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A Case Study: action based Entrepreneurship Education

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HOW EXPERIENCE PROBLEMS CAN BE OVERCOME AND COLLABORATION PROBLEMS
MITIGATED

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Abstract

This paper contributes by providing suggestions on how to analyze business ideas for exploitation in an entrepreneurial education context, and how the institution can provide support activities to enhance the chance of successful exploitation. Active learning has become the preferred choice of teaching entrepreneurship and external ideas are used to provide the students with business opportunities to exploit. An instrumentaø case study on the Norwegian University of Science and Technology – School of Entrepreneurship, however, finds challenges on collaborating with these external partners. By reviewing theory, ways to improve the analysis of business opportunities are found and presented. Additionally a structured idea search process and mentors are suggested as a mean of gaining access to sufficient business ideas and the experience and network necessary for a successful evaluation and exploitation process.

Introduction

The contribution of this paper is to provide suggestions on how to analyze business ideas for exploitation in an entrepreneurial education context and how the institution can provide support activities to enhance the chance of successful exploitation. Entrepreneurship practice has been subject to a rising interest over the latter years. In times of economic recessions and rising unemployment, entrepreneurship is by many regarded as a mean for continued economic growth and prosperity. With an increased interest in entrepreneurship, follows an increased interest in the facilitation of entrepreneurship, by policy makers, entrepreneurship education being an area of special attention. (Laukkanen, 2000). Entrepreneurship education is even regarded to play a major role in the economic development of a country (Gibb, 1996). According to a study by Brockhaus's (1991), entrepreneurship education is recognized as a tool for economic development worldwide, and universities all over the world, including former communist countries, both teach entrepreneurship and conduct research on both practical and theoretical entrepreneurship issues.

Entrepreneurship education has been in transition over the last couple of years, becoming more and more an arena of action learning and less prone to scholastic pedagogical methods. This is in line with the academic work on entrepreneurship education arguing that entrepreneurship is best taught by acts of entrepreneurship and experimental pedagogical tools (Haines, 1988; Hills G. E., 1988; McMullan & Long, 1987).

When looking into the literature on opportunity search, evaluation and exploitation, experience is often cited as one of the main ingredients of success. Experience can however not be taught in a scholastic setting, but emerges from observing, and participating in, real events.

So what strategies do entrepreneurship educators use to help students overcome the problems related their lack of experience and to build entrepreneurial knowledge reservoirs for themselves, and importantly: do they succeed at this?

Conducting an intrinsic case study on the action learning based institution Norwegian University of Science and Technology – School of Entrepreneurship (NSE) this article shows that NSE uses several strategies to overcome the experience chasm. Ideas are gathered from external sources to

overcome experience challenges on opportunity search and discovery, and are started with external partners to remedy experience challenges related to exploitation. Former students are involved in business plan workshops and external resource persons like lawyers and venture capitalists are brought in to help evaluate business potential. However, problems related to the collaboration with external partners have caused several projects over the last years to be abandoned. Problems with communication, involvement, dedication, and willingness to share economic reward, are examples of these problems. As a reaction, students shift towards less innovative ideas with less economic potential in order to steer clear of external partners. This I see as a threat to NSE's role as a school of technology based entrepreneurship.

This research points to flaws in the process of analyzing external business ideas where founder characteristics such as success in previous work, dedication and startup experience is not given enough attention, and looks into important areas where action based entrepreneurship education can possibly be improved. It is shown that in situations where collaboration with external partners occurs it may be useful to learn from venture capitalists in emphasizing team or founder analysis over most other characteristics of the opportunity.

The problem this article answers is the following:

In an action based entrepreneurial learning context, how should opportunities be analyzed, and how can the educating institution best provide support activities in order to maximize the chance of a successful exploitation?

The structure of this article will be as follows: First some theory on entrepreneurship education will be provided; second the methodology and NSE as context, will be presented; third findings of the case study are submitted; fourth, the theory is revisited in search of improvements to the existing process and framework; and last suggestions are presented.

Theory

It has been questioned whether (entrepreneurship) education increases the chance of a successful startup, or said differently, whether entrepreneurship can be taught at all (Fiet J. O., The theoretical side of teaching entrepreneurship , 2001) (Sexton & Upton, 1987).

In a 1994 study, Robinson and Sexton find that **general** education has a strong positive influence on entrepreneurship and success, even stronger than that of experience. This is in strong contrast to the often presented anecdote of the high school dropout making it big in the business world (Robinson & Sexton, The effect of education and experience on self-employment success , 1994). Later research has confirmed the importance of education, specifically entrepreneurship education; graduates with an entrepreneurship major are more likely to start new businesses and have stronger entrepreneurial intentions than the general graduate (Kolvereid & Moen, 1997).

Entrepreneurial education theory often distinguishes between the *science* and the *art* of entrepreneurial practice (Jack & Anderson, 1998). The science or skills includes raising cash, legal, marketing and other skills that can be learned in a traditional classroom setting (Garavan & O'Conneide, 1994). The art, however, can first and foremost be learned through experience rather than in the educational environment (Gorman, Hanlon, & King, 1997). The focus of most entrepreneurial courses is on the functional skills, or the science of entrepreneurship, however, entrepreneurship educators unanimously agree to a shift towards the artistic and creative teaching of entrepreneurship (Douglas & Shepherd, 1997).

The Schumpeterian and Kirznerian perspectives on entrepreneurship have also been used as a distinction between the teachable and unteachable aspects of entrepreneurship (Dana, 2001) argued that while the Kirznerian opportunity recognition can be taught, the Schumpeterian, opportunity creation, cannot. Summarized, entrepreneurship practice consists of both teachable and unteachable aspects. The teachable can again be separated into aspects teachable through traditional scholastic methods and aspects learned through experience.

An important question is whether the act of finding and selecting viable business ideas can be learned, or only the actual exploitation of it. According to Further, Saks and Gaglio (2002), it is possible to teach the evaluation of opportunities, but not the recognition thereof. Advocating that this can be achieved, Baron and Ensley (Baron & Ensley, 2006) state that, "*Basic research on pattern recognition and recent research in the field of entrepreneurship suggests individuals can learn to notice patterns necessary to identify business opportunities*". Research also suggest that the search for opportunities of experienced entrepreneurs differs significantly from that of novice

entrepreneurs suggesting there is a learning potential in experience (Bar-Hillel & Falk, 1982; Fiet, Clouse, & Norton, 2004; Gaglio C. , 1997; Gilad, Kaish, & Ronen, 1988).

Still, can a search for opportunities be managed in a world of unknowable uncertainties? According to Austrian economics an active search of opportunities is not possible since searching in an unbounded domain without knowing what to look for, per definition, cannot result in a successful outcome. Instead the Austrian entrepreneurial alertness (Kirzner 1973), where an opportunity is discovered as a surprise to the finder, is the way opportunities emerge. If opportunities emerge as a surprise to the finder in a world of unknowable distributed information, then alertness is largely dependent on luck (Demsetz, 1983) and luck cannot be taught. A belief in this perspective can hardly be combined with a positive view on entrepreneurship education, or can it? When conducting a search the object is to “(...) identify a discovery, which is a valuable economic opportunity, such as the founding of a new firm, the creation of a new product line, the development of an innovative technology, the satisfaction of an ephemeral market need through arbitrage, or the like (Fiet & Patel, 2006). Regardless of which perspective of opportunities one advocates, information is required to recognize and exploit a business idea (Fiet, 2001; Kaish & Gilad, 1991; Shane & Venkatamaran, 2000).

According to Fiet & Patel (2006) it is possible to maximize the outcome of a search for opportunities. This can be accomplished by utilizing one’s specific knowledge, which is the intellectual perception of people, places, timing, special circumstances and technology (Hayek, 1945) and searching in information channels, what can be a comparatively low-cost source of new specific information that is capable of changing our views of the future, particularly as they relate to the creation of new wealth (Fiet, 2007; Marshak, 1971) Entrepreneurs can select and search based of specific knowledge from prior experience (Fiet, 2007; Fiet, 1996). This can be described as searching for opportunities related to what the entrepreneur already knows, through information sources providing information in accordance with his own experiences. This search behavior is that of experienced entrepreneurs, which is different from that of novice entrepreneurs. (Bar-Hillel and Falk, 1982; Baumol, 1993; Fiet et al., 2004; Gaglio, 1997; Gilad et al., 1988). With a lack of experience, the possible information channels are reduced, decreasing the chance of finding a viable business opportunity.

Shane and Venkatamaran (2000) are more Kirznerian in their approach to opportunity discovery and do not, as Fiet, argue for the possibility of an active search; however they agree on the importance of experience. In a 2000 article they point to:

“(...) two categories of factors influencing entrepreneurial discovery, (1) the possession of prior information necessary to identify an opportunity and (2) the cognitive properties necessary to value it.” (Shane & Venkataraman, 2000, pp. 221,222)

As can be seen, an element that by many is regarded as important for the discovery of opportunities is experience and prior knowledge, and experience cannot be transferred through traditional learning methods.

According to Politis (2005) it can be distinguished between entrepreneurial experience and entrepreneurial knowledge. Experience in this context, can be defined as “(...) a direct observation of, or participating in, events associated with new venture creation(...)” while entrepreneurial knowledge is “(...)the practical wisdom resulting from what an entrepreneur has encountered(...)” (Reuber, Dyke, & Fischer, 1990). According to Kolb (1984) experimental learning consists of acquisition and transformation. In line with Politis’ (2005) framework for the entrepreneurial learning process, what is referred to as experience in the continuum are all observation, and participating in, events which can lead to entrepreneurial knowledge through a transformation process. Specifically included is startup experience, management experience and industry specific experience. Shane (2000, pp. 452) puts it:

“Three major dimensions of prior knowledge are important to the process of entrepreneurial discovery: Prior knowledge of markets, prior knowledge of ways to serve markets and prior knowledge of customer problems”.

The factors influencing a successful opportunity recognition and development process according to Ardichvili, Cardozo and Ray (2003) are, entrepreneurial alertness, information asymmetry and **prior knowledge, social networks**, personality traits, including optimism and self-efficacy and creativity and type of opportunity itself.

There has also been some research on entrepreneurs themselves and which attributes they possess that make them recognize opportunities others overlook. The importance of subjective differences between entrepreneurs and non-entrepreneurs is debated but since opportunity recognition is a cognitive act, it is also an individual act (Eckhardt & Shane, 2003). Some individuals may recognize opportunities others overlook because they possess the cognitive frameworks needed to perceive the patterns among seemingly unrelated trends or events (Baron & Ensley, 2006).

Traditionally entrepreneurship education has had an individual focus but in later years this has been subject to a shift towards a more action oriented pedagogical approach. This shift is based on what appears as consensus in the entrepreneurial education research, namely that entrepreneurship is best taught by acts of entrepreneurship and experimental pedagogical tools (Haines, 1988; Hills 1988; McMullan & Long, 1987, Root & Gall, 1981, Harwitz 1977). A parallel strategy combining individual focus with training in business establishments has been suggested by Laukkanen (2000). His “business generation model” suggests that students should be operationally involved in real business contexts.

There has however also been showed that entrepreneurship education has a lack of uniformity in their objectives, philosophy, content, pedagogy and outcomes (Fiet 2001, Gorman, 1997).

By asking successful entrepreneurs and CEOs of successful growth companies, Hood and Young (1993), identified what the practitioners suggest should be part of the curriculum in entrepreneurship education, based on their own experiences. Positive for the aim to educate entrepreneurs was their finding that the surveyed actually believed most aspects of entrepreneurship can be learned and is not genetically given or developed in early child years (Hood & Young, 1993). Summarized, entrepreneurship practice consists of both teachable and unteachable aspects. The teachable can again be separated into aspects teachable through traditional scholastic methods and aspects learned through experience.

As a result of the importance of experience in all aspects of the entrepreneurship field (discovery, evaluation and exploitation), action learning has emerged as the preferred pedagogical approach, often through a business generation model. According to McMullan & Long (1987)

entrepreneurship education should be creatively grounded with student exposure to problem solving and ambiguous and complex situations, in addition to hands-on working experience with community ventures. Shepherd & Douglas (1997) have suggested a shift of emphasize from teaching to learning through hands-on active participation in real life ventures with constructive feedback from an expert. This and similar approaches are referred to as action learning.

To find what an entrepreneurship educator does to support this business establishment, and to bridge the lack of relevant experience and network e.g. providing mentorship and collaborating with external founders is part of the aim of this research.

Important in the academic discussion of entrepreneurship education is the need for evaluation of itself (Block and Stumpf, 1992; Curran and Stanworth, 1989). The majority of studies actually trying to examine the effect from entrepreneurship education in terms of venture creation have however suffered from intrinsic procedural and methodological limitations (Curran & Storey, 2002; Gorman and Hanlon, 1997). Criteria of assessment can be the number of graduate or undergraduate courses offered, the level of commitment to and formalization of the program, the amount of institutional resources available in the form of faculty and staff dedicated to the program; and the presence of extracurricular organizations in the form of clubs, societies and special interest groups supported by the program (Robinson & Hayes, 1991).

The context of the research or the case is that of the NTNU School of Entrepreneurship (NSE). A general description of NSE follows.

NTNU SCHOOL OF ENTREPRENEURSHIP (NSE)

NSE is associated with the Norwegian University of Science and Technology. It educates master students in Science and Technology, with the aim to create future entrepreneurs and business developers. NSE has high ambitions both nationally and internationally with a vision to educate the world's best business developers.

“The primary goal for NSE is for the students to learn business development, the secondary is to accomplish technology based innovation” – Roger Sørheim, 2011

The two years at NSE contain a significant amount of practical project related work with an explicit aim for the students to create actual ventures. To be accepted at NSE, students have to be enlisted at any M.Sc. and Tech. degree at NTNU and to have completed 3 years of their studies, which corresponds to an undergrad or bachelor degree. To be accepted, the students have to show their skills and motivation through an application letter and interview and they will also be judged based on their previous accomplishments and grades. The purpose of this selection process is to secure ambitious and motivated students, necessary if the goal of launching new ventures is to be fulfilled.

ACADEMIC CURRICULUM

The action learning aspect of NSE is complemented by a curriculum of more traditional style. Since all students of NSE have a background corresponding to an engineering undergrad degree and are eventually receiving a master of science and technology, some technical/engineering subjects are needed. More interesting in an entrepreneurship context are the subjects supposed to help build the entrepreneurial competence. The first semester, the students have a course in strategy. Additionally, they are introduced to several entrepreneurial theory and research concepts such as effectuation vs. causation, the resource-based view on entrepreneurship, etc. The second semester two additional courses are mandatory, international business development, which consists of various marketing strategies, and technological business development which introduces concepts such as company valuation, venture capital and intellectual property rights. During the second year, the students are prepared for their masters degrees with a subject on research methods and entrepreneurship research.

SUCCESSSES

Over the years since its establishment in 2005, NSE has seen some successes:

Verdande Technologies, which was founded by students of the first ever class of NSE in addition to a NTNU professor, has expanded to 28 employees. It is still privately financed and held. Verdande is a technology based company which delivers:

“(...) a software-platform designed to reduce risk and cost related to complex and critical operations across industries. It is used in the planning process – to optimize the operation, during operation – to monitor and take corrective action when necessary, and in post-analysis – to improve efficiency.”

In fall 2010, NSE experienced its first exit of a NSE related company when the start-up called prampack, a protection bag for prams to be used during flight transport, was acquired by Stokke. In addition, several students are, or have been, involved in different other start-ups. Examples are Windflip, aiming to launch a barge for transportation of offshore floating wind turbines, and yast, an online time tracker for timing different projects of all shapes and sizes. Another startup called dSafe is also started by a NSE student with a business idea of digitalizing receipts.

The Instrumental Case Study Approach

An instrumental case study seeks to answer questions that arise from a conceptual review of theories and tries to understand the theoretical framework within a specific setting (Stake, 1995). I use the instrumental case study, or exploratory case in Yin’s (Yin, 1989) typology, to explore how theories play out in the real life context. The particular instance of the action based entrepreneurship master program at the NTNU used as the instrumental case to provide insight into the issue. The process of action based entrepreneurial education is elaborated on the basis of opportunity theories and venture capital theory as a theoretical framework. In case studies there are challenges regarding the determination of boundaries or the unit of analysis (Creswell 1998, Stake 1995). In this study the boundaries were defined according to a priori categories. The boundaries were set within three categories such as the idea selection and exploitation, problem of experience and challenges regarding external partners. The rationale is to rely on theoretical propositions, i.e. how these aspects can be combined, and then to analyze data and propose practical implications based on those propositions. The instrumental case study is thus used to provide tentative insight into an issue of how action based entrepreneurial education can function in these three areas.

This involves data triangulation, i.e. choosing descriptions from various sources of research. The use of different research sources, public documents, web sites, interviews and evaluation reports

has been shown to be a good approach in finding information, descriptions and interpretations of the action based entrepreneurial education case.

I have also used theory triangulation to obtain a more comprehensive view of action based entrepreneurial education. It has been proposed that the triangulation of multiple theories can, 'produce a richer, more sophisticated understanding of the phenomenon' (Babbie & Baxter, 2004, p. 319). Here, theoretical triangulation means that various theories are examined and compared to facilitate the research question, theoretical insights and practical implications. Using opposing viewpoints can enhance the validity (Denzin, 1970) especially when a broader, deeper analysis of findings is provided (Banik, 1993). The problem definition comes from a thorough analysis of the research in the entrepreneurship in a search for possibilities to increase chance of venture success. Theoretical reflections laid a basis for further exploring the field of entrepreneurship education and the experience problem.

In the discussion section I present some theoretical insights and educational implications which are articulated in light of the combined use of theories (i.e. opportunity theories, views on the importance of experience, venture capitalist decision criteria and successful venture criteria). The benefits of this type of triangulation hopefully include a better understanding of the action based entrepreneurial education phenomenon.

DATA

9 semi-structured interviews have been conducted with duration from 30 to 120 minutes. The interviewees represented 12 present and former startup projects.

Medium	Style	No. of respondents	Time	Class of
Mail	Semi-structured	11	NA	2011/2012
Phone	Semi-structured	4	5 Hours	2011
Live meeting	Semi-structured	5	4 Hours	2012

Table 1: empirical basis

DATA ANALYSIS

In data analysis, it is not the sheer amount of accumulated data, but the ability to identify the essence and reveal this essence with sufficient context (Wolcott, 1990). For data evaluation, grounded theory techniques have been used.

Findings

The NTNU School of entrepreneurship utilizes a specific framework of what is referred to as “acid tests” in combination with external ideas, to find viable business opportunities for the student to participate in action learning. Acid tests are a preliminary study of business potential conducted over one week in order to identify or discard the idea as a possible startup. These acid tests in combination with the initial search for ideas are a way of organizing and actively searching for business opportunities without the student having to identify the opportunities themselves.

The evaluations of the business ideas, or acid tests, are conducted during the first semester at NSE. This is done in groups of about 5 students, themselves choosing which idea to assess. The teams are chosen by the NSE staff. The business ideas are then assessed in a rather unstructured

process. The students are urged to call potential customers, industry experts, distributors, retailers etc. with an emphasis on quantity. The delivery is a however clearer, a report based on a template and a presentation of the findings described in the report. The main points addressed are:

1. *Product and/or service concept*
2. *Market/Industry*
 - a. *Segmentation*
 - b. *Value chain*
 - c. *Customers*
3. *Organization*
 - a. *Source of idea*
 - b. *Business model*
4. *Economy*

Before analyzing the ideas, these are gathered through different sources in a process that differs each year. (Students interviewed described this potential area of improvement, setting up a more systematic process to increase the number of ideas available). Among the ideas that were analyzed in 2009 and 2010 about 70 percent came from external sources. These external sources include technology transfer offices, industry partners, former students, etc.

Rated from most common to least, the idea sources are:

- 1) *Ideas by NTNU Technology Transfer or Cern Knowledge Transfer (15)*
- 2) *Ideas by NSE students and friends (14)*
- 3) *External ideas by industry partners etc. (11)*
- 4) *Ideas by active search towards NTNU researchers and students (3)*
- 5) *Ideas by former NSE students(1)*

When it comes to which ideas are eventually chosen, the ratio of student ideas has fallen to about 15% indicating that these are found to be less attractive than the opportunities with external partners.

As the first semester at NSE comes to an end, the students themselves form teams of an average of three students and select a business to pursue.

WHY PROJECTS ARE DISCONTINUED

An overweight of the interviewees however indicate collaborative problems with their respective founders. These problems include but are not limited to dedication, involvement, business knowledge etc.

Of the business ideas initially pursued by the class of 2011 several have been aborted due to collaboration problems with the external rights owners:

Expectation dissonance

“The rights owner had several different projects which resulted in him giving our idea less attention. We felt more and more that we were conducting consulting work than participating in a startup”

Communication problems

“It was a difference in what we were envisaged and what was actually the status of the project”.

Incentive and ownership problems

“We could just not summon the passion needed for our project since the ownership was elsewhere. Because of that it just became a school project.”

As one interviewee summarizes:

“My impression is that in reality there often arise two different teams. One NSE team writing a business plan, and one external team having the ownership and decision power. This way the NSE work is reduced to consulting work and not real business development”.

Some of these groups have later started over again with less technology intensive ideas. As one interviewee puts it, *“some may think that (non-technology ideas) do not belong at NSE, but as long as we do not have any recent successes (of technology startups) it is hard to gain support of choosing high tech.”* Another interviewee, having started again without external partners disclosed: *“We wanted to start something and making decisions without having to wait for someone else to approve. The progress just suffered too much on lack of commitment from our external partners”*

So while finding evidence that NSE seeks to overcome the experience problem with connecting with external partners in the search, and exploitation for business ideas. It is obvious that there are some challenges in succeeding with this process.

POTENTIAL IMPROVEMENTS

Mentors and learning

When asked of what they believed would remedy these problems, students e.g. suggested an institutionalization of evaluation and selection with more assistance from mentors and more learning from previous mistakes.

“More should be done to educate the students in previous mistakes. As of now I have the feeling that the same mistakes are done every year”.

“More mentors and coaches with experience since they early can spot collaborative difficulties and projects that should not be pursued”

“Institutionalization of evaluation and team creation could help not repeating the mistakes from previous classes”

Acid tests

The problems experienced by the students when collaborating with external partners seem to have several different explanations. One of which could be flaws in the analysis of the business ideas. As one student puts it: *“The Acid test framework is maybe too much a test of concepts, and the team is underemphasized”*. As a basis for further discussion, a thorough analysis of the acid tests from the last two years was conducted and revealed some challenges in other areas as well as related to the analysis of external founder.

- As a rule more than an exception, the conclusion was not built on the rest of the analysis.
- The acid tests were more a collection of information than an analysis at all and while for example the description of competitors and substitutes is given, little was said on how the competitive environment is positive or negative for a potential startup in that space.
- The importance of the team was undermined in the analyses, often not even looking into the working background of the founder.

Only 20% of the students graduating from NSE (2010 and 2011) continue an entrepreneurial career immediately after graduation, and because of the short age of the program, no long term effects can yet be seen. When the students graduating 2012 were asked if they thought they would continue their projects after graduation, alternatively what conditions would have be present for them to do so, most cite economic potential as the main driver for a decision to continue. Some also point to the possibility of having a career comparable to that possible as an employee, in terms of responsibility and challenges. This probably reflects the fact that students of NSE mostly are recruited to high status jobs, mainly in finance and consulting, often even

long before graduation. In a 2008 evaluation of NSE, 95% of alumnae view it as probable that they participate in a startup later in their career (Engløkk, 2008).

Literature revisited

Based on the empirical findings, the literature is revisited once more in order to come up with recommendations to improve the process of idea selection and exploitation.

“(…) experienced entrepreneurs appear to focus in their efforts to identify opportunities on factors likely to influence success, while novice entrepreneurs tend to be fascinated with sheer newness or novelty” (Baron, 2006). Naturally the experienced entrepreneurs know what to look for since they already have experienced the process of exploitation. In the following, some characteristics and attributes that can enhance the chance of success are established, as a basis for search and decision to exploit. The main sources of these characteristics and attributes are (1) literature on venture capitalists investment decisions, (2) literature on attributes among successful ventures and growth companies (3) literature on opportunities and (4) literature on the individual entrepreneur. If attributes that can increase chance of success can be isolated they can also be taught and since it is now clear how to teach aspiring entrepreneurs to be more alert (Fiet, 2007), this could be a considerable contribution to entrepreneurship education.

VENTURE CAPITALISTS DECISION CRITERIA

Venture Capital firms are “those organizations whose predominant mission is to finance the founding or early growth of new companies that do not yet have access to the public securities market or to institutional lenders” (Gupta & Sapienza, 1992), they are in other words professional investors in startup companies. In 2010 in the USA, companies that were at one point in time backed by venture capitalists accounted for 11% of jobs and 21% of GDP (Thompson Reuters, 2010), constituting solid evidence of the contribution VCs have had to the economy and society as a whole.

VCs have developed strict routines in analyzing venture potential. This can also be useful for entrepreneurs, especially those in need of VC funding (Hall & Hofer, 1993). Before making an investment they carefully scrutinize the founders and their business concept (Fried & Hirsch,

1994) and Venture capitalists are generally thought to be successful at predicting new venture performance (Shepherd et. al. 2000).

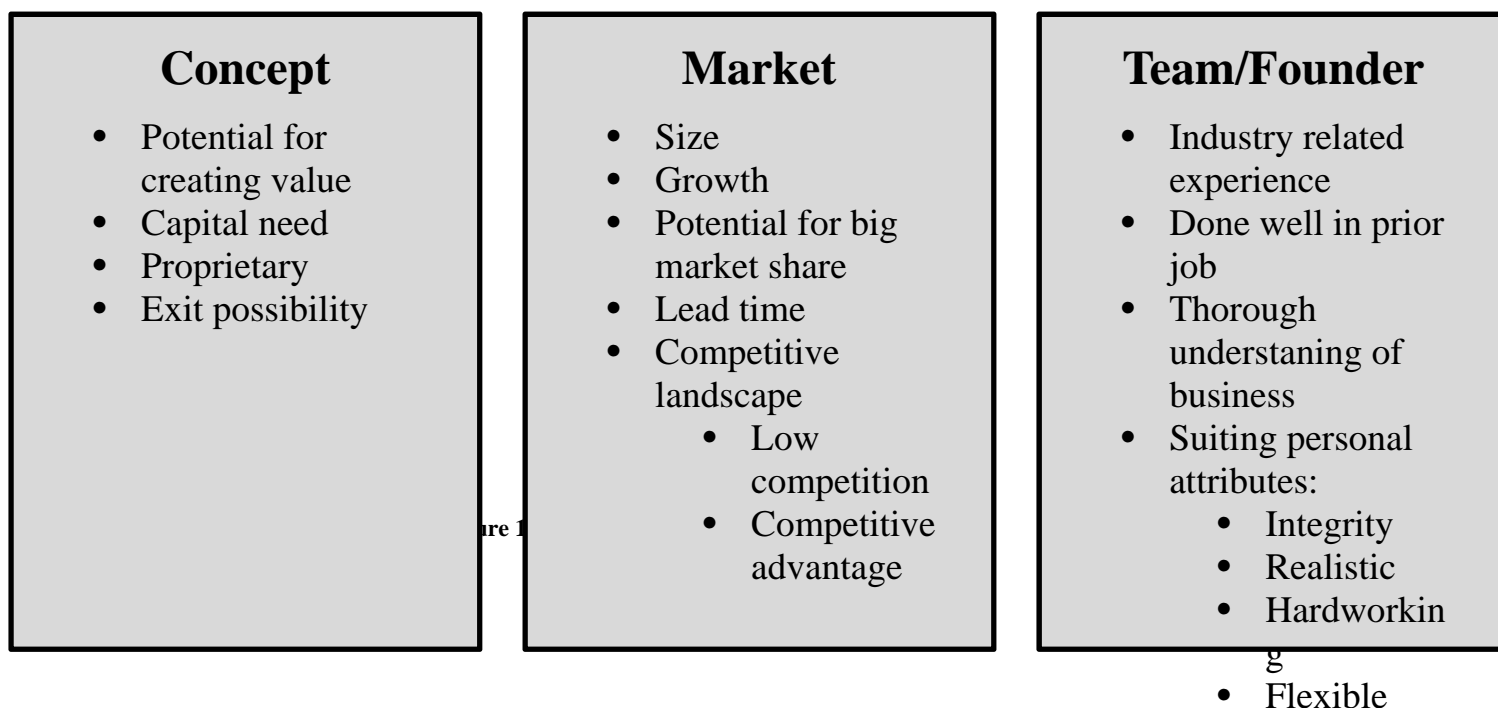
When using venture capital investment decision criteria as proxy for entrepreneurial decision criteria, we have to bear in mind two things, first, Venture capitalists have a preference for companies that increase their value ten - to hundredfold over a relatively short timeframe or as Mason & Harrison (2002) put it, hitting home runs; and second, the success of companies backed by venture capitalists is not only determined by attributes ex ante the founding event, but also by value added work by venture capitalists. Hellman and Puri (2002) find that funding by VCs contribute to the professionalism of startups and that these ventures have superior performance over non-VC-backed ventures. Even if only one in 600 startup companies receive venture financing, 60% of companies reaching an initial public offering (IPO) have backing from VCs (Kaplan & Lerner, 2009), so even as decision criteria in venture capital cannot be blindly accepted as a basis for a decision to exploit an opportunity, there are certainly elements in VC backed companies increasing the chance of success.

So what are the attributes and characteristics influencing the investment decisions of venture capitalists?

Hirsch and Jankowicz (1990) isolate three basic constructs as basis for venture capitalists decision making, namely Concept, management and returns. Fried and Hisrich (1994) expand on these investment criteria. Concept has four subtopics, first, potential for earnings growth, which can come from a rapidly growing market, increasing market share or significant cost cutting; second, the concept must involve a business idea (product service or retail concept) that works already, or can be taken to the marketplace within a limited period of time (max two or three years); third, the concept must have considerable competitive advantage versus competitors, or be in a relatively non-competitive industry fourth the concept must have reasonable capital requirements (ROI). Within the second basic construct, management, Fried & Hisrich (1994) elaborate: they must have displayed personal integrity; they must have done well in prior jobs; they must also be realistic, hardworking, and flexible and have a thorough understanding of the business. Within the returns construct, the investment must provide an exit opportunity, potential for high rate of return and high absolute returns. Kaplan and Strömberg (2004) find that market

size and growth is the most often cited driver for investment decisions. Another research by Shepherd, Ettenson and Crouch (2000) finds that “**on average, the most important criterion for venture capitalists in their assessment of profitability is industry-related competence.**” The second tier of importance is competitive rivalry, and educational capability. The third tier of importance is lead time, key success factor stability and timing x lead time interaction. In addition an earlier literature review by Hall and Hofer find several aspects of interests for venture capitalists, the attributes found important in most of the underlying research being, Managerial capabilities, and also experience of management team, cash out potential, stage of development and a proprietary product.

These important decision criteria found important in the venture capital community can be summarized through a model.



LITERATURE ON ATTRIBUTES AMONG SUCCESSFUL VENTURES AND GROWTH COMPANIES

Over the years there has also been some empirical research and theorizing on attributes that enhance the value of a company or venture and also several literature studies examining and summarizing this research. This research is a combination of empirical investigations of attributes that have actually lead to higher survival rate, theorizing on the same subject, etc. - Whereas the VC-literature merely states what VCs do, under the former mentioned assumption that these are successful at predicting new venture performance (Shepherd et. al. 2000).

By many scholars, what is regarded as the most important factor of new firm success, are the attributes of the founder or the founding team. In a preliminary to their 2003 article, *Characteristics, Contracts, and Actions: Evidence from Venture Capitalist Analyses*, Kaplan and Strömberg (2000) find that companies in which the VCs assessment indicated a strong management team are almost three times more likely to go public. The attributes of the founder are reflected into the firm as a lasting “stamp” that influences culture and behavior (Mullins, 1996). The founders lay an important foundation for the development of the firm, including strategy, operations and not least recruiting of employees. It is therefore not especially surprising that the founding team is of great importance as an indicator of firm success. More specifically the literature points to especially several areas of founder characteristics that will have a positive impact: Experience within the same industry (Cooper & Bruno, 1977) Education (Watson et al., 2003; Sapienza & Grimm, 1997) and the completeness of the founding team. A broad social and professional network also has a positive influence on chance of success (Hansen, 1995; Birley 1985).

In regards to market and industry factors a market with low competition is favorable (Roure & Maidique, 1986) since competitive intensity usually reduces overall industry profitability. A venture looking to be successful should also attack markets with a high buyer concentration (

Roure & Keeley, 1990; Duchesneau & Gartner, 1990) and aim at markets where they can gain a high market share and therefore play an important role (Roure & Maidique, 1986). A first mover strategy is somewhat of a twofaced sword. Although these firms enjoy higher risk of failure (Aaker and Day, 1986; Nelson and Winter 1982; Mitchell, 1991), they enjoy higher returns than their later counterparts (Schumpeter 1975; MacMillan, Siegal and SubbaNarasimha 1985; DeCastro and Chrisman 1995).

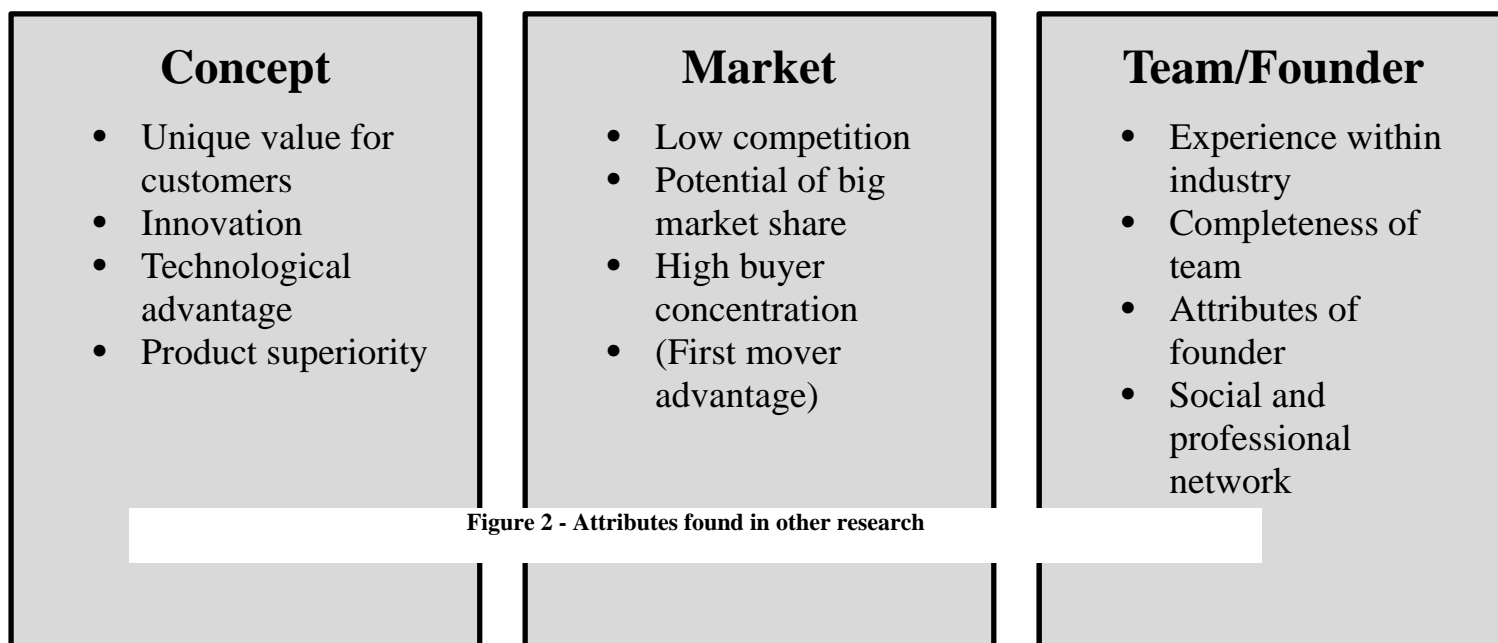


Figure 2 - Attributes found in other research

There are also some aspects on the business idea or concept believed to have a substantial impact on success rate. Firms creating unique value for customers have a greater chance of success (Doorley and Donovan, 1999; Kim & Mauborgne, 1997), the same with firms enjoying product superiority (Roper, 1997; Roure & Keeley, 1990). The quality of their products or services creates value for customers, encouraging repeat sales (Barringer et al, 2005). Innovation (DeCarolis & Deeds, 1999) and utilization of new, advanced technologies are also positive characteristics of growth companies and successful ventures.

Mitchell (1998) determined six basic attributes of viable business ideas: innovation, value, persistence, scarcity, non-appropriability, and flexibility. According to Fiet (in Press 05) there are four attributes of the opportunity that together make out the potential of the venture ideas, to be exploited for competitive advantage and wealth creation. Fit: Does the specific knowledge of the founding team fit the opportunity to be exploited? Value: Does the opportunity, if exploited,

have a potential of creating economic value, as creation or increase of revenues and decrease of costs? Rarity: Are there a vast number of competing threatening the market so that the chance of exploiting it with an economic profit is small? Inimitability: Does the venture have a cost advantage to competitors trying to follow a similar strategy? The only attribute not already covered is that of founder-idea-fit. The specific knowledge of the founder or the founding team must, as stated, fit that needed to exploit the opportunity.

It emerges from this theory that not only will experience increase the likelihood of finding an appropriate business idea, it is also the first and foremost indication on a successful exploitation, according to both research and practitioners. This will necessarily have implications for entrepreneurial education

When it comes to improving the acid tests, these findings can be used to either restructure the framework used, or to give some additional recommendations to the framework employed today.

For an entrepreneur student in learning, trying to establish a business with an external founder arguably some of these attributes are more important than others. Some of the more venture capital specific criteria in order to secure exponential growth will not be of the greatest importance. Creating unique value for customers and a potential and economic profit will however be important conceptual attributes, as well as technological advantage if applicable. In terms of market characteristics, low competition, potential of a high market share and a low buyer concentration are elements that increase the potential of success, and therefore something that should be part of the analysis of startup potential. What seems to be of greatest importance in earlier research are attributes connected to the founder or the founding team. This should be properly addressed. The attributes related to the team and founder are:

- 1) Experience related to the industry
- 2) Network
- 3) Founder characteristics
- 4) Completeness of team

The characteristics can be summarized:

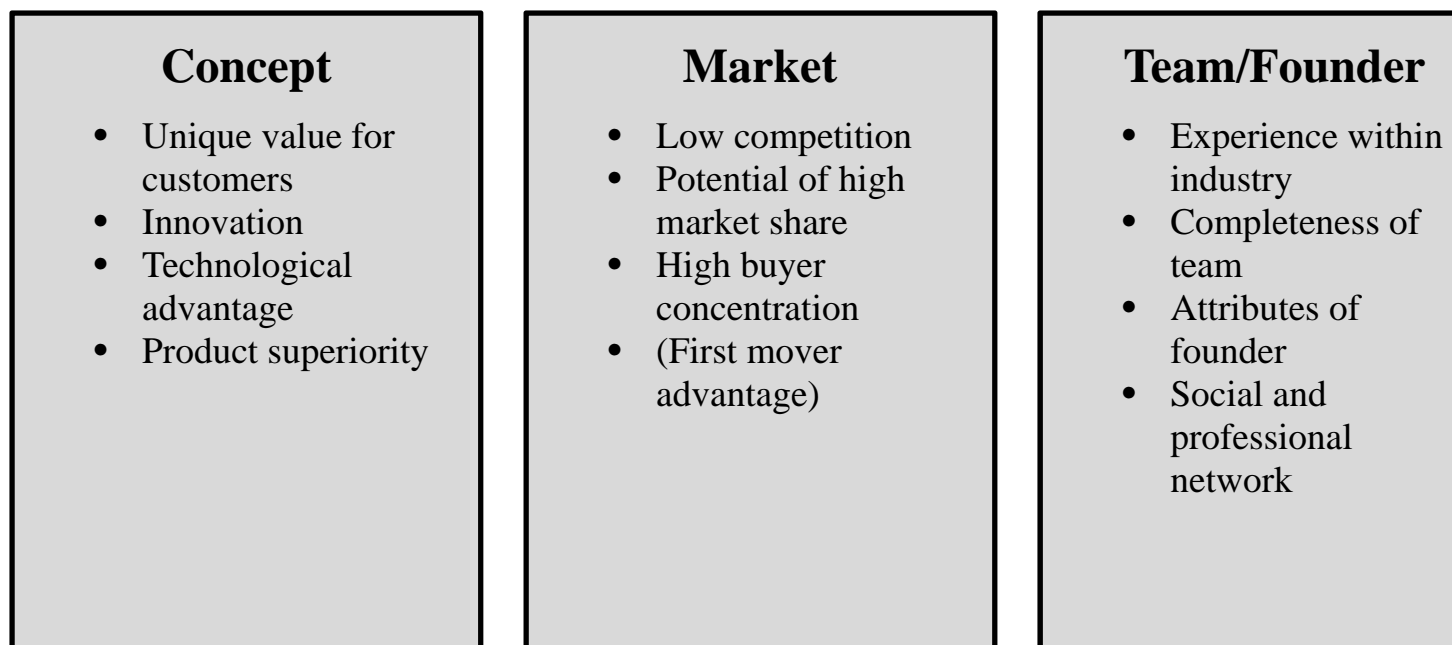


Figure 3 - Attributes applicable for NSE

When analyzing opportunities discovered by others, these students must combine the perspective of venture capitalists, with that of prospective entrepreneurs. They must combine the thorough analysis of the people involved with a personal assessment of whether the idea is a good fit with their personal knowledge, skills and motivation.

Discussion

Experience, both that related to the startup process and that related to industry, is again and again emerging throughout the entrepreneurship literature as a factor in opportunity discovery, evaluation and exploitation; - the main (theoretical) stages of an entrepreneurial venture. When aiming to educate future entrepreneurs, methods of action learning are believed to be advantageous over traditional learning methods. Action learning can be a way to build the startup experience necessary for a later entrepreneurial career, since entrepreneurship consists many elements that cannot be learned through traditional methods. Interestingly, the curriculum of NSE is in good correspondence with the suggestions of Hood & Young (1993), emphasizing strategy, financing, marketing e.g. in traditional lectures and weighting attributes like leadership experience, self-motivation and values when selecting students.

An important issue with the tendency of students to abandoned projects with external involvement is the threat to the technological profile of the education. If the success stories all consist of non-technology ventures, this can be potentially harming to the recruiting of students with ambitions to start technologically focused ventures. This is a very important reason to improve the process of finding and selecting business ideas or opportunities.

The analysis of the acid tests, and the study of the literature on attributes increasing chance of success, reveals flaws in the analysis process, mainly in the area of founder related attributes. The founder's influence on success seems to be underemphasized to a degree that maybe damaging for the ability to create successes from technological ideas with external partners.

When interviewing team members of all startup teams of the class of 2012, problems with the founder or other stakeholders were often given as challenges. This can be a consequence of the deficiencies in the analysis or acid tests. Based on the interviews, the analysis of the acid tests and firsthand knowledge, it is very possible that the success rate of NSE ventures could be improved with a better analysis of the entrepreneurial opportunities present and with a more thorough search for opportunities. An answer to this problem is not only relevant to NSE but in all cases where the decision to become an entrepreneur has been made ex ante of the opportunity discovery, and for all institutions aiming to educate future entrepreneurs.

A source of problems with evaluating and selecting the right ideas, is that this process in the case of NSE starts parallel with the individualistic teaching of themes that optimally should be known in advance such as marketing, strategy etc. This may possibly be part of the reason that the conclusions in the acid tests are so loosely based on the information in them. At this point in time, students do not yet know the meaning of their findings. Here the institution should provide some guidelines. Adding quality assured questions to the evaluation framework would be a low threshold solution to this. Examples of these questions are:

Team:

- Has the founder relevant industry experience?
- Has the founder done well in his prior job

- Has the founder access to a network helpful when exploiting this opportunity?
- Can the lacks of the founder easily be replaced without the founder opposing this?

In the market category, for example: Does the business opportunity have a high buyer concentration? To all categories, questions of this character can easily be developed based on the findings presented in the previous chapter of this paper.

But possibly a deductive knowledge focus when analyzing ventures is not enough to succeed. Potentially the mere analysis itself needs to build on a basis of prior experience

Mentors, external partners or former students could be brought in to also help on the evaluation and selection of ideas. A need for more mentorship was suggested by some of the students interviewed. Mentors could be used as a way of improving both opportunity validation and exploitation. Several scholars have called for the stronger tool, "entrepreneurs in residence". This strategy is of course more resource demanding. When aiming to teach through action learning and the establishment of real ventures, the university could institutionalize some of the elements called for by entrepreneurship literature such as experience and also a network needed to gain access to the necessary resources.

Important is also the search process for these opportunities. The best optimized analysis will not make up for an idea/opportunity basis without the necessary potential.

When trying to establish a framework for active search for opportunities, Fiet & Patel (2006) emphasize experience and prior knowledge as the fundament for building a search procedure. This of course complicates the process for students in need of business ideas for their action learning startups. Necessarily a more optimized process of gaining access to external ideas should be developed. This is also suggested by several of the interviewed students. Secure more and higher quality ideas through a more formalized collaboration with industry partners and universities could be a solution.

Some final recommendations for the improvement of an action based entrepreneurship education are:

- External ideas are an effective tool in action based entrepreneurship education, since it is difficult to discover opportunities without having an experience base.
- When using external ideas, the founder/team involved should be analyzed as were you a venture capitalist
- Utilizing a checklist with guiding questions can remedy lack of previous knowledge, when analyzing ideas at an early point in time of the entrepreneurship education.
- Mentors or entrepreneurs in residence should be involved in the process of evaluating and selecting ideas.
- The institution should help remedy the student's lack of network by establishing contact with general entrepreneurial resources (lawyers, accountants, industry specialists)
- The institution should provide a structured process securing access to as many ideas/opportunities to

As stated in the findings chapter, the majority of students from NSE go into high status jobs after graduation. By some, this is seen as a indicating a problem with the school and a failure to educate entrepreneurs. It can however also be argued that the number of students continuing their career with a “direct from school- startup” is not an adequate measure of the impact of the education. If NSE manages to provide the students with an entrepreneurial mindset and entrepreneurial ambitions, the longtime effects of the study program may prove great. Students may gain valuable industry and leadership experience through their employment, and utilize this in later startup projects later in their working life. As the study program is merely 5 years old, it is yet too early for any empirical work on the long term effects but the 95% of alumnae indicating future startup ambitions (Engløkk, 2008) certainly look promising. In any case, it is important to increase the number of students working with entrepreneurial ventures during their entire time at NSE, to increase the learning effect. It seems fair to suggest that if the intensity is kept equal, the longer venture involvement is prolonged, the more experience is accumulated. And for this reason it is important to better the process of selecting the right ideas.

Limitations and future research

While this paper examines the advantages and challenges of action based education based on one single case, it is important to note that none of these findings may apply to other (technological based) entrepreneurial education contexts. That is to say, the aim is not to achieve and defend a statistical generalizability, but to provide a context of application to enable naturalistic generalization. The concept of naturalistic generalization is described as a partially intuitive process arrived at by recognizing the similarities of objects and issues in and out of context (Stake 1980, p. 69). Hence, it is essential that the case study is properly descriptive as readers may recognize essential similarities to cases of interest to them. These are similarities which can be associated to the fact that hardly no action based entrepreneurial educational programs is without challenges. For example challenges regarding dealing with analyzing opportunities discovered by others as shown in this case, students should combine the perspective of venture capitalists with that of prospective entrepreneurs.

To bear in mind that it is through education that research on entrepreneurship could do a lot for business practice (Davidsson 2002), it seems reasonable to propose future research along these lines. Future research may focus on how to measure the level of learning that occurs for the student entrepreneur during the experiential process. A simple pre-test and post-test could capture entrepreneurial knowledge prior to and after each project in order to determine the project's effect on the students. This measurement would also allow the researchers to analyze which projects benefit entrepreneurial learning the most and at which experiences seem to have the greatest impact for students. Even without this research, however, it is reasonable to assume that from an educational perspective, this action based type of learning and education is valuable because students get to act like an entrepreneur without incurring any (real) risks, and potential entrepreneurs get information at little cost. Future research could also further explore the impact of 'Train the trainer' provision to educators, not only from the perspective of the educators but also, through comparative analysis of student feedback and assessments. Moreover, the feedback can generate re-definition of goals, contents and pedagogies. Maybe we also need more in-depth case studies to get a more accurate picture of one of the main challenges for

entrepreneurship educators: they have to meet the rigors of academia and science while keeping a practice-based focus and entrepreneurial climate in the learning experience environment (Solomon, Duffy and Tarabishy 2002).

WORKS CITED

- Alvarez, S., & Barney, J. (2007). Discovery and creation: alternative theories of entrepreneurial action. *Organizacoes em contexto, Ano 3, n. 6* .
- Ardichvili, A., Cardozo, R., & Ray, S. (2003). A theory of entrepreneurial opportunity identification and development . *Journal of Business Venturing, Volume 18, Issue 1* , 105-123 .
- Babbie, E., & Baxter, L. (2004). *The basics of communication research*. Belmont, CA: Thomson Learning.
- Banik, B. (1993). Applying triangulation in nursing research. *Applied Nursing Research 6(1)* , 47-52.
- Bar-Hillel, M., & Falk, R. (1982). Some teasers concerning conditional probabilities. *Cognition, 11* , 109-122.
- Bar-Mittel, M., & Faulk, R. (1982). Some Teasers Concerning Conditional Probabilities. *Cognition 11* , 109–122.
- Baron, R. A., & Ensley, M. D. (2006). Opportunity Recognition as the Detection of Meaningful Patterns: Evidence from Comparisons of Novice and Experienced Entrepreneurs. *MANAGEMENT SCIENCE, Vol. 52, No. 9* , 1331-1344.
- Barringer, B. R., Jones, F. F., & Neubaum, D. O. (2005). A quantitative content analysis of the characteristics of rapid-growth firms and their founders . *Journal of Business Venturing, Volume 20, Issue 5* , 663-687 .
- Baumol, W. (1993). Formal Entrepreneurship Theory in Economics: Existence and Bounds. *Journal of Business Venturing 8* , 197-210.
- Birley, S. (Volume 1, Issue 1). The role of networks in the entrepreneurial process . *Journal of Business Venturing* , 107-117.
- Block, & Stumpf. (1992). Entrepreneurship education research: Experience and challenge. In D. Sexton, & E. J. Kasarda, *The State of the Art in Entrepreneurship* (pp. 17-44). Boston, MA: PWS-Kent.
- Cooper, A. C., & Bruno, A. V. (1977). Success Among High-Technology Firms. *Business Horizons, Vol. 20, Issue 2* , 16-22.
- Creswell, J. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Beverly Hills, CA: Sage Publications, INC.

- Curran, J., & Stanworth, J. (1989). Education and training for enterprise: some problems of classification, avaluation, policy and research. *International Small Business Journal*, vol 7 (2) , 11-22.
- Curran, J., & Storey, D. (2002). Small business policy in the United Kingdom: The inheritance of the small business service and implications for its future effectiveness. *Environment and Planning C: Government and Policy* 20 , 163-177.
- Dana, L. (2001). The Education and Training of Entrepreneurs in Asia. *Education & Training* 43 (8/9) .
- Davidsson, P. (2002). What Entrepreneurship can do for Business and Policy Practice. *International Journal of Entrepreneurship Education* 1(1) .
- DeCarolis, D., & Deeds, D. (1999). The impact of stocks and flows of organizational knowledge on firms' performance: an empirical investigation of the biotechnology industry. *Strategic Management Journal* 20 (10) , 953-968.
- Demsetz, H. (1983). The neglect of the entrepreneur. In E. J. Ronen, *Entrepreneurship*. Lexington, MA : Lexington Books.
- Denzin, N. (1970). *The research act*. Aldine Publications Co.
- Doorley, T., & Donovan, J. (1999). *Value-creating growth*. San Fransisco: Jossey-Bass.
- Douglas, E., & Shepherd, D. (1997). Is Management Education Developing, or Killing, the Entrepreneurial Spirit?
- Duchesneau, D. A., & Gartner, W. B. (1990). A profile of new venture success and failure in an emerging industry . *Journal of Business Venturing*, Volume 5, Issue 5 , 297-312 .
- Eckhardt, J. T., & Shane, S. A. (2003). Opportunities and Entrepreneurship. *Journal of Management*, vol. 29 no. 3 , 333-349 .
- Engløkk, E. A. (2008). *Evaluering av NTNUs entreprenørskole (Eng: Evaluation of NTNU's School of entrepreneurship)*. Trondheim.
- Fiet, J. O. (2007). A Prescriptive Analysis of Search and Discovery. *Journal of Management Studies*, Volume 44, Issue 4 , 592–611.
- Fiet, J. O. (1996). The informational basis of entrepreneurial discovery. *Small Business Economics* , 419-430.

- Fiet, J. O. (2001). The theoretical side of teaching entrepreneurship . *Journal of Business Venturing, Volume 16, Issue 1* , 1-24.
- Fiet, J. O. (2001). The theoretical side of teaching entrepreneurship . *Journal of Business Venturing, Volume 16, Issue 1* , 1-24 .
- Fiet, J. O., & Patel, P. C. (2006). Entrepreneurial Discovery as Constrained, Sytematic Search. *Small Business Economics, Volume 30, Number 3* , 215-229.
- Fiet, J., Clouse, V., & Norton, W. J. (2004). Systematic search by repeat entrepreneurs. In J. (. Butler, *Research in Entrepreneurship and Management 4* (pp. 1-27). Greenwich, CT: Information Age Publishing .
- Fried, V. H., & Hisrich, R. D. (1994). Toward a Model of Venture Capital Investment Decision Making. *Financial Management* , 28-37.
- Gaglio, C. (1997). Opportunity identification: Review critiquw, and suggested research direction. *Advances in Entrepreneurship, Firm Emergence and Growth* , 139-202.
- Gaglio, C. (1997). Opportunity Identification: Review, Critique and Suggested Research Directions. In J. K. (ed.), *Advances in Entrepreneurship, Firm Emergence and Growth, 3* (pp. 139-202).
- Garavan, T. N., & O'Cinneide, B. (1994). Entrepreneurship Education and Training Programmes: A Review and Evaluation. *Journal of European Industrial Training 18(8)* .
- Gilad, B., & S. Kaish, J. R. (1988). The Entrepreneurial Way with Information. In S. M. (ed.), *Applied Behavioral Economics, 11* (pp. 480–503). Brighton, England: Wheatshaef Books, Ltd.
- Gilad, B., Kaish, S., & Ronen, J. (1988). The entrepreneurial way with information. In S. Maital, *Applied Behavioral Economics, Volume 2*. Sussex, UK: Wheatsheaf Books.
- Gorman, G., Hanlon, D., & King, W. (1997). Some Research Perspectives on Entrepreneurship Education, Enterprise Education and Education for Small Business Management: A Ten-Year Literature Review. *International Small Business Journal, vol. 15, no. 3* , 56-77.
- growth., V. i. (1997). Product Innovation and Small Business Growth: A Comparison of the Strategies of German, U.K. and Irish Companies. *Small Business Economics, Volume 9, Number 6* , 523-537.
- Gupta, A. K., & Sapienza, H. J. (1992). Determinants of venture capital firms' preferences regarding the industry diversity and geographic scope of their investments. *Journal of Business Venturing Volume 7, Issue 5* , 347-362.

- Görling, S., & Rehn, A. (2008). Accidental ventures - A materialist reading of opportunity and entrepreneurial potential. *Scandinavian Journal of Management* , 94-102.
- Haines, J. G. (1988). The Ombudsman: Teaching Entrepreneurship. *Interfaces Vol. 18, No. 5, Sep. - Oct. , 23-30.*
- Hall, J., & Hofer, W. C. (1993). Venture capitalists' decision criteria in new venture evaluation. *Journal of Business Venturing Volume: 8, Issue: 1 , 25-42.*
- Hansen, E. L. (1995). Entrepreneurial Networks and New Organization Growth. *Entrepreneurship: Theory and Practice, Vol. 19 .*
- Harwitz, R. (1977). How to Breed Entrepreneurs. *Director 30, 2 , 62-63.*
- havnes, P., & Skjenkeland, L. (2007). Evaluating entrepreneurship program objectives and measurements dilemmas. *Journal of enterprising culture 15(4) , 339-370.*
- Hayek, F. (1945). The Use of Knowledge in Society. *The American Economic Review, Vol. 35, No. 4 , 519-530.*
- Hellmann, T., & Puri, M. (2002). Venture Capital and the Professionalization of Start-Up Firms: Empirical Evidence. *The Journal of Finance Volume 57, Issue 1 , 169-197.*
- Hills, G. E. (1988). Variations in University entrepreneurship education: An empirical study of an evolving field . *Journal of Business Venturing, Volume 3, Issue 2 , 109-122 .*
- Hills, G. (1988). *Toward the advancement of entrepreneurship theory. Presentation to the U.S. Association for Small business and Entrepreneurship. Milwaukee, WI.*
- Hisrich, R. D., & Jankowicz, A. (1990). Intuition in venture capital decisions: An exploratory study using a new technique . *Journal of Business Venturing , 49-62.*
- Jack, S. L., & Anderson, R. (1998). Entrepreneurship Education within the Condition of Entreprenology. *Proceedings of the Enterprise and Learning Conference. Aberdeen.*
- Jong, J. P. (2010). Schumpeter versus Kirzner:. *Working paper .*
- Kaish, S., & Gilad, B. (1991). Characteristics of opportunities search of entrepreneurs versus executives: Sources, interests, general alertness. *Journal of Business Venturing, Volume 6, Issue 1 , 45-61 .*
- Kaplan, S. N., & Lerner, J. (2009). *The Past, Present, and Future of Venture Capital - Preliminary.* University of Chicago Booth School of Business, Harvard Business School.

Kaplan, S., & Strömberg, P. (2004). Characteristics, Contracts, and Actions: Evidence from Venture Capitalist Analyses. *The Journal of finance Volume 59, Issue 5* , 2177-2210.

Kaplan, S., & Strömberg, P. (2000). *How Do Venture Capitalists Choose Investments? Working paper*. Chicago: Graduate School of Business, University of Chicago.

Kirzner, I. (1973). *Competition and Entrepreneurship*. Chicago, IL: University of Chicago Press.

Kolb, D. (1984). *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Kolvereid, L., & Moen, Ø. (1997). Entrepreneurship among business graduates: does a major in entrepreneurship make a difference? *Journal of European Industrial Training, Vol. 21 Iss: 4* , 154 - 160.

Laukannen, M. (2000). Exploring alternative approaches in high-level entrepreneurship education: creating micro mechanisms for endogenous regional growth. *Journal of Entrepreneurship and Regional Development* .

Marshak, J. (1971). Economics of information systems. In M. D. Intriligator, *Frontiers of Quantitative Research* (pp. 32–107). New York: North-Holland Publishing Co.

Mason, C. M., & Harrison, R. T. (2002). Is it worth it? The rates of return from informal venture capital investments . *Journal of Business Venturing Volume 17, Issue 3* , 211-236.

McMullan, E. W., & Long, W. A. (1987). Entrepreneurship education in the nineties. *Journal of Business Venturing, Volume 2, Issue 3* , 261-275.

Mcmullan, W. E., & Long, W. A. (1987). Entrepreneurship education in the nineties. *Journal of Business Venturing, Volume 2, Issue 3* , 261-275.

Mitchell, W. (1991). Dual clocks: Entry order influences on incumbent and newcomer market share and survival when specialized assets retain their value. *Strategic Management Journal, Volume 12, Issue 2* , 85-100.

Mullins, J. W. (1996). Early growth decisions of entrepreneurs: the influence of competency and prior performance under changing market conditions. *J. Bus Venturing, Volume 11, Issue 2* , 89-105.

Nelson, R., & Winter, S. (1982). *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.

Politis, D. (2005). The Process of Entrepreneurial Learning: A Conceptual Framework. *Entrepreneurship Theory and Practice, Volume 29, Issue 4* , 399-424.

- Reuber, R., Dyke, L., & Fischer, E. (1990). Experiential acquired knowledge and entrepreneurial venture success. *Academy of Management Best Paper Proceedings* , 69-73.
- Robinson, P. B., & Sexton, E. A. (1994). The effect of education and experience on self-employment success . *Journal of Business Venturing, Volume 9, Issue 2* , 141-156 .
- Robinson, P. B., & Sexton, E. A. (1994). The effect of education and experience on self-employment success . *Journal of Business Venturing, Volume 9, Issue 2* , 141-156 .
- Robinson, P., & Hayes, M. (1991). Entrepreneurship education in America's major universities. *Entrepreneurship Theory and Practice, 15(3)* , 41-52.
- Root, J., & Gall, M. (1981). Interactions between student achievement orientation, locus of control, and two methods of college instruction. *Educational Communication and Technology, 29 - 3* , 139–146.
- Roure, ..., & Maidique, M. (1986). Linking prefunding factors and high-technology venture success: An exploratory study. *Journal of Business Venturing, Volume 1, Issue 3* , 295-306.
- Roure, J. B., & Keeley, R. H. (1990). Predictors of success in new technology based ventures. *Journal of Business Venturing, Volume 5, Issue 4* , 201-220 .
- Sapienza, H., & Grimm, C. (1997). Founder characteristics, start-up process, and strategy/structure variables as predictors of shortline railroad performance. *Entrepreneurship Theory and Practice, 23(1)* , 5-24.
- Schumpeter, J. (1975). *Capitalism, Socialism and Democracy*. New York: Harper Torchbooks.
- Sexton, D. L., & Upton, N. B. (1987). Evaluation of an innovative approach to teaching entrepreneurship. *Journal of Small Business Management, Vol. 25, 1987* .
- Shane, S. A. (2003). *A general theory of entrepreneurship: the individual-opportunity nexus*. Cheltenham, Glos: Edward Elgar Publishing.
- Shane, S. (2000). Prior Knowledge and the Discovery of Entrepreneurial Opportunities. *Organization Science, Vol. 11, No. 4* , 448-469 .
- Shane, S. (2001). Technological Opportunities and New Firm Creation. *Management Science, Vol. 47, No. 2* , , 205-220 .
- Shane, S., & Venkataraman, S. (2000). The Promise of Entrepreneurship as a Field of Research. *The Academy of Management Review, Vol. 25, No. 1* , 217-226 .

- Shepherd, D. A., Ettenson, R., & Crouch, A. (2000). New Venture Strategy and profitability: A venture capitalist's assessment. *Journal of Business Venturing* 15 , 449-467.
- Shepherd, D., & Douglas, E. (1997). Is Management Education Developing or Killing the. *Proceedings of the 1997 USASBE Annual National Conference*. San Francisco, CA.
- Siegel, R., & MacMillan, I. C. (1988). Corporate venture capitalists: Autonomy, obstacles, and performance. *Journal of Business Venturing, Volume 3, Issue 3* , 233-247 .
- Solomon, G., Duffy, S., & Tarabishy, A. (2002). The state of Entrepreneurship Education in the United States: A Nationwied Survey and Analysis. *International Journal of Entrepreneurship Education* 1(1) , 1-22.
- Stake, R. E. (1995). *An Intensive Study of Case Study Research Methods*. Houston: Sage Publications.
- Thompson Reuters. (2010). *National Venture Capital Association Yearbook 2010*. New York: Thompson Reuters, NVCA.
- Vesper, K. H., & Gartner, W. B. (1997). Measuring progress in entrepreneurship education . *Journal of Business Venturing, Volume 12, Issue 5* , 403-421 .
- W.C., K., & R., M. (1997, Jan-Feb). Value innovation: the strategic logic of high growth. *Harvard Business Review* 75(1) , pp. 102-12.
- Watson, W., Stewart, W. H., & BarNir, A. (2003). he effects of human capital, organizational demography, and interpersonal processes on venture partner perceptions of firm profit and growth . *Journal of Business Venturing, Volume 18, Issue 2* , 145-164.
- Wolcott, H. (1990). *On seeking and rejecting validity in qualitative research*. New York: Teachers College Press.
- Yin, R. (1989). *Case Study Research: Design and Methods (1st ed.)*. Beverly Hills, CA: Sage Publishing.
- Aaker, D. A., & Day, G. S. (1986). The Perils of High-Growth Markets. *Strategic Management Journal, Vol. 7, No. 5* , 409-421.