, C.J. (2007), *Good Capitalism, Bad Capitalism, and the Economics of Growth and Prosperity*, Yale University Press, New Haven, CT.

Bjerke, B. (2005), "Public entrepreneurship – marginal made central", paper presented at Enterprise & Innovation Conference, University of Waikato, Hamilton, 7-8 July.

Bosma, N. and Harding, R. (2006), *Global Entrepreneurship Monitor: 2006 Summary Results*, London Business School, Babson College, London.

Brunsson, N. and Johannisson, B. (1983), *Lokal mobilisering. Om industrier kommunalpolitik och kommuners industripoltik*, Doxa, Nässjö (in Swedish).

Catford, J. (1998), "Social entrepreneurs are vital for health promotion – but they need supportive environments too", *Health Promotion International*, Vol. 13 No. 2, pp. 95-7.

Dees, J.G. (1998a), "Enterprising nonprofits", *Harvard Business Review*, Vol. 76, pp. 55-67.

Dees, J.G. (1998b), *The Meaning of "Social Entrepreneurship"*, Harvard Business School, Boston, MA, p. 6.

Dupuis, A. and De Bruin, A. (2003), "Community entrepreneurship", in de Bruin, A. and Dupuis, A. (Eds), *Entrepreneurship: New Perspectives in a Global Age*, Ashgate, Aldershot, pp. 109-27.

Etzkowitz, H. and Leydesdorff, L. (2000), "The dynamics of innovation: from national systems and 'Mode2' to a triple helix of university-industry-government relations", *Research Policy*, Vol. 29, pp. 109-23.

Foucault, M. (1976), *The History of Sexuality*, Vol. 1, Pantheon, New York, NY.

Foucault, M. (1980), *Power/Knowledge. Selected Interviews and Other Writings 1972-1977*, Pantheon, New York, NY.

Gawell, M. (2007), "Activist entrepreneurship – attac'ing norms and articulating disclosive stories", PhD dissertation, University of Stockholm, Stockholm.

Goss, S. and Leadbeater, C. (1998), *Civic Entrepreneurship*, Demos, London.

Henton, D., Melville, J. and Walesh, K. (1997), "The age of the civic entrepreneur: restoring civil society and building economic community", *National Civic Review*, Vol. 86 No. 2, pp. 149-56.

Hjorth, D. and Bjerke, B. (2006), "Public entrepreneurship: moving from social/consumer to public/citizen", in Steyaert, C. and Hjorth, D. (Eds), *Entrepreneurship as Social Change*, Edward Elgar, Cheltenham, pp. 97-120.

Holmberg, L., Kovacs, H. and Lundqvist, M.A. (2007), *Samhällsentreprenör – en förstudie på uppdrag av KK-stiftelsen*, KK-stiftelsen, Stockholm.

Johannisson, B. (1985), "Business and local community – Swedish experiences in bottom-up planning for local industrial development", Report 1985:4, University of Östersund, Östersund.

Johannisson, B. and Nilsson, A. (1989), "Community entrepreneurship – networking for local development", *Journal of Entrepreneurship & Regional Development*, Vol. 1 No. 1, pp. 1-19.

Johnson, S. (2000), *Literature Review on Social Entrepreneurship*, Canadian Centre for Social Entrepreneurship, Edmonton, available at: www.business.ualberta.ca/ccse/publications/default.htm

Keenoy, T., Oswick, C. and Grant, D. (1997), "Organizational discourses: text and context", *Organization*, Vol. 4, pp. 147-57.

Leadbeater, C. (1997), *The Rise of the Social Entrepreneur*, Demos, London.

Nationalencyklopedin (2001), *Swedish National Encyclopedia*, Bra Böckers, Helsingborg (in Swedish).

Ogbor, J.O. (2000), "Mythicizing and reification in entrepreneurial discourse: ideology-critique of entrepreneurial studies", *Journal of Management Studies*, Vol. 37 No. 5.

Palmås, K. (2003), *Den barmhärtiga entreprenören – Från privatisering till socialt företagande*, Agora, Stockholm (in Swedish).

Peredo, A.M. and McLean, M. (2006), "Social entrepreneurship: a critical review of the concept", *Journal of World Business*, Vol. 41 No. 1, pp. 56-65.

Porter, M.E. and Kramer, M.R. (2006), "Strategy and society – the link between competitive advantage and corporate social responsibility", *Harvard Business Review*, Vol. 84 No. 12, pp. 78-92.

Potter, J. (1997), "Discourse analysis as a way of analyzing naturally occurring talk", in Silverman, D. (Ed.), *Qualitative Research*, Sage, London, pp. 144-60.

Regeringskansliet (The Swedish Government) (2001), "Social ekonomi – en tredje sektor för välfärd, demokrati och tillväxt" (in Swedish), available at: www.socialakooperativ.com/acrobat_filer/soceksv.pdf

Schumpeter, J. (1934), *The Theory of Economic Development*, Harvard University Press, Cambridge, MA.

Shane, S. and Venkataraman, S. (2000), "The promise of entrepreneurship as a field of research", *Academy of Management Review*, Vol. 25 No. 1, pp. 217-26.

Steyaert, C. and Hjorth, D. (Eds) (2006), *Entrepreneurship as Social Change*, Edward Elgar, Cheltenham.

Westlund, H. (2001), "Social economy and employment. The case of Sweden", paper presented at Uddevalla Symposium 2001 (Regional Economies in Transition), Vänersborg, June 14-16.

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