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A study of the different views of the financial gap issues for university spin-offs

A tri perspective study from the views of the investor, founder, and technology transfer office on university spin-offs at Lund University and Chalmers University of Technology

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Authors: Carl-Fredrik Hårsmar, Lund University
Nils Åsheim, Chalmers University of Technology

Supervisors: Jonas Gabrielsson, CIRCLE, Lund University
Tomas Karlsson, Department of Technology Management and Economics, Chalmers University of Technology

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Preface

Our study was conducted during the summer of 2013 with early preparations in the spring and touch-ups in the fall. It has been our master dissertation at Lund University respectively Chalmers University. Working together from two different universities is not very common but it has certainly been very resourceful.

First of all, we would like to thank, Jonas Gabrielsson and Tomas Karlsson, for supervising and guiding us through the process. Your knowledge and feedback certainly contributed to the quality of the study. We would also like to thank all our interviewees, who gave us their time and participated in the study and we hope this study will come to your use.

Our interests in entrepreneurship and venture capital brought us together to write this thesis and the work has given us a lot of new knowledge about the industry. This is certainly a field that we will work with and be part of in our future professional careers and we very much enjoyed doing this study. We hope that some new insights from the study could be useful to policymakers and others involved in making the entrepreneurial climate better and that the study could spur future interesting research in the field.

Lund and Gothenburg, April 2014

Carl-Fredrik Hårsmar

Nils Åsheim

Abstract

Stimulation of innovation is a hot topic around the world. The developed economies are nowadays significantly dependent on innovation for further growth. One central source of innovation is universities and their ability to turn new knowledge into value-adding innovations. One of these technology transfer measures is through the creation of university spinoffs (USOs). High-tech startups, however, often require a significant amount of capital invested during the formative stages, which can be hard to acquire. The purpose of this study is to contribute with knowledge that could help understand how to narrow the financial gap between USOs and the venture capital market. The study will approach this financial gap from the three involved actors in USOs: the founders, the investors and the technology transfer office (TTO). The scope of this study is Chalmers University of Technology and Lund University.

The methodology used to explore this area and get an overview of the actors' different views were in-depth interviews with people from the different actor groups according to an interpretivist approach, also known as the actor's view. This approach supports the pragmatic objective of the study to first gain a deep understanding of the different actors' views on the financial gap to later draw conclusions and induce theories. A total of 14 interviews were conducted, with investors, academic founders, and technology transfer offices.

In order to build a theoretical framework for the subsequent analysis, an extensive exploratory literature search yielded four areas that all relates to the financial gap issue. The theories chosen were financial gap theory, choice of financing in small business theory, negotiation theory and governmental intervention theory.

The results show that most of the financial gap theory can be confirmed. It is the risk connected to the information asymmetry and the uncertainties that are the most important reasons and much of that have to do with time and competence. The small size and thereby the lack of competition in the venture capital industry is another reason why institutional investors move forward in the venture life cycle, which increases the financial gap. This leaves more space to be filled by private investors such as business angels, and public money. Unfortunately, they are too few. The founders have to spend a significant amount of time to find and attract venture capital, resulting in less time spend on developing the core business.

The conclusion of the study is that academic founders should try to fund their projects as a research project as long as they can. Once incorporated, the company should have a clear business model with a customer and potential market in mind, minimizing technical risk and maximizing the chances of attracting venture capital. The government needs to revise the employee stock option regulation to make it more transparent and easier to use. It should also accept the proposed investment credit to stimulate seed investments. Most importantly, the government should make more public capital available in the seed phase together with the private investors, i.e. hybrid investment.

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1 Introduction

1.1 Background

The objective of this study is to contribute with knowledge that could help understand how to narrow the financial gap between university spin-offs and the venture capital market. This study will approach the financial gap from the three involved actors in university spin-offs: the entrepreneur, the investor, and the technology transfer office. By taking a tri-perspective approach towards the financial gap, new insights can be found that could help narrow the gap. Furthermore, the conclusions drawn here could hopefully be applied to enhance the general entrepreneur-investor-incubator relationship and also provide a basis for better policymaking.

Stimulation of innovation has become a hot political topic around the world (OECD, 2007; Atkinson & Ezell, 2012; The Economist, 2013; Nesta, 2012). The developed economies have become considerably more dependent on innovation as a source of economic growth. This has led to a stronger focus on innovation as a competitive instrument of growth. Innovative companies tend to grow faster (35% yearly sales growth compared to 14%) and create more jobs (30.5% annual employment growth compared to 3.8%) than the average company (EVCA, 2002; Achleitner & Klockner, 2005). They also pay higher gross-wages and offer more training opportunities than other firms do (Achleitner & Klockner, 2005).

One central source of innovation is universities and their ability to turn new scientific knowledge and technological inventions into value adding innovations (Audretsch, 2005). The past two decades have seen a considerable rise in the number of high tech start-ups aimed at commercializing university invented technologies. High tech start-ups, however, require a significant amount of capital invested during the formative stages. In many cases it will take several years before a potential investor can make an exit and get a return on the investment (Dimov & Murray, 2006). As a result, most private investors are reluctant to take on the uncertainties involved in this type of projects (Dimov & Murray, 2006).

Many universities have set up a technology transfer office to support the commercialization of academic research. The academic entrepreneurs usually have more formal education in their field of expertise (Siegel, Waldman, & Link, 2003; Ndonzau, Pirnay, & Surlemont, 2002) but less managerial skills (Shane & Khurana, 2003; Shane, 2004; Vohora, Wright, & Lockett, 2004) than other start-ups outside universities. Also, both prior entrepreneurial experience and private sector work experience significantly influence university professors' ability to identify and develop business ideas based on their research (Gabrielsson, Politis, & Tell, 2012; Karlsson & Wigren, 2012). The technology transfer office provides services and skills to the academic entrepreneurs needed to increase the commercialization rate of the start-up (Golub, 2003).

One major obstacle for high tech start-up is to find and attract capital to develop and grow the business. Debt finance is almost impossible to get for high tech start-ups because banks perceive them as very risky and they often lack collateral (Murray, 1999; Gompers, 1994). Another source of finance is equity finance, where the investor provides capital for a share of the company in return, thus sharing both risks and rewards of the venture. Seed financing – investment in the early stage (see figure 1) – is a complex process, especially when it comes to high tech companies. Investors face

many issues when evaluating a prospect, e.g. due diligence is problematic for cutting edge technologies, market assessment is difficult since the market might not exist or change very fast, and future financing might be tough to obtain (Storey & Tether, 1998). Information asymmetry between the entrepreneur and investor makes it hard for investors to invest because the entrepreneur, who sits on more information about the business than the investor, could use this information to achieve its own goals instead of the investor's. It could also be the other way around, that the investor knows more of the aggregated market opportunities, which can be advantageous on his behalf (Winborg, 2000).

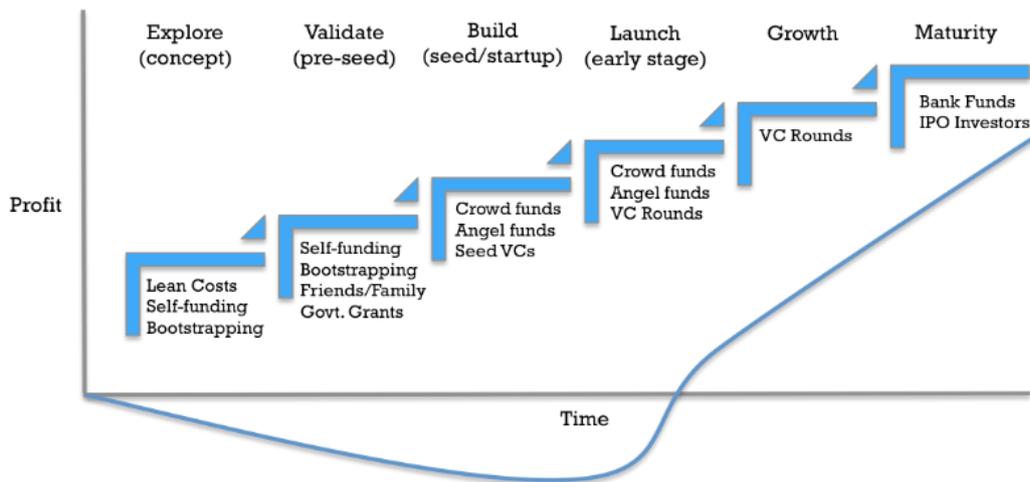


Figure 1: Start-up funding and life-cycle phases

Previous research suggests that early venture capital involvement is crucial for the success and growth of high tech start-ups (Bygrave & Timmons, 1986; EVCA, 2002). The venture capital market can not only contribute with finance but also knowledge about the market, access to networks, and management capabilities. This creates a paradox. The venture capitalists are reluctant to invest early in high tech start-ups because of the uncertainties and at the same time venture capitalists are viewed as the most important success factor for these very same start-ups. The term venture capital can have several meanings but in this study it is defined as what is generally called formal venture capital or professionals who raise funds to invest and produce a return on investments in start-ups (Landström, 2007).

The existence of a financial gap between start-ups and investors has been discussed for a long time and there are many different definitions of the financial gap. In this study we use the definition used by the OECD: "...the term is basically used to mean that a sizeable share of economically significant SMEs cannot obtain financing from banks, capital markets or other suppliers of finance. Furthermore, it is often alleged that i) many entrepreneurs or SMEs that do not currently have access to funds would have the capability to use those funds productively if they were available; ii) but due to structural characteristics, the formal financial system does not provide finance to such entities" (OECD, 2006).

Sweden's venture capital industry has developed significantly in the last decade. Today Sweden has a high share of venture capital in relation to GDP compared to other countries (see Table 1).

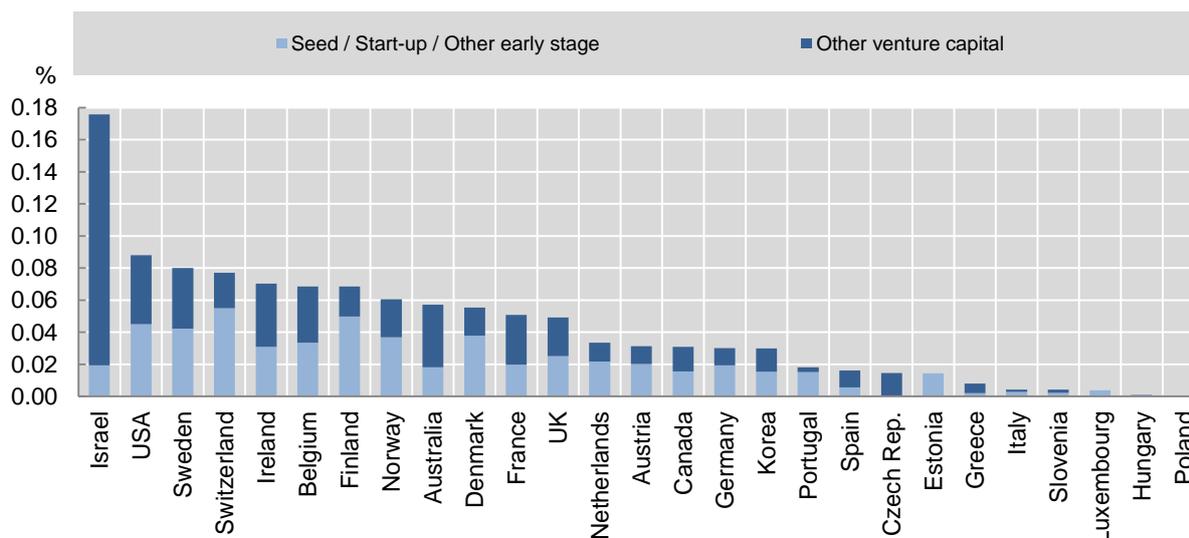


Table 1: Venture capital investment as percentage of GDP per country in 2009 (OECD, 2011)

However, the amount of early venture capital invested has decreased in recent years, especially in the seed and start-up phases (see Table 2). The decrease in early stage venture capital in Sweden comes mainly from a decrease in private investments (Svenska Riskkapitalföreningen, 2011). One public measure to counter this trend and encourage higher private venture capital investment is the proposed investment tax credit (The Swedish government, 2012) for individuals investing in small businesses.

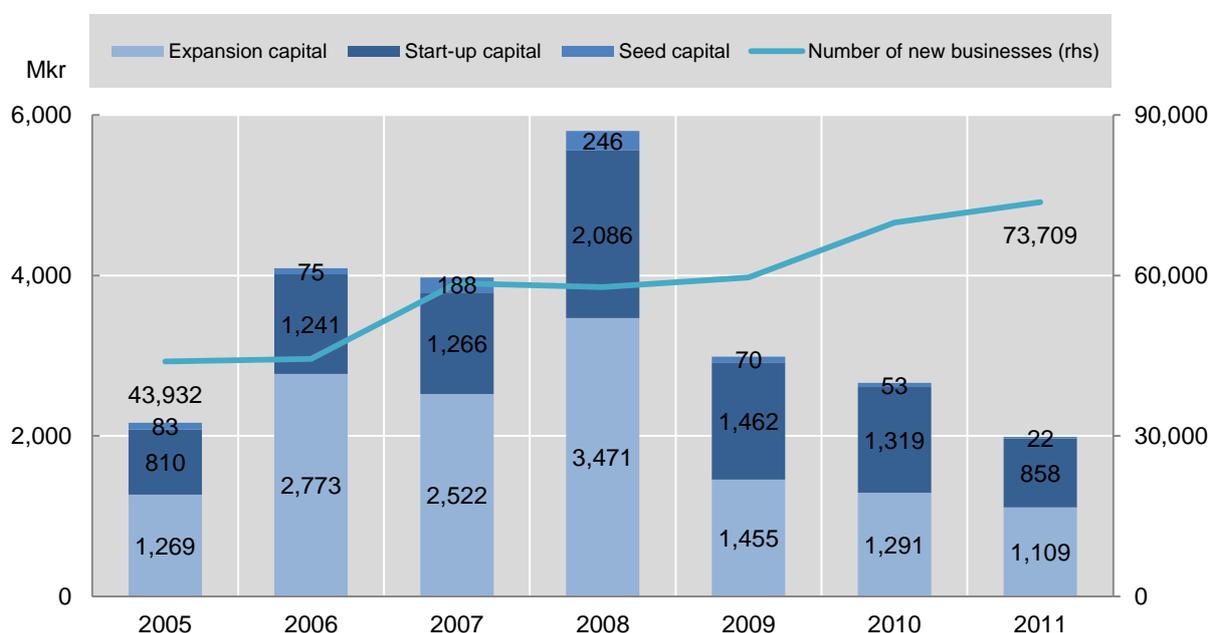


Table 2: Venture capital invested in the early phases in Sweden from 2005 to 2011 (Svenska Riskkapitalföreningen, 2011; Tillväxtanalys, 2013)

The lack of research on the contributions from the technology transfer office to narrow the financial gap in Sweden led up to this thesis. Most previous research approaches the financial gap phenomena from either the entrepreneur or the investor perspective. Earlier research somewhat lacks the multi-perspective this study includes to fully understand the social construction that results in a financial

gap. There is little previous research on the technology transfer office role in bridging the financial gap between university spin-offs and venture capital in Sweden.

1.2 Problem discussion

In recent years the venture capital invested in the early stages has declined year over year in Sweden (see Table 2). During the same period the number of new businesses in Sweden has increased steadily. This suggests that the financial gap has widened as more entrepreneurs compete for less equity venture capital. This creates a significant hurdle for high tech start-ups who, on average, rely heavier on external funding and venture capital to increase its survival rate and boost growth (Politis, Gabrielsson, & Shveykina, 2012).

University spin-offs (USO), start-ups based on university research, are a subcategory of start-ups that generally is highly innovative, knowledge-based, with high growth potential. Since the researcher owns the intellectual property from academic research in Sweden, the university does not get any equity or licensing fees from these companies. The technology transfer offices (TTO) at Swedish universities provide support services to the USOs such as business development, intellectual property and legal services, investor contacts, and funding that partially covers the seed stage.

The objective of this study is to contribute with knowledge that could help narrow the financial gap experienced by academic entrepreneurs trying to attract venture capital. Most previous discussions (Winborg, 2000; Dimov & Murray, 2006) take a one-sided perspective (Landström, 2007)(e.g. from the entrepreneur or the investor) on the financial gap and assume it is perceived uniformly by all actors. This study will approach the financial gap from the three involved actors in USOs: the entrepreneur, the investor, and the TTO. The main focus will be on the government and the TTO's role and how they can contribute to narrow the financial gap. The study will contribute with a renewed view on the financial gap experienced by the different actors and how their views might differ from each other.

The TTOs at Lund University and Chalmers University of Technology are selective in the projects that they fund and help develop. They also take a level of ownership in the projects. Taking ownership in the projects influence the control the research/idea provider can exert on the project. In some cases the entrepreneur/commercializer and idea provider are separate people. In relation to the financial gap, that concerns venture funding, this study will not differentiate between the person who commercializes and the idea providers and will regard them as one entity - a founding team, which we will refer to as the (academic) founder.

The research question can be summarized as followed:

RQ: How do the views on the financial gap differ from the academic founder, investor and TTO?

1.3 Purpose

The purpose of the study is to investigate the current views on the financial gap for USOs at Lund University and Chalmers University of Technology from the involved actors. By taking a multiple perspectives approach on the financial gap new insights can be found that could help narrow the gap. Furthermore, the conclusions drawn here could hopefully be applied to enhance the

interactions between founders, investors and incubators in terms of financing and also provide a basis for better policymaking.

An objective is also to determine the role and importance of a third party intermediary, e.g. the government or TTO, in the financing-related interactions between the founders and the investors.

1.4 Delimitations and focus areas

The term investor in this study refers to formal (professional) venture capital firms and business angels – wealthy individuals whom invest their time and money in start-ups –, thus excluding corporate venture capital, since this was never occurring in our sample of USOs.

The phases considered will be the early stages in the venture life cycle: seed and start-up. The other development phases are left out of the study, since investments in those phases are more considered expansion capital than venture capital. The scope of all three actors will be delimited to USOs.

1.5 Relevance and target group

Any conclusions drawn that can enhance the entrepreneurial environment will have a large socio-economic impact due to higher economic growth and more jobs created.

This thesis is targeted to entrepreneurs, investors and all forms of incubators, in academia as well as in society in general. It will hopefully also serve as an input for future policy making for regulators.

1.6 Disposition

- Chapter 1 – Introduction
- Chapter 2 – Theoretical framework
- Chapter 3 – Methodology
- Chapter 4 – Empirics
- Chapter 5 – Analysis
- Chapter 6 – Conclusions and recommendations
- Chapter 7 – Comments

2. Methodology

2.1 Research approach

The interactions between individual founders, investors, and TTOs are probably best observed using an interpretivist approach (Bryman & Bell, 2011) instead of a positivist approach. An empiricist or positivist view has been predominant in venture capital research. An alternative to a positivist view is to look at the individual situation of the participant actors and their social interactions with each other. This view, called the actor's view (Arbnor & Bjerke, 1994), is characterized by being open-ended, innovative, and understanding. This view can contribute to improve the understanding of the enigmatic persistency of the funding gap, as no such gap should actually exist under positivist (equilibrium assumptions in economics) assumptions. However, even if no gap should exist under the positivist view the founders could still perceive that there is a lack of external capital. This study takes an actor's view to first try to understand the individuals and then to induce a theory.

2.2 Research process

To adopt the actor's view a deep understanding of the individual actors is required. This view supports the pragmatic objective of the thesis to first try to gain an understanding of the different views on the financial gap and then to suggest practical actions for the TTOs to close the financial gap. The chronological research process of the thesis can be illustrated in figure 2 below.

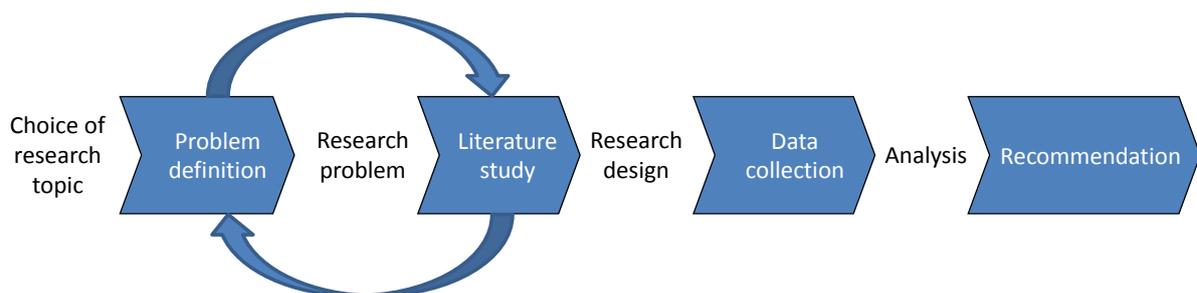


Figure 2: The research process

2.2.1 Exploratory interviews

Two exploratory interviews have been held with a business angel and a representative of a formal venture capital firm. The interviewees were asked general questions on the subject and were asked to elaborate freely on the issues they regarded important and that they thought required attention.

2.3 Research design

The empirics used consist of primary sources in the form of interview data of different actors involved in the academic technology transfer process: founders, investors, and TTOs.

2.3.1 Research method

Primary sources of data are qualitative interviews of the actors involved in the investment process of USOs: founders, investors, and TTOs. Fourteen interview objects have been selected for an in-depth interview. This qualitative method allows the interviewer to ask open-ended questions that hopefully lead to new insights and does not limit the answers to a number of pre-specified answer choices as in quantitative studies (Ghuri & Gronhaug, 2002). The intention with this approach is to enter the interview without any biases and hypothesis but hopefully draw hypothesis subsequently in the analysis of the interviews.

The interviewer asks open-ended questions and let the interviewee choose the direction of the interview. In case the discussion gets too far off-topic the interviewer steers it back to the research questions following an interview guide (see Appendix A). The semi-structured interview allows the interviewer to dig deep enough and also get reasonable comparable data. This is very suitable for exploratory research (Ghauri & Gronhaug, 2002).

The results will be very subjective and cannot be unconditionally assumed to apply to the whole population (Bryman & Bell, 2011). However, the research question is complex and can be better understood using qualitative research instead of quantitative statistics. There are two ways to structure the interview: unstructured interview or a semi-structured interview. The semi-structured model fitted the purpose better and allowed the interviewers to ask follow-up questions and dig deeper into each questions during the interview.

2.3.2 Choice of research objects

The investor research objects were found through Svenska Riskkapitalföreningen's (2013) member database and all members matching the criteria's were contacted. The criteria's used was investors investing in the seed and start-up phase in Sweden and that have made an investment in a USO. Three investors, also matching the criteria's, were found using the authors' personal connections. Both formal venture capital firms and business angels were contacted. Each interviewee either invests his own money or is a senior investment manager.

Representatives from Lund University's and Chalmers University of Technology's transfer offices to be interviewed were chosen by recommendations from the supervisors. The representatives were well experienced and well informed of its respective office operations.

Investors

Name	Type of investor	Interview type	Interview length	Date
Anonymous	Business Angel	Face-to-face	75 min	11.07.2013
Nordic Investment Solutions	Venture Capital Advisory Firm	Telephone	60 min	05.08.2013
Scope	Venture Capital Firm	Telephone	20 min	05.08.2013
P.U.L.S. Invest	Venture Capital Firm	Face-to-face	60 min	08.08.2013
Creandum	Venture Capital Firm	Telephone	25 min	15.08.2013
Almi Invest	Public Venture Capital Firm	Telephone	30 min	15.08.2013

Table 3: Investor interviews

Technology transfer offices

University	Organization	Interview type	Interview length	Date
Lund University	LU Innovation System	Face-to-face	60 min	13.08.2013
Chalmers University	Chalmersinvest	Face-to-face	30 min	05.08.2013
Chalmers University	Innovationskontor väst	Face-to-Face	60 min	11.09.2013

Table 4: Technology transfer offices interviews

Academic founders

Company	Origin university	Industry	Interview type	Interview length	Date
A1M Pharma	Lund University	Life sciences	Telephone	30 min	07.08.2013
CarpoNovum	Lund University	Life sciences	Telephone	30 min	09.08.2013
Arterion	Chalmers University	Technology	Face-to-face	60 min	05.09.2013
Tajitsu	Chalmers University	Technology	E-mail	--	10.09.2013
TEKNOPOL	Lund University	Technology	Telephone	60 min	20.09.2013

Table 5: Academic founders interviews

Academic founders to be interviewed were found using the TTOs' databases. Only entrepreneurs that had used the transfer office's services were contacted and that had successfully received venture capital.

2.3 Reliability and validity of the study

According to Cuba & Lincoln (1994) the primary criteria for assessing a qualitative study is: trustworthiness and authenticity. Trustworthiness is made up by four criteria: credibility, transferability, dependability, and confirmability. Each of these criteras will be reflected upon in the context of this study.

To ensure the first criteria of trustworthiness – credibility –many academics use triangulation. This necessitate the use of multiple methods or sources of data in studies of social phenomenas. Denzin (1970) define the approach to the use of "multiple observers, theoretical perspectives, sources of data, and methodologies". The nature of the problem definition and the approach to attack the financial gap phenomena from the perspectives of the different actors is a form of triangulation. Also, the use of different theoretical perspectives helps give this study credibility. The empirics and analysis were conducted in such a manner that themes and patterns were first identified in the three groups (i.e. founders, TTOs, and investors). Then similarities and differences between the different groups was analyzed

Transferability refers to the degree that the findings can be applied to other contexts. Since the qualititative approach study a small group and focus on deep insights it is not certain that any derived findings will be general findings. To prove that these findings is true in general is not the goal of qualitative research. Instead qualitativie research is meant to produce what Geertz (1973) calls thick description – a detailed description of a culture. This study provides a "thick description" of the social construct that needs to be validated in another study using more quantitative measures so that it can be considered transferable. "Thick description" is deep, dense, and detailed accounts of problematic experiences. These accounts often state the intentions and meanings that organize action (Denzin, 2001). By looking at the financial gap from three different actors and asking open-ended questions the results were a "thick description" of the social construct that would probably have been missed if only one viewpoint was studied. Only academic founders that have been successful in attracting venture capital were included in the study. The motivation for this is that they have worked with venture capitalists and experienced not only the process of trying to attract venture capital but also the involvement and influence of venture capitalists on the start-up. However, this creates a success bias in the selection of research objects and the academic founders' views presented in the findings might not be fully transferable and apply to the general academic founder. Instead the findings better reflect the views of successful academic founders.

Dependability could be considered qualitative research's comparison of reliability in quantitative research. Cuba & Lincoln (1994) propose that researchers should adopt an "auditing" approach in that complete records are kept of all phases of the research process and provided in an accessible way. The reason for this is to make the work easily assessed and "audited" by peers. However, in management and business studies this has not become a popular approach to improve dependability since it is very demanding in qualitative research (Bryman & Bell, 2011). The authors audio recorded and transcribed each interview. In this study the interview guide and interview profiles are presented but the full interview transcripts are left out.

Cuba & Lincoln (1994) suggest that researchers should act to achieve confirmability. Confirmability entails trying to achieve complete objectivity when performing the study. As previously pointed out, this is impossible in business studies but the authors should act in good faith, i.e. it is obvious that the author has not allowed personal values or theoretical preferences to influence the research process or the results derived (Bryman & Bell, 2011). The authors of this study attempt to achieve confirmability by scanning a variety of literature, using a broad theoretical base, and bouncing ideas off the supervisors. The theoretical base is connected to the questions asked in the interviews and thus opens up to many possible explanations for the problem explored. Also, cross-checking the interview guide with supervisors has further improved the objectivity of the study. The authors conducted two exploratory interviews to check the theoretical base early in the process.

The last criterion for assessing qualitative research is authenticity. The term comprises five points that raise concerns of a wider political impact (Bryman & Bell, 2011); first, does the research fairly represent different viewpoints among members of the social setting? The approach of the research to view the financial gap from the involved actors in the investment process in itself represents the viewpoints of different members. Second, does the research help members arrive at a better understanding of their social environment? Third, does the research help members to more accurately appreciate the perspectives of other members in their social setting? Fourth, has the research acted as an impetus to members to engage in action to change their circumstances? Fifth, has the research empowered members to take the steps necessary for engaging in action? The objective to bridge the financial gap between the involved actors satisfies the last four issues well. By getting a better understanding of the views on the financial gap the research can educate the involved actors of the others situation and it can also point out what areas need to be worked on to bring the involved parties closer. This analysis will in itself suggest areas where practical action can be taken to improve the conditions for USOs.

3 Theoretical framework

This chapter will present four theories, illustrated in the orientation graphic below (figure 3), that relates to the financial gap issue. Together, they will build the theoretical framework on which the later analysis will be based. The theories are, in order of presentation, financial gap theory, financial choice, negotiation theory and governmental intervention theory. The chapter is concluded with an elaborate summary together with a graphical illustration of this study's analytical model.

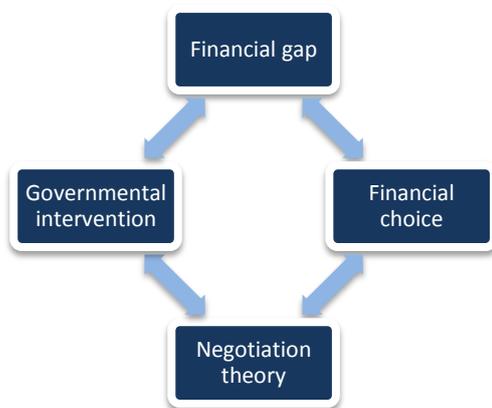
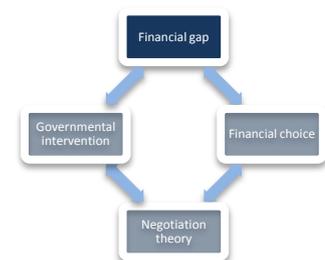


Figure 3: Overview of the theoretical framework



3.1 Financial gap

USOs from technical universities are usually attempts to commercialize a piece of the research conducted at the institution. During the initial pre-market years, the start-up needs to finance its operations through other means than sales. In the following subchapter the financial gap will be explained in detail. Then the agency theory and the important uncertainty variable will be presented as two theories explaining the financial gap.

3.1.1 The meaning of the financial gap

The term financial gap is used to illustrate that often-times, when it comes to start-ups and small businesses, like USOs, the managers experience problems when trying to attract smaller amounts of long-term external finance from financiers, such as banks and new owners (Winborg, 2000). The problem can be viewed both from a supply side and a demand side perspective. Supply side refers to the investors and their willingness to invest in small businesses and demand side refers to the businesses' need for, and interest in, external funding.

Many private investors, especially the institutional, think it is too early to invest in a USO at the early stages, with biotechnology USO's as exceptions (Shane, 2004). They want to wait until proof of principle is done and a prototype is developed, product development is initiated and the company is closer to its targeted market. This is mainly because of the time horizon issues regarding a possible exit either through acquisition or initial public offering. Thus, there is a financial gap between

founding of a USO and when it is attractive enough for private investors to acquire a share. Also, the entrepreneur would have to give up a very big share in the earliest stages, which could have negative influence on his or her motivation, and is thus not considered an option.

To enable entrepreneurs to build up enough value to not have to give up a major part of the shares for smaller amounts of money and simultaneously make the company attractive enough for the investors, there are public funds available to at least partly bridge the gap. Government grants, subsidies and contracts are often the major source of revenue for USO's during the initial period. It has even been shown that government funding is necessary for spin-offs to be founded and to survive (Shane, 2004). Government funding can be used for further development of the technology and to find commercial uses for the technology, because many USO's are created to exploit technologies for which the founders have not yet been able to identify a commercial use. Government funds also facilitate the acquisition of private sector financing by serving as a catalyst for future investment and also by providing a subsidy to reduce the private sector financing costs. It is also a way to manage the sometimes overwhelming risk inherited in USO's, because they often are cutting edge and thus are exposed to both technical and market risk. This will be discussed in more detail in chapter 3.4.

It is important to distinguish between the terms *gap* and *credit rationing*, as well as between an objective and a subjective gap. The capital market might be functioning perfectly in the sense that it is cleared by interest rate or required rate of return, but managers could still perceive it as impossible to attract capital on what they think is fair terms. In this sense, there is and will always be a gap. This could happen even though no credit rationing has taken place (Winborg, 2000). However, the market is said to be dysfunctional if relatively more risky businesses cannot attract capital at any terms. Then, credit rationing is said to take place (Stiglitz & Weiss, 1981).

3.1.2 Agency theory

The illustration below (figure 4) shows the basic idea of agency theory.

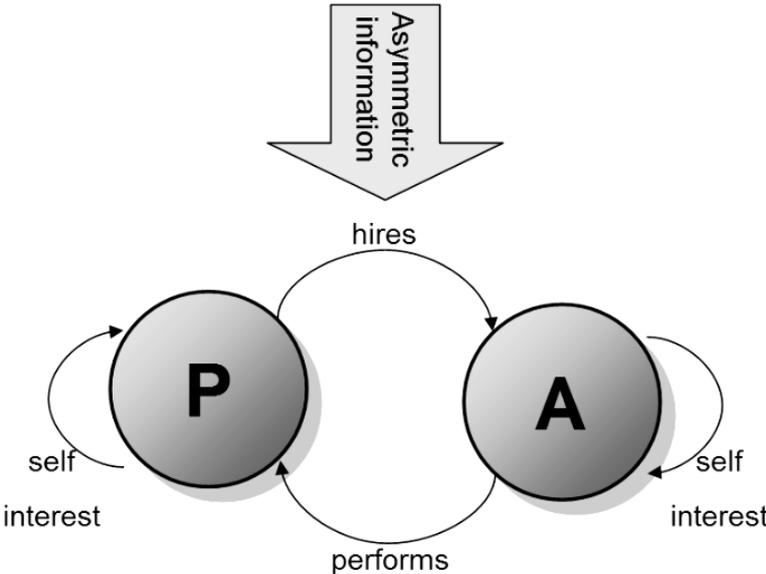


Figure 4: Illustration of the agency theory

The key idea is that principal-agent relationships should reflect efficient organization of information and risk-bearing costs (Eisenhardt, 1989). Agency theory provides a unique, realistic and empirically testable perspective on problems of cooperative effort (Fama & French, 2002). The agency model applied to venture capital focuses on the arrangement where control and ownership are separated. One party, the principal (investor), delegates work to another, the agent (entrepreneur), who performs work on the principal's behalf, in this case runs the business. In this set-up there are certain vital pieces of information that is only available to the agent, which leads to asymmetric information. It is difficult for the principal to know if the agent is using this information for self-interest purposes or for the advantage of the firm and the principal. This leads to a number of problems (Van Osnabrugge, 2000).

3.1.2.1 Contracts

The agency relationship is basically individuals who try to cooperate but with, to varying extents, different preferences. To limit the agency costs contracts are employed. Contracts specify important statutes, such as performance criteria, payoffs and the right of the agent. However, contracts can neither be written nor enforced without costs involved, which leads to agency problems. Contracts imply costs such as structuring, bonding and monitoring, and these costs may exceed the benefits of the contract. This is especially true when it comes to USO's in early stages, where no product is ready for the market, no cash in-flows yet present etcetera. The information asymmetries are impossible to completely contract away, which yields two agency problem causes - goal alignment and verification conflicts, and conflicts in risk sharing.

3.1.2.2 Incomplete contracts

As an alternative to the principal-agent approach there is the incomplete contracts-approach, which suggests that contracts are always incomplete. Therefore it is rather the ex-post allocation of control that is of importance, than the ex-ante screening and contract writing. The approaches place emphasis on different stages in the investment process, where the incomplete contracts-approach implies gaining control at later stages. Particularly in high-risk ventures, such as USO's, it is suggested that the best way to gain control and exert power over the investment is through active involvement after the investment has been made.

3.1.3 Uncertainty

Uncertainty makes financing spinoff companies difficult in three ways. First, it makes the evaluation of opportunities by investors complicated. Second, it creates bargaining problems between entrepreneurs and investors because it often leads to disagreement between entrepreneurs and investors on the profitability of the venture (Wu, 1989). Third, it leads investors to seek collateral to decrease the loss in event of failure. This uncertainty makes it very important for the entrepreneurs to demonstrate the values of their ventures. Investors in USO's are looking at founder attributes in search for entrepreneurial talent, but also at factors that the founders do not control, namely evidence of a large market, the presence of proprietary technology and the existence of a platform technology (Low & Abrahamson, 1997; Kaplan & Stromberg, 2001; Carter & Van Auken, 1990; Amit, Glosten, & Muller, 1990).

3.1.3.1 Founder attributes

Private sector investors in university spinoffs favor ventures founded by people who fit the profile of successful entrepreneurs (Shane, 2004). The research conducted previously suggests that investors prefer founders with the industry and management experience to identify and exploit successfully

entrepreneurial opportunities in new technology. As a result, prior research suggests that founders of university spinoffs with more management and industry experience are more likely to obtain financing than those without that experience (Vohora, Wright, & Lockett, 2004). At a minimum, observers explain that investors seek entrepreneurs with a sufficient level of business skills to allow them to work effectively with business people, preferring those with significant research funding from industry, since investors believe this demonstrates sensitivity to the demands of industry personnel. Moreover, professional investors tend to favor companies whose founders have knowledge of customer needs. While USO founders often have limited knowledge of whether customers are interested in their technologies (Vohora, Wright, & Lockett, 2004), private investors tend to select those spinoffs whose founders have greater knowledge of markets and customers.

3.1.3.2 Evidence of large market

Private sector investors favor university spinoffs that are developing products or services for a large market. The standard venture capital model of investing holds that private investors should favor ventures that operate in large markets, which can provide greater financial returns if the company successfully introduces its product, given a relatively high cost and uncertainty of technology and market development by spinoffs. Therefore most private sector investors that finance USO's prefer spinoff companies that are aiming at large markets.

3.1.3.3 Proprietary technology

Private sector investors in USO's also favor those spinoffs with strong patent protection on their technologies. In general, USO investors prefer to finance companies with patented technologies because patents provide externally verifiable evidence of a competitive advantage (Bhide, 2000). As a result, investors can have some confidence that a spinoff that they finance would, in fact, be able to appropriate the returns of the innovation, should it succeed in commercializing its technology. Several observers have shown that patents enhance the ability for USO's to raise money. One large sample statistical study of USO's supports this proposition. Focusing on variation in the effectiveness of patents across different industries, Shane and Stuart (2002) examined the performance of 134 spinoffs from MIT from 1980 to 1996 and found that, the more effective patents were at preventing imitation of a technology in an industry, the more likely a spinoff was to raise venture capital.

3.1.3.4 General-purpose technologies

Private sector investors in USO's also favor those spinoffs that possess general-purpose technologies that can be applied in a variety of different markets. The possession of a general-purpose technology facilitates the financing of USO's because of the market, technology and competitive uncertainty associated with this type of ventures. Entrepreneurs cannot know with certainty whether they will be able to produce new technology products or services, whether there is a market for those products or services, or whether the firm or its competitors will capture the returns from introducing those new products or services. Consequently, the founders of USO's need to be flexible and adapt to changing circumstances and a general-purpose technology suits that need.

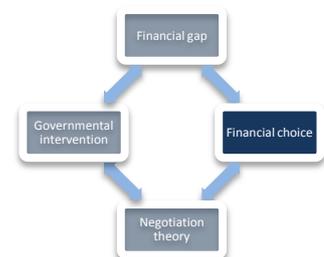
3.1.4 Financial gap, agency theory and uncertainty

The primary reason for the financial gap in the capital markets for USOs is information asymmetry and the inherent uncertainties in the ventures. According to Shane (2004) there are specifically four problems that this information asymmetry creates in the process of financing USO's. First, the entrepreneur wants to keep his or her superior information about an opportunity secret because this information is what constitutes the start-ups potential competitive advantage. Thus, the

entrepreneur will not disclose everything to potential investors and the investors have to make decisions on limited information (Casson, 1995). Second, the entrepreneur can use this information advantage to extract resources that fully informed investors would not have provided (Shane & Cable, 2002). Third, the entrepreneur can use this information asymmetry and the limits on investor monitoring that it imposes to expose the invested capital to excessive risk (Shane, 2003). Fourth, information asymmetry creates potential for adverse selection because it makes it difficult for investors to distinguish between talented entrepreneurs pursuing valuable opportunities and untalented entrepreneurs pursuing opportunities of limited value (Sahlman, 1990).

3.1.5 Financial gap summary

The financial gap refers to the problem for small businesses to raise external capital to fund its business. The agency theory is a popular explanation of the problem, where information asymmetries cause the principal (investor) and agent (entrepreneur) to act in self-interest. Two tools to minimize the effects of the information asymmetries are contracts and incomplete contracts. Finally, uncertainty in the business creates problems for the investor to fully evaluate the business and its potential profitability, creates a bargaining problem between the entrepreneur and investor, and leads the investor to seek collateral to decrease the loss in case of failure. This will be further elaborated in a subsequent chapter about Negotiation theory.



3.2 Financial choice in small businesses

As previously mentioned, the financial gap can be viewed from two perspectives: the supply side and the demand side. The problem is not only a supply side problem with insufficient capital available from investors but also a demand side problem. The entrepreneurs may lack the information and knowledge to seek out investors. Also, the entrepreneur may have a negative attitude towards external financing and giving up equity. In this subchapter theories and previous research regarding the financial choice of funding made by managers of small businesses will be presented.

3.2.1 View on venture capital

In a study by Saetre (2003) two entrepreneurial views on venture capital are presented. In a venture capital investment, the entrepreneur can either view capital as a scarce resource, meaning that the capital itself is of importance, or the entrepreneur can view capital as a commodity, meaning that other factors than the capital itself are of higher importance. The entrepreneurs that take the commodity view are far more restrictive of whom they let invest and demand more competent investors with relevant industry experience and network (Saetre, 2003).

One motive for the entrepreneur to start his or her own company is the notion of being “independent” of others (Landström, 2004). Per Davidsson (1989) points out that growth is not always a primary objective for the entrepreneur. Also, in a study from Chalmers University of Technology by McQueen & Wallmark (1982) that surveyed founders of spinoffs found that most of them did not found their company because of a desire to generate wealth but to fulfill their desire to commercialize their technology.

3.2.2 Access to finance

Founders of small businesses may lack sufficient knowledge of investments and a network to acquire external capital. There are many different and dispersed sources of capital available in the market. This is positive because it contributes to a well-functioning market but it also creates a problem for the entrepreneur: to identify the different alternatives and gain knowledge of the sources and what they demand might be too overwhelming for the entrepreneur (Landström, 2003).

3.2.3 Pecking order theory

Many studies (Calof, 1985; Holmes & Kent, 1991; Norton, 1991; Scherr, Sugrue, & Ward, 1993) of small business managers’ financial preferences have supported the pecking order theory presented by Myers (1984). What these studies have shown is that small business managers’ financial preferences are aligned with the preferences of managers of large quoted companies. The pecking order theory is based on the principle of least effort, meaning that the path of least effort or struggle will be the preferable choice. The pecking order theory suggests that when making capital structure decisions managers rank the source of funding in the following way: (1) internally generated equity, (2) debt financing, and (3) external equity provided by a new owner. However, the underlying explanation for financial preferences in small business is more complex than was initially implied by Myers (1984) for large listed companies – that evaluation of financial opportunities are strictly due to relative costs to the owner. In small businesses the management and ownership are often integrated, which will influence the interpretation of financial sources in that more emphasis will be put on retaining control over operations and assets as long as possible (Holmes & Kent, 1991). Although, it should be noticed that the pecking order is constrained for most small business as the option of raising external equity might not be available at all (Holmes & Kent, 1991).

3.2.4 Reverse pecking order theory

As an alternative to the traditional pecking order theory, Aernoudt (2005) presented a “reverse pecking order theory”. He showed that start-ups have an excessive demand for external equity explained by two reasons. First, without revenue and cash-flow internal financing is impossible to utilize. Debt financing is often approved when the loan is secured by assets, which many start-ups lack and thus making it difficult for start-ups to get debt financing. Second, debt entails interest costs and fixed payback obligations. Aernoudt (2005) suggests that for start-ups there are many positive aspects with business angel financing, e.g. the absence of financial expenses and easier access to second round financing. According to the theory, business angel financing can no longer be considered as a last resort of financing. Which of the two pecking order theories that holds true for USOs will be analyzed in the analysis section.

3.2.5 Financial bootstrapping

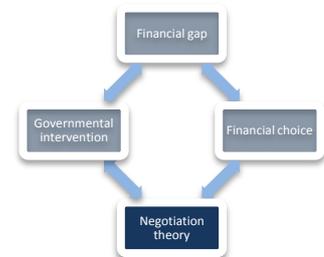
Many small businesses are often extensively and sometimes entirely financed from other sources than institutional financiers, applying different kinds of bootstrapping methods (Thorne, 1989). Financial bootstrapping has been defined as the behavior of attracting the resources needed without

the involvement of external long-term finance (Freear, Sohl, & Wetzel Jr, 1995). More precisely, the term financial bootstrapping refers to means for securing the use of necessary resources at low or no cost. Examples of financial bootstrapping are borrowing equipment, sharing resources, delaying payments, negotiating favorable conditions with suppliers and customers and using resources of the owner. Most small businesses face many difficulties in obtaining debt and equity, which are often more costly than internal financing, leading the company to use financial bootstrapping more frequently (Ebben & Johnson, 2006). Winborg (2000) and Gibson (1992) argue that bootstrapping methods can help reduce the financial gap for small businesses.

Financial bootstrapping is often considered an undesirable consequence of small businesses not being able to acquire financing. However, there is research arguing that it could also be a positive thing. Greene et al. (1999) propose that, given the financial situation a small firm is in, bootstrapping becomes a fundamental block in building the new venture. Timmons (1999) even argues that bootstrapping will give firms a competitive advantage by creating “a discipline of leanness” and methods of maximizing stockholder value. However, too much focus on bootstrapping and cost-awareness in the company strategy can hamper small businesses’ ability to really grow (Winborg, 2000).

3.2.6 Financial choice in small businesses summary

In contrast to venture capital investors, the entrepreneur’s main motive is not always growth. His or her main driver might be to commercialize the technology or become “independent”. Those seeking venture capital may lack the network and can have a hard time finding the dispersed sources available. The pecking order theory suggests that entrepreneurs seek external equity finance as a last resort. In response, the reverse pecking order suggests the opposite that start-ups have an excessive demand for external equity. Financial bootstrapping methods develop in small business as methods to limit its need for finance.



3.3 Negotiation theory

Noted statesman and negotiator Henry Kissinger defined negotiation as, “a process of combining conflicting positions into a common position, under a decision rule of unanimity” (Kissinger, 1969). In this subchapter the fundamentals of negotiation theory and the two branches of negotiation theory will be presented.

3.3.1 Basic concepts of negotiation theory

There are two different fundamental branches of negotiation theory. The parties are either negotiating over a fixed amount (i.e. a piece of a fixed pie, zero-sum), which generally produces win-lose situations, or they try to create win-win situations by enlarging the pie (see figure 5 and 6 below).



Figure 5: Fixed pie

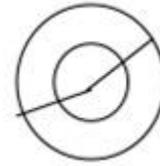


Figure 6: Expanding pie

These branches are called distributive (fixed pie) and integrative (expanding pie). Zartman (1988) describes the main school of thoughts in negotiation theory as five different levels of analysis. These are the structural, the strategic, the processual, the behavioral and the integrative approaches. It is important to acknowledge, however, that most negotiators use a combination of approaches and borrow from all kind of schools of thoughts when they are negotiating. For the purpose and relevance of this study, the two extremes, the structural and the integrative, will be described further.

3.3.2 Structural approach

Structural approaches to negotiation consider negotiated outcomes to be a function of the characteristics or structural features that define each particular negotiation. The structural approach finds explanations of outcomes in patterns of relationships between parties or their goals (Zartman, 1976). In this view, the relative *power* of each party affects their ability to secure their individual goals through negotiations. The definition of *power* can however vary. Sometimes it is the ability to win, or alternatively, as the possession of “strength” or “resources”. The central idea is the notion that the strong will prevail, or, in the language of classical realism, that “the strong do what they can and the weak suffer what they must” (Thucydides, 1910). Yet even in situations when there is one very strong and one very weak party, the range of outcomes is very wide. Therefore, analysts of this approach have looked at additional structural properties such as symmetry-asymmetry, the availability of *alternatives*, or the role of *tactics*.

Other factors, such as negotiating skill, can play a key role in shaping negotiated outcomes. Negotiators should be aware that a blind attachment to “winning” all you can from a negotiation regardless of the other parties’ satisfaction, can be a poor long-term strategy if it means that the other side will lose its will, or ability to maintain its side of the negotiated agreement.

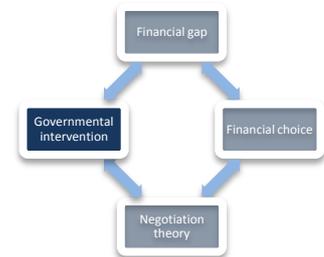
3.3.3 Integrative approach

Integrative approaches, in contrast to distributive approaches, frame negotiations as interactions with win-win potential. Instead of a zero-sum view, integrative theories and strategies look for ways of creating value or expanding the pie as in the picture above, so that there is more to share between the parties as a result of negotiation. Integrative approaches use objective criteria, look to create conditions of mutual gain, and emphasize the importance of exchanging information between parties and group problem-solving (Lewicki, Barry, Saunders, & John, 2003). Therefore, integrative strategies call for participants to work jointly to create win-win solutions. They involve uncovering *interests*, generating *options* and searching for commonalities between parties. Negotiators may look for ways to create value, and develop shared principles as a basis for decision-making about how outputs should be claimed (and who claims them).

3.3.4 Negotiation theory summary

Negotiation theory gives a foundation for understanding critical aspects of financing agreements between founders and financiers. The two different views on Negotiation theory are known as

distributive and *integrative*. The former regards negotiations as a zero-sum distribution of a fixed amount, whereas the latter focuses on expanding the value of which to share. It is important to know both the power structures of the negotiators as well as how to work for value creation when analyzing early venture capital.



3.4 Governmental Intervention Theory

Certainly, the governments in the developed countries of the world have the means to decrease the financial gaps in their countries. But is it reasonable to expect government officials to help freewheeling entrepreneurs and venture investors?

3.4.1 Why governments should intervene

The need for innovation is widely accepted by governments around the world. Virtually every area of cutting-edge entrepreneurial activity in the world had its origins in proactive government intervention. Similarly, the venture capital industry in many nations has been profoundly shaped by government intervention (Lerner, 2009). With a few exceptions, small firms did not invent the key genetic engineering techniques or Internet protocols. These enabling technologies were developed with government funds at academic institutions and research laboratories. However, it was the small entrants that first seized upon the commercial opportunities. Venture capital clearly serves as an important source industry for innovation, reflecting the fact that these investors both provide important guidance to young firms and relieves all-too-common capital constraints.

A first rationale for government intervention lies in the fact that there is a “virtuous cycle” in entrepreneurship and venture capital. Activities by pioneering entrepreneurs and venture capitalists pave the way for subsequent generations. Institutional investors gain greater confidence that the sector in which venture capitalists are operating is a viable one, and become more willing to back funds. Entrepreneurs become familiar with the trade-offs associated with venture capital financing. Initial disputes about the types of terms and conditions commonplace in venture financing are balanced with an appreciation for the types of gains possible with the involvement of a seasoned financier. Thus, pioneering entrepreneurs and venture capitalists generate positive externalities that benefit others. It is precisely when such externalities are present that public interventions, whether they are tax incentives, regulatory shifts, or more direct measures, are justified (Lerner, 2009).

A second rationale for public intervention in the entrepreneurship and venturing area is that knowledge spillovers may occur. In many cases, the firms pioneering an innovation get fewer benefits than society as a whole does. As a result, companies are likely to do less research than desirable. But with government subsidies at hand, firms may be encouraged to invest the socially ideal amount of funds in R&D. The differences between social and private returns are especially large among the smaller firms. Therefore, it may make sense for governments to fund young research-intensive firms, even if the direct financial returns from these investments are somewhat less than would be reasonable given the risks that are taken on.

There are also a few arguments against governmental intervention. The first and largest concerns the competence of the government. In many cases, officials cannot value, coach nor manage an entrepreneurial and innovative firm. There are numerous examples of governments who destroy innovation in certain industries by trying to create large champions and thus save jobs in large companies, such as the French government and the electronics industries in the 1980's (Owen, 2012). A failure to understand the basic nature of the entrepreneurial process is also a frequent problem. Since the uncertainties are large at early stages, officials are able to direct funds to friends or family, without necessarily getting caught. The capture problem, where "entrepreneurs" start up a company in an area where they are unable to be successful, but they can capture the public subsidies, is also ever present. Thus, a lack of foresight about the incentives government programs set up can be very costly indeed.

3.4.2 How governments should intervene

History has shown that some interventions work well and others do not. Essentially, the government can work with either increase the demand for venture capital by "setting the table" for entrepreneurial activity, or it can increase the supply of venture capital.

3.4.2.1 Increase demand for venture capital

The process of table-setting, ensuring that the environment is favorable for entrepreneurs and venture investors alike, has been far too neglected. No matter how many inducements are offered to make venture investments, without attractive investment opportunities the venture industry is unlikely to be sustainable (Lerner, 2009).

Looking more generally, entrepreneur-enabling efforts can be seen as to fall into four broad categories:

- Getting the laws right
- Ensuring access to cutting-edge technologies
- Creating tax incentives — or removing barriers
- Training potential entrepreneurs

The importance of the ability of entrepreneurs and investors to enter into complex contracts, where different outcomes can result if the company's progress varies, is substantial. An example would be convertible preferred stock (Investopedia, 2013). In particular, these securities allocate control to the entrepreneur when things are going well, but allow the investors to assert control if the firm is doing poorly. In this way, entrepreneurs can be sure that if they do a good job running the firm, the investors will not be able to use their special rights to wrest away their hard-earned gains (Lerner, 2009).

The second set of efforts seeks to encourage the development and transfer of university technologies. Cautions have emerged from the experience of some nations with technology transfer, particularly efforts that have involved raising substantial funds to finance academic spinouts. Many schools and governments have been tempted to consider the establishment of funds that would duplicate the activities of independent venture funds. Case studies and empirical evidence raise doubts about whether such efforts are likely to be successful. In some cases, the academic funds have crowded out independent venture capitalists, discouraging the involvement of individuals who would have the ability to add tremendous value to the spun-out entities. In other cases, these funds

have been plagued by poor decision-making, putting many millions of dollars into unsustainable companies.

The third set of actions concerns taxes. Increasing the differential between the tax rates on capital gains and ordinary income would spur corporate employees to found companies, thereby increasing the need for venture capital. Paul Gompers and Josh Lerner (1999) empirically find support for Poterba's capital gains tax rate claim: lower capital gains taxes appear to boost venture capital fund-raising. The cuts in the capital gains rate seem to have a particularly strong effect on the amount of venture capital supplied by tax-exempt investors, who are not affected directly by the change. This suggests that the primary mechanism by which capital gains tax cuts affect venture fund-raising is by increasing the demand of entrepreneurs for capital. Rather than cutting all capital gains taxes, one approach that has been employed in many countries is to create special tax rates for capital gains from investments in entrepreneurial firms. If taxes make it costly to succeed as an entrepreneur, other policies, especially common in Europe, punish failure. Another set of initiatives to boost entrepreneurship, then, addresses policies that make it costly to fail. In light of the experimental nature of the entrepreneurial process, policies that punish individuals who are involved with failed ventures can be counterproductive.

A final set of policies seeks to better prepare entrepreneurs by providing education. These policies have taken a variety of forms, from general training to hands-on assistance with the development of business plans. These initiatives typically help the inventor make a more informed decision on whether to pursue an idea, as well as providing background information on financing and strategic routes frequently chosen by entrepreneurs.

3.4.2.2 Increase supply of venture capital

In their eagerness to jump-start entrepreneurial activity, governments frequently race to hand out capital. Failing to focus on creating favorable conditions for entrepreneurs will lessen the demand for the funds that are made available. Direct interventions to increase the supply of capital for entrepreneurs and venture capitalists have differed along many dimensions:

- The parties providing the capital. In many cases, government officials have handed out the funds themselves. In others, academic institutions or non-profits have been delegated to provide the funding. In yet others, private sector organizations have been provided capital to give in turn to entrepreneurs.
- The amount of funding: matching vs. complete investments.
- The structure of the funding: outright grants vs. return on invested capital.
- The "strings" attached to the capital: the extent to which the government contracts have constrained the activities of these firms and funds has varied substantially.

Direct interventions present far more substantial challenges to public officials than the previous two types of initiatives we have looked at. There is always a danger of spending public resources unwisely. A tax subsidy for capital gains may for example not generate enough economic activity to make up for the revenue loss (Lerner, 2009).

3.4.3 How governments should not intervene

The provision of public funds to entrepreneurial companies and venture funds is a far trickier process than the "table-setting" exercises described earlier. But the experience of many programs across the

globe suggests some common pitfalls can be avoided with careful planning. There are two fundamental challenges that, unless properly addressed up-front, can doom a program before it begins.

The first pitfall is the failure to understand the entrepreneurial and venture capital markets. These markets are complex, and good intentions alone are not enough to overcome fundamental flaws. Any number of poor design decisions—from expecting the effort to bear fruit too quickly, to creating too large or too small a program, to inflexibility in design—can doom an effort.

The second danger is a top-down approach, in which bureaucrats mandate which sectors or locations are to be funded, without listening to what the market is saying. Whatever the motivations for such targeted funding, it is likely to be a road to disaster. Programs are more successful if the entrepreneurs or venture capitalists receiving public funds have to raise matching capital from private sector sources as well. In this way, the market can help sort out which players are likely to succeed, and who will probably be ineffective.

3.4.4 Summary of governmental intervention theory

Governments around the world today seek to promote entrepreneurial and venture capital activity, employing a variety of “stage setting” and direct strategies. But programs to promote entrepreneurship are challenging. Governments cannot dictate how a venture market will evolve, and top-down efforts are likely to be unsuccessful. The same common flaws doom many programs. These flaws reflect both poor design, indicating a lack of understanding of the entrepreneurial process and poor implementation. Governments must do a careful balancing act, combining an understanding of the necessity of their catalytic role with an awareness of the limits of their ability to stimulate the entrepreneurial sector. If policymakers apply these key lessons, many sagas of waste and disappointment can be avoided. Entrepreneurs will find a more hospitable climate, and we will all benefit from a healthier economic world.

3.5 Theoretical framework summary

The purpose of this chapter was to present previous research relating to the financial gap. As mentioned before, the financial gap can be viewed both from a supply and demand perspective. The supply view can partially be explained by information asymmetries between the founders and the investor, meaning that the founders know more about the technology than the investors, causing the investor to refrain from investing or insure himself using contracts or other methods, which in turn generates extra costs. It could also be that the investor knows more about the market potential than the entrepreneur, which flips the asymmetry in the other direction. Also, uncertainties in the start-up cause the investor to fully evaluate the business, which incurs further costs. Generally, a good founding team, a large targeted market, proprietary and/or general-purpose technologies help to decrease the uncertainties for the investor.

Taking a demand side view, there is evidence showing that some entrepreneur’s primary goal is not growth. For those who seek to acquire external equity finance, the dispersed and various sources of finance might be too overwhelming for the entrepreneur. Many also lack the network and a sufficient knowledge about the existing sources. The pecking order theory suggests that external equity is the least preferable option of finance for entrepreneurs, since internally generated funds and debt would allow the founder to maintain full control. However, recent research on startups has supported an alternative theory. The reverse pecking order theory suggests that some entrepreneurs

see external equity as their most preferable source of finance, since it is really the only viable option in these early stages. Different methods of financial bootstrapping, such as lean startup or employee stock options, can be applied in firms as an effort to avoid acquiring extra finance. This can however put a constraint on the development and is therefore viewed as an undesirable consequence of businesses not being able to raise enough venture capital.

Negotiation theory plays a role in trying to understand the aspects of financing agreements between founders and financiers. The theory points out the importance for the negotiating parties to understand each other and to work towards a value-adding process and a win-win situation. Although a venture investment per se is integrative (expanding pie), it could be more or less distributive (fixed pie) depending on the bargaining power of the participants. It is also important to not neglect the influence of negotiating skills. Negotiators need to understand that it is probably a poor long-term strategy to have a blind attachment to “winning” all you can from the counterparty regardless of the counterparty’s satisfaction. This could affect factors like cooperation and motivation negatively.

Government intervention is fundamental to entrepreneurial activity and will set the environment from which innovations can be generated. Many governments across the world apply different programs to promote entrepreneurial activity. There are mainly two tasks for the government to work with in this regard: stage setting including legal framework, and market complementation through injection of public venture capital. According to theory, the government should rather take a passive role than an active role in the venture capital market. It is a balancing act for governments to understand their very important catalytic role but also be aware of the limitations of the role the government can play in stimulating new innovations.

These areas will be explored and analyzed according to the graphical model below (figure 7). The interactions between founders, government/TTOs and investors concerning the financial gap will be explored through interviews, and will be analyzed together with the corresponding theories. This will hopefully lead to a highlighting of differences in views on financial gap, suggestions to decrease the gap and suggestions for further research.

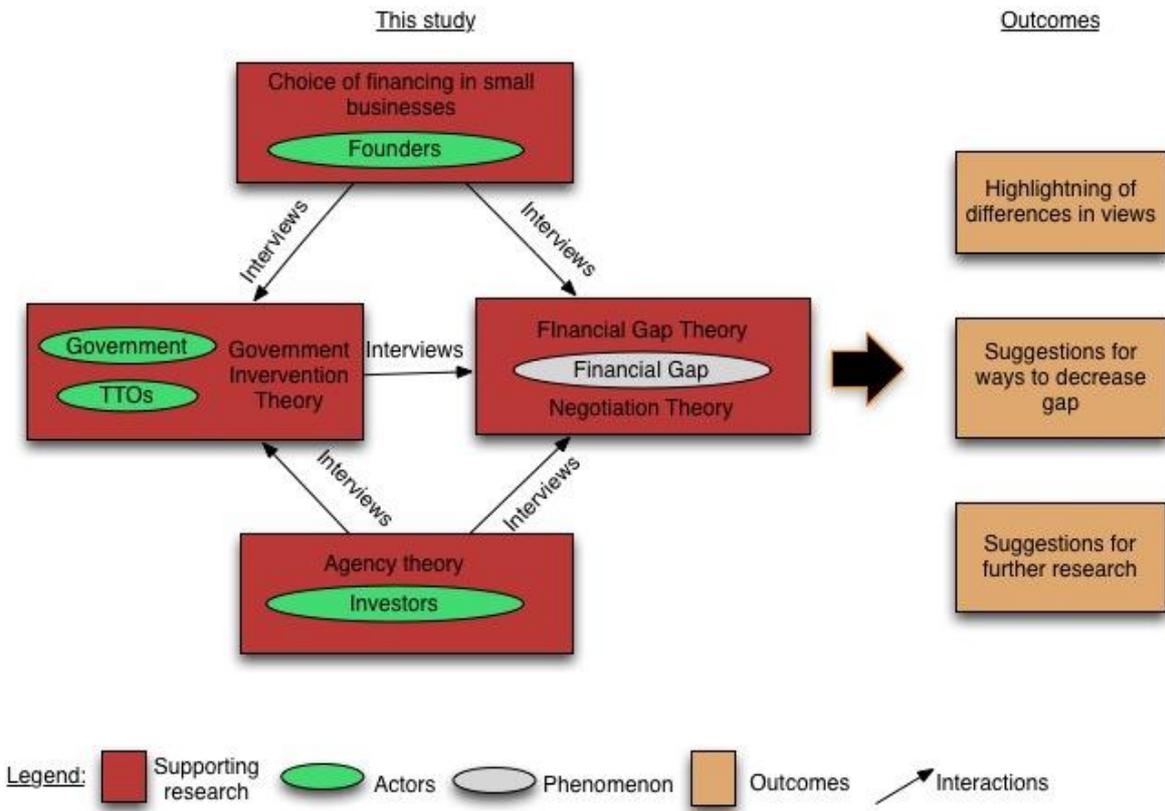


Figure 7: The analytical model

4. Results

To get an understanding for how investors, founders, and TTOs view the financial gap-phenomena, a total of 13 interviews were conducted with people working with the investment process of USOs. They were in short asked about 3 different areas:

- Their perceptions of the financial gap for USO's, the reasons for its existence and how it is affecting their business.
- How the society's innovation support systems can be improved to handle the financial gap, including hybrid investments and tax regulations
- How the universities' innovation support systems can be improved to handle the financial gap, including the TTOs' role.

To view the questionnaires, see Appendix A.

4.1 Investors' view

In this chapter the investors' current view on the financial gap for USO's is presented. This info was extracted through in-depth interviews with 6 investors in start-up companies with extensive field experience. To view the detailed profiles, see Chapter 2.

4.1.1 Perceptions of the financial gap

The investors all agreed that there exists a financial gap in the seed phase of high-tech venturing in Sweden. However, many respondents stressed the importance of a precise definition of this phenomenon. In their view, there is not and will never be a funding problem for the most successful startups, mentioning companies such as Spotify or Skype. Many also thought that about 70%, a very rough estimation, of the start-ups should never get any money at all, since their concepts are not good enough to become commercially viable. But for the companies in between, who will not become worldwide successes but still could create many new jobs and be good for Sweden as a country, the problem exists. At least in the sense that it is tricky to achieve private venture capital.

"Some use to say that if 100% is a success, then the idea is perhaps 10%" – Investor

For all respondents, the long time horizon from idea to company and product in USOs and the risk associated with that including technical and market risk, are the primary reasons that the financial gap exists. For professional investors managing large amounts of money, it becomes inefficient to invest in risky high-tech startups, because they need to make money on their owners' money on a relative short time frame. The managing costs in relation to amount invested become too high to do seed investments for funds of a certain size. However, smaller venture capitalists that are investing their own money, such as business angels, are able to work on a wider time frame. They usually also have more time to devote to helping to build the new company.

"Today a lot of the value creation in business comes from new business models. However, USOs are focused on research and intellectual property, which do not generate value in the large success stories we see today" – Investor

All respondents thought that it is good that bad companies are knocked out, and that the market should decide who survives and who does not. Nothing should be done venture-wise without a customer and target market in mind, which is one of the fundamental problems with USO's. Many

also raise concerns that the ones who shout loudest about the “huge financial gap” are the entrepreneurs who failed, because they were not good enough. In the world of venture capital it is impossible to have a deterministic view on venture survival and success, because it is impossible to know who is going to make it and who will not as early as the seed phase. Many respondents also suggest that the recent lack of success-stories among USOs might be a reason why investors are careful or even reluctant to invest in USOs.

4.1.2 Society’s support systems

Overall, the respondents were consistent in the view that the public support systems in Sweden in terms of funding start-ups are fairly good today, at least compared to previous decades. A majority of the respondents think that the tax credit proposal, that will make venture investments up to a certain level tax deductible for private investors, will do good for the purpose of this study. The removal of property tax, wealth tax and inheritance tax is allowing people to build up private wealth, from which parts can be invested into new ventures and thus create an increased number of business angels, who are most likely to invest early in start-ups. Almi’s merge with Innovationsbron, two public investors, into Almi Invest will also make public start-up funding more effective, respondents think, because it creates more of a critical mass. All of the respondents were also positive towards hybrid investments, where public money complements private, but most think that the investment decision should be made solely by the private actor, who have better incentives to make money because they invest their own money, and have more effective incentive systems among its employees. This way administration, such as due diligences, are minimized to increase efficiency.

“Let’s say that we invest in a company. Then the tax income for the state will be five times as high as compared to the money we invest, including VAT, back tax, payroll taxes, and income taxes. The society is skeptical towards investment credits because they are often directed towards wealthy individuals but the one who benefit from it is society itself” – Investor

However, there are certain things that need to be improved. Many respondents mention that more competence, primarily commercial, is needed in the public investment institutions. The taxation of employee stock options is also much too high, since it is labeled as income of employment, with a marginal tax of 70 %. This is a good way for start-ups with limited resources to finance operations early in the venture life cycle, but is not a viable option in Sweden today because of taxation. Another thing that is limiting the potential of new high-tech startup successes, mainly in Stockholm, is the regulated housing market and the limited supply of housing. This makes it expensive for outside expertise and talent to move to the major cities, where most high-tech start-ups are located.

“It would be easier for private investors to invest if the government could bear the risk in the beginning. But who in the government can make the selection where to invest?” – Investor

4.1.3 The universities’ support systems

The most frequent topic among the respondents concerning the universities’ tech transfer processes was competence. Many companies and founders are not commercially prepared to start their business. Narrowing the “commercial competence gap” would make it easier to attract investments. Also, a researcher who is world leader in his or her area wants to speak with someone of the same caliber about starting a business. Otherwise they will become frustrated and go somewhere else, or not start a business at all. What investors find most important for TTO’s in terms of aiding USO’s to

acquire financing are three areas: educating founders in commercial skills to make them more focused on customers and sales, educating and coach founders in presentation skills to communicate better with potential investors, and better communication between TTO's and investors about potential opportunities. This also requires competence in these areas, which many respondents perceived that many TTO's lack to various extents. Some investors point out that the TTOs must reach a "critical mass", like several American universities TTOs have, to attract the right people to help USOs.

"The fact is that if a world leading scientist wants to discuss his start-up with, let's say a business developer at the technology transfer office, then he wants to talk to someone of the same 'order' that understands business development... More senior and experienced people need to be recruited to the technology transfer offices." – Investor

To many investors, simply weeding out projects with low potential would be something TTO's could help with to make the investors more interested and make their job easier, although this can be tough due to political reasons. It is also important to bet wide at the idea stage, since it is impossible to know exactly which projects will turn out to be successes. Many respondents thought that it could be a good idea to give the universities more USO-labeled money to be able to keep their USO's afloat perhaps a little while longer than they can today, but too much money would just be wasteful in terms of building new successful companies. This is because of personal relationships, academic status-projects that will never survive commercially and the lack of competence to develop businesses.

Since the managing team is one of the most important factors for an investor to invest, it is important that the TTO's can help USO's by supplying experienced external entrepreneurs with sufficient commercial skills to those startups where the idea-creator are more interested in continuing with research and publish articles (Politis, Gabrielsson, & Shveykina, 2012). That would make investors more confident in investing in USO's, according to the respondents. Here the model at Chalmers receives some credit.

4.1.4 Other key insights

Many investors mentioned that, although more public money in the early stages would be welcomed, the government officials are not best suited to distribute the investment funds. There are many uncertainties in the industries that USOs are involved in and it is impossible to predict the future. Politicians are incentivized to score political points by "forecasting" the future and budget investments for certain industries, e.g. solar energy. By doing this they offset the market. The best use of the public money would be together with private money in tune with the market and where the private investors control and operate the company.

4.1.5 Summary investors' view

In order to solve this problem with financial gap for USO's, the trick is to reduce the technical risk enough for private investors to be interested. They can handle the commercial risk, but they need someone to carry parts of the technical risk. The time horizons also limit the possibilities of private investments. This is where public money is important. All of the investors agreed that a new publicly funded but privately managed fund with a mission to invest in the seed phase would definitely help bridge the gap, and would be the most efficient way to canalize public money into new ventures. To lower taxation on stock options for employees could also help companies survive the financial gap, as

well as introducing the proposed tax credit scheme to encourage more people to become business angels, who are more likely than professional VC firms to invest early in new high-tech ventures. The TTOs need more competence and resources to function the way they should, according to the respondents. Their primary objectives to help USO's get funded is to educate the founders commercially, communicate better with potential investors and to work actively to complement start-up teams with experienced entrepreneurs when needed.

4.2 TTO's view

In this chapter the TTO's current view on the financial gap for USO's is presented. This information was extracted through 3 in-depth interviews with business developers, from Lund University and Chalmers University of Technology, with extensive field experience, and from Chalmersinvest – a venture capital seed fund investing the school's money in USOs at Chalmers University of Technology. To view the detailed profiles, see Chapter 2.

4.2.1 Perceptions of the financial gap

All respondents noted that there is a significant financial gap for USOs. Previously, there was a lot of, especially pre-seed, capital available and investors believed it was fairly easy to get a great return in this market. However, during the dotcom crash many investors lost a lot of money and the view on early venture capital changed. The respondents note that they now see that the pendulum has turned again and that there is money to be made. There are not so many players in the market right now but those who are have a good opportunity to earn a good return.

One respondent sees that there are many projects with good potential but lacks a good entrepreneur to execute them, resulting in that many of these projects fail. It is hard to attract good people because there is little room to offer a salary in the beginning. Investors are not willing to pay for salaries.

There are some projects that require up to 150-200 million SEK in equity that are too big for TTOs to invest in. The TTOs do not have the resources to support investments of this size and targets smaller investments in the first rounds. Almi Invest and private investors are the only ones that can make the bigger investments.

4.2.2 Society's support systems

Every respondent believes that Sweden needs more business angels. Sweden has had a high property and inheritance tax for a long time, resulting in less built up wealth among individuals staying in the country. This has changed in the last decade but it will take time before we see any major increase in business angels in the market. All respondents also see tax credits for investments in start-ups as part of a solution to bridge the financial gap. One respondent points out that it is not only the capital itself injected in the start-ups that will help bridge the gap but also that the society might change its view on investments in start-ups. A regulatory change might increase the awareness and importance of start-ups among the population and result in a more entrepreneurial-friendly climate. Today many entrepreneurs are afraid of going to friends and family for funding.

One TTO mentions that it must become more profitable to manage a venture capital fund working in the seed phases. If you have a venture capital fund investing in the early phases you don't invest that much money per investment and you have a portfolio of about 15-20 investments. There are fixed costs associated with managing a fund. Administration and personnel costs are fixed independent of

whether the fund invests 1 million or 100 million SEK. This results in a higher proportion of fixed fees in a portfolio of early stage investments than in a later stage investment portfolio. That is one of the reasons why there are fewer investors in this stage and more in the later stages. One solution to this would be to subsidize management costs in early phase investment funds with public money. That would shift more funds towards investments in early phases.

Public subsidizes injected straight into a start-up is not a good solution to the financial gap. However, the TTOs agree that hybrid investments are a good way to go. Almi Invest for example has syndicated with EU's infrastructure fund and with private investors to invest half the required money each. Also, if investors can match the investment with a public loan, equaling the value of the equity in the start-up, it will increase the return on equity and attract more private investors. Internationally, many countries have adopted a cap on the return for the public investor in hybrid investments, i.e. the public investors return on equity is capped at 10% per year for say three years and the excess return will be given to the private investor. This would give a boost to the private early stage investment in Sweden.

One respondent believe that the society should stop investing public money as venture capital, but should rather go back to more equity loans instead. These loans have higher interest rate than regular bank loans, but if you are late with interest payment or amortization, it will not put you into bankruptcy. The respondent thought that this would be a win-win, since most money come back as employees income tax anyway, and can comeback twice through the higher interest rates, but founders get to keep total control and retains all incentives to build a successful company.

One respondent see entrepreneurship education at university level as a tool to improve the attitudes towards entrepreneurship. It is only in recent years that entrepreneurship has become more attractive and popular. Previously, students went to university to become "employable" but that is about to change now. Entrepreneurship education in elementary school and high school is also good.

The TTOs acknowledge that the climate for small business in Sweden has improved a lot in recent years. When you have revenue and cash flow the rules are more favorable and the owners can take out more dividends, especially if you employ people. In addition, the corporate tax has been reduced significantly.

4.2.3 Universities' support systems

All respondents believe that the TTOs' main service should not be to provide capital but to educate and help entrepreneurs with business development. The TTOs contribute with business development, legal and intellectual property services, recruit management, marketing, and networks of mentors and financiers.

"The strategy work is what raises the quality of the project" – TTO

One TTO's strategy is to be a very active investor in the companies it chose to invest in. It believes it is an advantage to have the university as one of the owners because it can be seen as a "sign of quality" and be used as a selling argument to customers.

According to one respondent, the biggest challenge is to find good entrepreneurs to execute the idea. One solution to that are students, which is an under-utilized and cheap resource in creating successful USOs. The TTO is trying to engage hungry and competent students with academic

researchers. “The students may lack experience but it is better to have something than nothing.” The same office is running a pilot project of financing the student/entrepreneur’s salary for a limited time.

4.2.4 Other key insights

One respondent wishes to see more serial entrepreneurs. Many of those interested in running a project are not qualified to do so. There are more people applying than is needed. There are a couple of serial entrepreneurs that the office knows are good entrepreneurs and can easily assign projects but they are not many.

Innovation networks, such as CONNECT, are very important tools for USOs to find and set up a successful start-up, says one TTO. Hopefully, he says, these networks will become more active again as the economy recovers from the recent financial crisis.

Another respondent says that lean start-ups and financial bootstrapping are two of several ways to decrease the financial gap.

4.2.5 Summary TTO’s view

There exists a financial gap for USOs today but there are an increasing number of good opportunities today to make a great investment return. One possible solution to decrease the gap is to attract more business angels and improve their financial climate through actions such as the proposed tax credit scheme. Also, there is a lack of good entrepreneurs in Sweden. More entrepreneurial education and change of attitude towards entrepreneurship can create more and better entrepreneurs. There are regulatory changes that can be made to increase investments in the early phases: subsidies of management costs in early stage investments fund, more public funds to hybrid investment, and caps on the return on the public investment in hybrid investments. All these improvements will improve the financial incentives for the private investor to invest in USOs.

4.3 Founders’ view

In this chapter the founders’ current view on the financial gap for USO’s is presented. This info was extracted through in-depth interviews with 5 founders of start-up companies whom all have succeeded to attract venture capital and also have used TTO services. To view the detailed profiles, see Chapter 2.

4.3.1 Perceptions of the financial gap

Raising venture capital was perceived as very difficult by all the founders. Two issues were frequently observed. First, raising external capital is very time-consuming for the founder. The founder has to spend valuable time raising capital instead of working with the business and product development. There are no options since first priority is to keep the company afloat. One founder says that raising capital consumes 80% of his time. Second, it is hard to get in contact with financiers. Most founders lack a network of potential investors. Many perceive that the gap has widened recently, since many investors are still on the stock market, and the few VC-firms on the market has moved forward in the venture life cycle.

The founders in the life science industry points out that they require a lot of product development and accumulate a lot of costs before reaching a final product. There are not many sources of early finance available, especially for investments of this size. One suggestion for improvement is that they

carry out academic research longer and receive research funds longer before starting a company. A problem with incorporating too early, one responder said, is that it is even harder getting funded, and if you manage to find investors, the investor base gets too big after a couple of investment rounds, and becomes hard to coordinate. To stay within academia longer would help cover the early costs and keep the investor base low.

“You must generate some costs to become attractive among investors. At the same time will it drain the company’s resources from working on its core business” – Founder

All respondents were positive towards private venture capital. They recognize that private investors are crucial in financing and developing the business. They also note that they are not discouraged by being diluted by potential private investors. However, one respondent suggested that, in today’s conditions on the VC market, founders should perhaps change their negative view towards an early IPO on the smaller stock-markets, at least if you are in need of heavy financing. It is hard to get as much money as you want today, and the difference would be small documentation-wise, since founders today have to send status-reports to existing investors frequently, as well as search for new money, which is also time-consuming. With a successful IPO, the entire sum required would be available immediately instead of in slices.

4.3.2 Society’s support systems

All founders recognize that more early funds and subsidies are needed. However, they are skeptic of funds such as Industrifonden and other public funds to distribute public money. They may lack the expertise to fully evaluate and understand the product and may lack market expertise. Many think that the market should decide who gets funded and who do not, but that the market in itself is too small in Sweden. The competition is too low. Therefore, one respondent says, should the society not invest venture capital directly and compete with existing actors, but they should procure the investment management from private actors, and thus expand the existing market instead. Private actors are allowed to use much more dynamic compensation models with bonuses and such, and thus do a better job.

Salaries for executives, administrators, engineers etc. constitute a large cost for many USOs. If the government could subsidize some of these costs it would lower the start-ups’ costs and their financial need. Especially, if the founders could get subsidies to hire a CEO they themselves could devote more time to the actual core-business.

Many respondents lift the issue regarding employee options as the primary tax-related issue for startups. The tax law is rather unclear on this matter, especially whether the proceeds should be classified as income of employment and/or capital gain, which in many cases end up as both which generates a 70% marginal tax. One respondent says he understands the point of separating capital gains and income tax, but thinks startups should be exempt from this, since they are no partners of a big-four company or such, but they actually take a real risk. In general, he says, the Swedish tax system is created with only the big corporations in mind. His suggestion is to copy the Californian law, which has created a new form of options called ‘incentive options’, which only startups can issue.

“The employee stock option problem is the largest tax obstacle for small businesses in Sweden. The regulation is very unclear. You never know if the tax agency will come after you in case you make a profit” – Founder

It must be possible to deduct donated money from tax for Swedish companies, as it is in the USA, according to one respondent. It is impossible for companies today. That makes it a lot less interesting to donate money to interesting research projects, which would help close the gap. Also, one start-up wanted to give stipends instead of salary to master’s thesis writers, to not tamper with their governmental monetary study support, but that was not possible.

Finally, one respondent said that there is a need for a way to own IP collectively without starting a public company, since almost all patents today are a product of a team of researchers, not individuals. This problem force researchers to incorporate too early, and thus the need for finance becomes very large and the time to market is very long. To enable this would somewhat close the gap from underneath.

4.3.3 The universities’ support systems

The founders believe that the TTOs could use more money to spend in the early phases. If they could provide patent engineering services and take on some patenting costs it would greatly help USOs. It would both lower the costs and the founder can spend more time on product development. Some founders think it could be a good idea to locate TTOs outside the university’s campus. This because the academic culture in general is not business-friendly enough. One respondent even believed that the TTO’s in Sweden should merge into only two, to create enough critical mass.

“Put the technology transfer offices outside the universities! The values and culture in academia are not aligned with entrepreneurship. To discuss entrepreneurship with universities is like discussing democracy with Putin” - Founder

Many founders said that a change in attitude within academia towards venturing and entrepreneurship is required. It must be accepted to run a company in close connection with your research, which many professors do not like today. Many professors are uncomfortable with business. They also think they have already done the major part and invested a lot of time when they actually only have been supervising Ph.D’s. To help this, a compulsory doctoral course on IP and entrepreneurship is needed, according to one respondent.

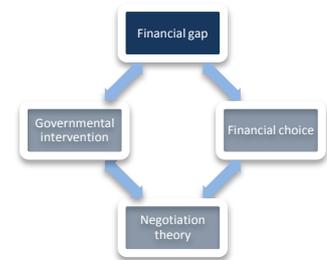
The TTOs most important input is to provide access to a network of financiers and give good advice on both public and private financing alternatives. The second most important service is to help recruit board members with previous industry experience, and also to find real entrepreneurs to steer the ventures. Here the model of Chalmers University of Technology has received much appreciation compared to the University of Lund, which is more traditional in this sense. However, many entrepreneurs think that the TTOs’ services are too expensive, where e.g. Chalmers Innovation charges more than SEK 5000 per month for a simple office.

4.3.4 Summary founders’ view

Founders find it very difficult to raise external capital and it takes up much of their time. They believe that subsidies and public funds to cover executive pay and patent costs would greatly help USOs. The founders are positive towards private venture capital and specify that the most valuable service that TTOs can provide is access to a network of financiers.

5. Analysis

In this chapter the different perceptions of the financial gap experienced by investors, founders, and TTOs will be analyzed. At first, similarities and differences in the views of the financial gap between the actors will be highlighted and will be compared with previous research and theories on the subject as presented in the theoretical framework in chapter 3. Second, an analysis on financing choice in small businesses will be conducted. Then, an analysis of the data and negotiation theory will be presented. Finally, the actors' views on governmental intervention and its corresponding theory will be analyzed.



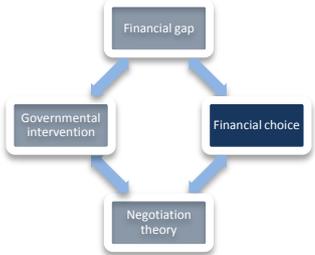
5.1 Views on the financial gap and agency issues

Both investors and TTOs report that the early venture capital market is fairly good today, at least compared to the previous decades. However, the findings suggest that there exists a substantial financial gap for USOs in Sweden. The gap is most apparent for investments between proof-of-concept stage with investments of about SEK 1 million and up to larger investments made by the bigger venture capital firms. According to previous theory on agency issues, the risks and uncertainties associated with investments in USOs are too high and discourage investors to invest. The risks can be derived from two types of risks: market and technical risks. These risks increase with the time it takes to establish a company and develop a final product from idea. Long time horizons and the inherent agency issues are generally synonymous with USOs, so much of this theory can be confirmed. If an investor cannot fully understand what the product will do and how it will do it, it is hard to get funded by him or her. Therefore, any measure that could lower the development time would make it more attractive for investors to fill the financial gap. A possible solution presented by both investors and founders is to delay the actual founding of the company. If the innovation process can be done within the academic institution for a longer time and be funded with research grants it will shorten the timeframe for the succeeding company and it will have a better chance of attracting more venture capital when it seeks to do so. This could be a new form of financial bootstrapping for USOs. But in order to make this happen, a change of attitude towards commercialization is required in the academic institutions, which is not business-friendly enough today, according to the respondents.

Both investors and TTOs agree that the current venture capital market is in better shape today than before because of recent political reforms. Nevertheless, founders complain that it is too hard to find and raise external capital, which was expected. Investors say that high risks associated with USOs and the lack of commercial competence refrain them from investing in USOs. TTOs pose a potential explanation to the “commercial competence gap”, that there is a shortage of good entrepreneurs. Many of the entrepreneurs that apply to work with the TTOs' projects are not qualified to work on the projects. Thus, the TTO's should intensify its work with bringing in good entrepreneurs, in line with previous research by Politis et. al. (2012).

All interviewees agreed on the fact that the size is too small and the competition is too low in the Swedish venture capital market. This is a big reason for the financial gap, because as funds grow

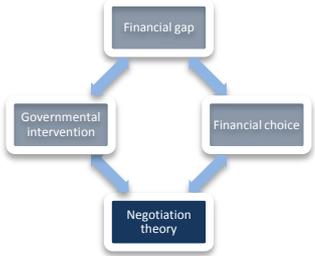
larger they tend to move forward in the venture life cycle. In the recent years, there have been too few new entrants in the earlier stages. This is something the government should look into.



5.2 Views on financial choice in USOs

Founders spend a lot of time raising venture capital. This stalls the product development process and consumes much of the founder’s valuable time. The founders say that they lack the network and contacts to potential investors and that cold calls never work. This is in line with Landström’s (2003) previously presented theories that many entrepreneurs don’t know where to access to external financing. Remarkably, founders are unaware of or unrealistic about the time that is required to both find and raise venture capital. Very few founders did contemplate on the trade-offs of trying to raise venture capital, for example that the chance of receiving venture capital in the first place is relatively low, cost is high, dilution of discretion in managerial decision making is significant, and it consumes the founders’ scarce time. If founders lack the knowledge of the alternative costs for raising venture capital that could be a competence gap that the TTOs could help fill early in the start-up phase.

One view of the trade-offs is being reflected in the founders’ very positive view on private venture capital saying that they are not discouraged by being diluted. This view could suggest that founders view venture capital as a scarce resource and that the reverse pecking order theory potentially holds true for founders of USOs. With regards to the successful response bias presented earlier, the founders might be prone to be positive since they have all succeeded in receiving private venture capital before. However, not all companies have been a success story. Some of the affiliated companies have been close to bankruptcy or not yet seen any positive cash flows.

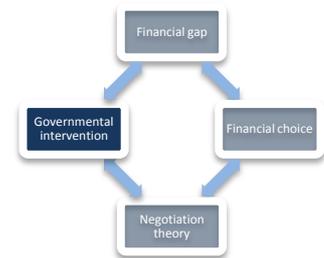


5.3 Views on negotiation theory

Because there sometimes exists large information asymmetries, it is clear that the positions in a negotiation situation between investors and founders often tend to become more structural than integrative. To bridge this, more mutual understanding of the counterparties is necessary, which is something a TTO should be able to help with. When a USOs investor base is growing, it is also hard to reach consensus and this can become an obstacle when new investors are coming in, and some old investors tend to not be as integrative as before.

The lack of competition in the Swedish venture capital market when it comes to seed investments tends to make the negotiations even more structural, since venture capital is a fairly scarce resource. This makes it hard for founders to get through with their terms and needs, and could lead to a drop in motivation. The routine of delivering the agreed upon capital in smaller tranches instead of

everything at the same time, with a reporting requirement before each tranche, also indicates that the investor-founder relationship has clear structural characteristics. This is despite the fact that the sole nature of venture investments is integrative. The problem is the relative lack of success-stories when it comes to USO's, which makes the investors a bit more risk-averse and protective of their interests.



5.4 Views on governmental intervention

Both investors and TTOs state that more business angels in Sweden are needed to improve the early venture capital market. They are seen as the most likely investors of USOs. The most efficient way to increase the number of business angels is by improving the financial incentives for wealthy individuals to keep and invest their capital inside Sweden. Today, the climate is good but it will take time before the results will show given that the political landscape doesn't change in the meantime. All participants support the investment tax credit, proposed by the government. However, opinions differ on how effective it will actually be, and some say it is the culture that is the major factor to the lack of business angels, not the tax legislation.

Suggestions for improvements by all participants are hybrid investments and directed cost subsidies to start-ups. Hybrid structures where public money will complement private money without claiming control of the firm and let the private investor control and operate the company would be an efficient way to bridge the financial gap, because public money is needed to reduce the risks enough in USOs to make it attractive to commercial money. A good suggestion to accomplish this is that the government should publicly procure venture capital management, with clear guidelines on how it should be invested. Then the public money is invested by private investors who will do a better job because their compensation models are more aligned with performance. It is also a good way for venture capital firms to early come in contact with USOs, which can be valuable when it comes to further expansion. So it could be a win-win situation.

Also, subsidies for salaries in start-ups as well as subsidies for management costs in early venture capital firms would boost investments in USOs. Jointly, any new subsidy would need a clear policy of who can receive them and what is required from the recipient so to minimize the bureaucracy and expertise needed by the government body that will distribute the funds.

The label of employee stock options as income of employment needs to be changed in order to make it a viable option of finance for start-ups. It must also be easier to understand the legislation regarding different option arrangement, because this is unclear today according to the respondents. It should be possible to differentiate between start-up options and options in large employee-owned firms such as the accounting and law firms.

5.4.1 Views on TTO's role

Investors find TTOs most important function is to educate founders and provide commercial skills, and connect good investment opportunities with investors. The latter is also what founders find is the most useful of TTOs' services. The former, educating founders and providing commercial skills, is something that investors are skeptic that the TTOs can provide due to lack of experience and

competence within the TTOs' organizations. Investors believe TTOs have to consolidate to reach a critical mass in order to attract the right people and provide these services. TTOs, on the other hand, argue that it is the lack of good entrepreneurs that creates the "commercial competence gap", mentioned earlier. Put together, this could suggest that TTOs are not able to attract the right people whom in turn can help USOs to find and hire good and experienced entrepreneurs.

All participants agree, especially founders, that more public funds dedicated to TTOs aimed at keeping some of their USOs afloat longer could be useful. However, both founders and investors stress that too much public funds would be wasteful because TTOs are not best suited to distribute the funds.

5.5 Summary of analysis

The financial gap for USOs is most apparent for investments between proof-of-concept stage with investments of about 1M SEK and up to larger investments made by the bigger venture capital firms. This has to do with the associated risks of a USO investment. The risks of investing in USOs can be derived from two types of risks: market and technical risks. These risks increase with the time it takes to establish a company and develop an end-user product from the research. Long time horizons are generally synonymous with USOs. Therefore, any measure that could lower the development time would make it more attractive for investors to fill the financial gap. One of these would be to keep the projects within the institutions longer.

A TTO official also suggests that it is the lack of skilled entrepreneurs that causes this specific financial gap for USOs. An additional reason for the financial gap, according to the empiric data, is the small size of the venture capital market and the lack of competition therein. This also has consequences for the negotiation situation that tends to become more structural, because venture capital is a scarce resource in Sweden. The information asymmetries between the investor and the founders also add to making the negotiations more structural.

It is remarkable to note that many founders are unaware of or unrealistic about the time that is required to both find and raise external capital. They don't contemplate on the trade-offs concerning low probability of getting funded, high costs, dilution of management and ownership and also the time it consumes. If this is a competence gap, it could be one of the TTO's tasks to fill this. But generally, founders are not scared of being diluted since they are all positive towards equity investments. This suggests that the reverse pecking order theory holds true for USOs.

In order to help decrease the gap, the government can do mainly two things: Set the stage for the already active early-stage investors and founders, and to complement the market with public venture capital. On the stage-setting note, the tax credit for private investors in startup companies proposed by the government is widely supported. What still can be improved is subsidies for salaries in startups as well as subsidies for management of seed investments in venture capital firms who invest early. The employee stock options' taxation issue must also be solved and especially easier to understand. On the public venture capital note, most interviewees, not just investors but also founders and TTO officials, prefer the hybrid investment approach, where public money complements private. Another related solution suggested by many interviewees is that the government publicly procures management to a new venture capital actor who's task is to only make seed investments with public money on competitive but fair terms.

6. Conclusions

This chapter presents the main conclusions and suggestions derived from this study.

6.1 Financial gap

When looking at the empirics, it is clear that the actors have different views on how big this problem is, although all agrees that it exists to some extent. This suggest further governmental concern on this matter, and can also be an indication for incubators on what start-ups really need help with - to get funded. In this field, it is very hard to have a deterministic view on things, since the uncertainties are so great. When a project fails in the early phases, it is very speculative to say that it would have succeeded, had it only received more money. It is important to emphasize that nothing should be done within a corporate entity in terms of product development without a customer and potential market in mind, which is sometimes a problem when it comes to USOs, since research is most of the time focused on explaining and solving a specific problem and not so much focusing on who is having the actual problem and what they want and value, and this translation may be hard.

6.2 Financial choice in USOs

The founders are very positive towards venture capital but they did not elaborate on the alternative costs of raising venture capital. This could imply that they see venture capital as the only source of finance or that they are unaware of the trade-offs in raising venture capital. Also, since many of the founders lack the network and access to venture capital the cost and time it takes to raise venture capital is high. The founders would benefit from a consolidated public venture capital market. If they can spend less time to find the right contacts it would lower their cost and time spend on raising venture capital.

Not many founders see an initial public offering (IPO) on the smaller stock exchanges as an option of finance today. They see it as a large hurdle with having many short-sighted equity holders demanding a lot of regularly information and taking up time. However, using venture capital as a source of funding is also very demanding. After several rounds of venture capital, start-ups may end up with a lot of different investors, all with different demands, such as time frame preferences and constraints, on their investments and criteria for add-on investments. This is also very time-consuming. Therefore IPOs should at least be considered an option for some USOs even in the early phases.

6.3 Negotiation theory

The culture within academia can sometimes be hostile towards business and entrepreneurship. Because of this, projects are sometimes forced to incorporate and leave the research environment too early, and one of this study's main conclusions is that much of this problem boils down to time. Timing in venture creation, time to market, time to manage venture capital funds, time required to seek venture capital, time to become commercially prepared as founder are some of the suggested time issues. Time and money are usually closely linked, and money is a scarce resource for high-tech startups such as USOs. This also includes the bargaining issues that arise when the investor base becomes large in a USO. The academic culture needs to change and be more allowing towards parallel research and venturing. This is one of the most important tasks for the TTO to give advice on and help with.

6.4 Governmental intervention

The stage-setting task for the government is also a crucial area for improvement in order to decrease the financial gap for USOs and other high-tech startups. The employee option system must be improved for small startups, where the suggestion to add a startup option alternative much like the one in California should be possible to implement in Sweden. Other things, such as economic incentives like the proposal for a tax credit for investors in startups, are also important to help solve this problem. The stage-setting task is one of the most important tasks for the government to spur innovation and entrepreneurship.

7. Recommendations

One of the most emphasized points in this study concerns the state of the Swedish venture capital industry. All respondents suggested that the competition is too low and the actors too few, especially when it comes to seed investments in high-tech startups. The government must try to increase the competition through stage-setting efforts such as economic incentives. A recommendation would be to, together with a commercial actor, create a new player in the industry, such as they did with Creandum a couple of years back, with the mission to only invest in early phases.

Another option to stimulate seed stage investments is for the state to introduce favorable tax incentives for funds that invest in the early stages. The management of venture capital firms has a limit to how many projects they can work on simultaneously. When the successful seed stage funds grow they become too large to be able to spend time on smaller investments and naturally move to later phases. If the management can be stimulated by tax incentives for investing in seed stages it would be more attractive for management to focus on seed stage and it would increase the competition in the industry.

All respondents also appreciated the hybrid investment approach, so this is something the government should increase. This may reduce the risk enough to make the USO investment appealing enough for commercial actors.

8. Comments

This chapter summarizes the author's comments on methodology, credibility and ends with suggestions for further research.

8.1 Comments on methodology

The method of a large number of in-depth interviews was good to create a deep understanding for the nature of this problem. The choice to look at the financial gap from three different views is what makes this study interesting yet difficult. To understand what contributes to the financial gap, it is important to understand the social context of the involved actors, differences in reasoning and ideology. However, this method is very time demanding, and can often times yield contradictive results. This makes the analysis harder, but also more important.

8.2 Comments on credibility

It is quite challenging to draw firm conclusions in a non-static field where much is based on subjectivity, psychological and social factors. It is also this that makes it interesting to study. The complexity is almost as large as there are actors. It is important to always have in mind the several biases people might have when conducting an interview. It demands a lot of the interviewer to be able to filter the answers, both based on theoretic knowledge, but also the background of the interviewee and his or her projects and merits. The authors' are satisfied with the selection of interview objects. It includes a range of investors, from private seed venture capital firm Creandum to a public venture capital fund Almi to a business angel. On the founder side, the founders interviewed represent both successful start-ups but also struggling and less successful start-ups.

8.3 Future research recommendations

The qualitative approach taken in this study helped to give an in-depth idea of the different views on this issue. However, it has some credibility-concerns as discussed above. Therefore, a quantitative survey of this matter would perhaps add to the understanding of the problem, at least in terms of measuring the magnitude of the problem.

Financial bootstrapping and lean startup is an interesting area when it comes to financial gap. To close the gap from the bottom would be the most resource-effective way, even though it forces more people to take on higher risks. Ideally, this leads to better motivation and eventually more growth. Therefore, a study on the possibility to create a new type of startup employee stock option in Sweden would also be interesting in connection to this study.

The theoretic foundation is far from complete in this area, so a lot more research is needed to strengthen this base. A take on an evolutionary economics-perspective with regards to this issue would be interesting, since much of today's theoretic foundation is based on the classical equilibrium approach.

An observation during investor interviews is that they mention that American start-ups spend more money on revenue increasing activities such as sales and marketing than Swedish start-ups. Also, as a result, the investments are larger but they generate revenues faster. It would be interesting to further study this hypothesis and compare for example Swedish start-ups with American start-ups.

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Appendices

Appendix A – Interview guides

The interviews have been semi-structured with slightly altered guides for the different actors. The interview guides below have served as a basis for all interviews but questions have been added, altered, and removed during the interviews.

Investor interview guide

View on financial gap

- To what extent do you experience the financial gap?
- How has the financial gap influenced your operations?
- What problems does the financial gap lead to?

Solutions to the financial gap

- How can the financial gap be bridged?
- How can Society's support systems for innovation improve to reduce the financial gap?
- How can universities' support systems for innovation improve to reduce the financial gap?

View on TTOs' role

- What is the most important service technology transfer offices provide?
- What can technology transfer offices do to stimulate investments in USOs?

Other

- What is your general view on investments in USOs?
- Is there anything else important regarding the investment process in USOs?

Academic founder interview guide

View on venture capital

- What is your experience of private venture capital?
- What was the biggest challenge to secure venture capital?
- What is your attitude towards private venture capital?
- What could make you more positive towards private venture capital?

View on financial gap

- To what extent do you experience the financial gap?
- How has the financial gap influenced your operations?
- What problems does the financial gap lead to?

Solutions to the financial gap

- How can the financial gap be bridged?
- How can Society's support systems for innovation improve to reduce the financial gap?
- How can universities' support systems for innovation improve to reduce the financial gap?

View on TTOs' role

- What services from the technology transfer office did you use?
- What is the most important service technology transfer offices provide?
- What can technology transfer offices do to stimulate investments in USOs?
- Are there any services that they do not currently provide that they should?

Other

- What is your general view on investments in USOs?
- Is there anything else important regarding the investment process in USOs?

TTO interview guide

View on financial gap

- To what extent do you experience the financial gap?
- How has the financial gap influenced you operations?
- What problems does the financial gap lead to?

Solutions to the financial gap

- How can the financial gap be bridged?
- How can Society's support systems for innovation improve to reduce the financial gap?
- How can universities' support systems for innovation improve to reduce the financial gap?

View on TTOs' role

- What is the most important service technology transfer offices provide?
- What can technology transfer offices do to stimulate investments in USOs?
- What is your biggest challenge?

Other

- What is your general view on investments in USOs?
- Is there anything else important regarding the investment process in USOs?