A Descriptive Study of Portfolio Management within the Context of New Venture Projects: A New Insight for Business Incubators and Venture Capital Firms in Sweden

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ABSTRACT

New Ventures projects emerge in response to the growing need of countries to develop and grow economically in an environment characterized by rapid changes. The importance of these projects is such that during the last decades they have played a role not only as drivers of the economy but also as sources of new jobs and innovation (Chen, 2009). Due to this importance, there have been multiple studies related to the efficient management of such projects. However, it is not sufficient for these projects to be managed properly, but the presence of limited resources makes necessary to select, prioritize and control these projects strategically within a portfolio.

This strategic management can be carried out by using the theory developed in Project Portfolio Management (PPM). The importance of PPM is the ability to integrate the world of projects with the operation of organizations, helping to minimize failures such as making unnecessary effort to undertake these projects in an appropriate manner when in fact these are not the right projects. However, there is a lack of knowledge in the application of PPM theory for New Ventures projects, because their characteristics differ from those of any other type of projects in terms of high level of risk and, in many cases, high technical uncertainty (Mac Millan & Gunther, 2000). This knowledge gap can be minimized using two different approaches. The first one consists in employing the theory developed by PPM in R&D projects, applying it for New Venture projects, as suggested by Mac Millan & Gunther (2000). The second approach corresponds to using the theory developed around the management of projects within Business Incubators (BIs) and Venture Capital firms (VC) in every stage of the PPM process.

This study describes how BIs and VCs in Sweden manage their New Venture projects portfolios in issues such as selection, prioritization and monitoring and control. To achieve an adequate depiction of this process, the study seeks primarily to identify the role of BIs and VCs in the PPM and the proper relationship that should exist between both organizations to ensure an ideal flow of projects at each stage of their development. In addition, it also seeks to find whether tools outlined in the literature are often used in practice.

Among the main findings of the study, the major contribution of the BIs is mainly in the feasibility analysis of projects and the support they give in their development, while VC firms are usually more focused on the selection, prioritization and monitoring and control of their portfolios. In practice there have been shortcomings in the transition of New Venture projects between BIs and VCs. These can be solved by creating a single organization that integrates the entire process of PPM between BIs and VCs, or other alternative is for VCs to start investing mainly in early stage projects. Another important finding corresponds to the use of the expertise of BIs and VCs members as the most important tool when making strategic decisions. And although there is general satisfaction with the success of these projects in Sweden, some authors have argued that this industry is not totally mature. Therefore, this study suggests using some tools, proposed in a conceptual model, developed to achieve the maturity that New Venture projects industry requires.

Keywords: New Venture projects, Project Portfolio Management, Business Incubators, Venture Capital firms.
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Finally, we would like to highlight the value of the role of our cherished friends and classmates with whom we have shared this journey. They are not only like part of our family but also contributed with valuable opinions and inputs to constantly improve this academic work.

SPECIAL DEDICATION

To my beloved parents and my sister in Ecuador, who despite the distance never stopped encouraging me and being concerned about the progress of this work.

Carlos Julio Centeno Burbano

Thanks to my family in Colombia for all your support during these last 16 months, without it would not have been possible to achieve this dream....And thanks to God for giving me health and the opportunity to live this unforgettable experience.

Juan Camilo Arbeláez Zapata
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<tr>
<td>BI</td>
<td>Business Incubator</td>
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<td>BIC</td>
<td>Business Innovation Centre</td>
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<td>CPI</td>
<td>Corporate Private Incubators</td>
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<td>IPI</td>
<td>Independent Private Incubators</td>
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<td>IPO</td>
<td>Initial Public Offering</td>
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<td>IT</td>
<td>Information technology</td>
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<td>MPT</td>
<td>Modern Portfolio Theory</td>
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<td>NTBF</td>
<td>New technology based firms</td>
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<td>PMI</td>
<td>Project Management Institute</td>
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<td>PPM</td>
<td>Project Portfolio Management</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>SISP</td>
<td>Swedish Incubators and Science Parks</td>
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<td>SMEs</td>
<td>Small and Medium enterprises</td>
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<td>SVCA</td>
<td>Swedish Venture Capital Association</td>
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<td>UBI</td>
<td>University Business Incubator</td>
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<td>VC</td>
<td>Venture Capital</td>
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1.1 Background information

“Over the last 25 years, two-thirds of the net new jobs and 95% of the radical business innovations have come from New Ventures” (Chen, 2009, p. 93).

These facts indeed justify the wide recognition and importance that New Ventures have acquired over the last decades due to their role as boosters of economies and a revolutionary source of new jobs (Chen, 2009). Due to its importance there is a considerable amount of literature related to New Venture projects which are characterised by their high risk, due to the elevated uncertainty regarding the success of the project in the future and the delivery of the promised benefits (Ruhnka & Young, 1991). These risk-related features frequently lead New Venture projects towards failure or to simply never emerge, and it is for this reason they require assistance for proper development. To this fact must be added the frequent poor financial power owners of these projects usually have. Financial resources are significant because without funding, entrepreneurs will not be able to develop and commercialize the innovation/opportunity (Basu, Osland & Solt, 2008). Investors of this sort of projects typically allocate financial resources in some of them and they expect at least a minimum amount of projects to be successful and so they can have a return that justifies other allocations in different not so prosperous projects.

New Ventures success highly depends on external financing and thus their development process is crucial. Business Incubators (BIs) and Venture Capital firms (VCs) are two critical actors because the two combined handle the entire process a New Venture project has to go through. Although entrepreneurs may have specialized knowledge, they frequently lack a full set of business competences (Allen & Rahman, 1985). This is where the BIs facilities play a key role providing assistance that fills the need of knowledge of the business, reducing early-stage operational costs such as rent and other administrative expenses, and establishing entrepreneurs in a local enterprise support network (Allen & Rahman, 1985). In the case of VCs, they are important because they are able to allocate the substantial infusion of financial resources these entrepreneurs need in order to grow their businesses (Hall & Hofer, 1993). Furthermore, VCs operate in environments where their efficiency in selecting and monitoring investments gives them a comparative advantage over other investors. In fact, based on previous studies Amit, Brander, & Zott (1998) assert that the success rate of Venture Capital-backed ventures is meaningfully higher than the success rate of New Ventures in general.

Nonetheless, there is a gap of knowledge in the way how BIs and VCs balance and manage their portfolios of New Ventures projects, which is corroborated by authors such as Bakker, Knoben, de Vries, & Oerlemans (2010). Therefore, they recommend future research in this area using an approach known as Project Portfolio Management (PPM), which is defined by Cooper, Edgett & Kleinschmidt (1997a) as a dynamic
decision process where new projects are evaluated, selected and prioritized; and existing projects may be accelerated, killed or deprioritized.

The process undergone by New Venture projects yet requires a supporting technique for its proper implementation. It is at this point that PPM becomes an important tool not only to prioritize and select the best projects to maximize the benefits of the entire portfolio but also to monitor and control those projects under an uncertain environment (Levine, 2005). The importance of PPM is related to the ability to integrate the world of projects with the operation of the organization. This integration contributes to prevent the pitfall of making unnecessary enormous efforts, for BIs and VC firms, to undertake projects in an accurate way when they are not the right projects. This issue is evidenced by many New Venture projects that do not deliver the expected benefits, are not synchronized with the vision of the organization, involve an excessive risk or are admitted merely due to political reason (Levine, 2005). In the end, incubators and capital investors are frequently spending a high amount of resources, which are limited, in projects that are not maximizing the benefits.

In the literature is not possible to find a direct relationship between PPM and New Venture projects. Nevertheless, this relationship can be created using two different approaches: the first approach concerns linking New Venture projects with Research and Development projects (R&D) with high technical and market uncertainty (Mac Millan & Gunther, 2000); while the second refers to the use of studies done in BIs and VCs related with specific stages in the model proposed by Archer & Ghasemzadeh (1999).

Concerning the first approach, research to date has tended to focus PPM methodology especially in sectors as Information Technology and New Product Development in R&D. Some authors as Mac Millan & Gunther (2000) consider New Venture projects as a type of R&D projects with high technical and market uncertainty, but they do not develop a framework to select and control this type of projects using PPM methods. This relation is important because the extensive literature in PPM for R&D projects could be used to understand how PPM is applied in New Venture projects. Inside the literature for PPM within R&D projects is possible to identify two types of approaches. The first one is based on the development of tools for the selection and prioritization of projects in a portfolio using mathematical models that frequently are so complex that in real life managers hardly understand them (DePiate & Jensen, 1999). The second type of studies offers more practical models that can be straightforwardly applied by those responsible for managing projects portfolios. Some examples of these models are the ones proposed by Cooper et al.(1997 a), Hsuan, (2001), DePiate & Jensen (1999) and Chien (2002).

For the second approach, in order to create a relationship between PPM and New Venture projects, although it was also not possible to find a previous study that describes all the PPM process within the required framework, there are some studies focused on specific stages within the process as: screening, selection and monitoring and control in both BIs and VCs. The screening of New Venture projects is mainly developed in studies conducted by Lumpkin & Ireland (1988) and Aerts et al. (2007). The selection of these projects within BIs is analysed by Bergek & Norrman (2008) proposing some selection strategies, while inside VCs, Yang, Narayanan & Zahra (2009) suggest a model to select projects based on the experience and Petty (2009) considers the selection as a dynamic
process where VC firms are continually weighting the selection criteria. Authors as Carter & VanAuken (1994), Isaksson (2000) and Eldridge (2007) focus their studies to the monitoring and control of VCs on New Venture projects.

Finally, with regard to Sweden, where our research focuses, though studies related to the New Venture projects framework were found, it was not possible to find any study focusing on all the process since the moment of submitting the project proposal, doing the feasibility analysis, selecting the projects and at the end the monitoring and control of those New Venture projects. These studies are normally focused on either BIs or VCs. Hence, our study seeks primarily to fill the existing research gap between PPM methodology and practices carried out independently by BIs and VCs to support New Ventures, using the two mentioned approaches to relate them, and then linking them in a conceptual model that has been developed to fulfill this issue.

1.2 Research Objectives

We have defined two primary objectives which are basically the essence of the present research:

1. Identify the role of both Business Incubators and Venture Capital firms within the entire process of Project Portfolio Management, in which a New Venture project becomes from a simple proposal into an actual business. Moreover, also to identify the optimal relationship that should exist between BIs and VCs to ensure an ideal flow of projects at every stage of their development.
2. Discover whether, in practice, both BIs and VCs employ the PPM tools and methodologies suggested by authors from the literature, and to what extent.

This research will also strive to achieve additional objectives:

- Understand the frameworks and tools used in other sectors, as R&D projects portfolios, identifying its relation and application in portfolios of Venture projects.
- Recognize the different set of criteria to select and prioritize New Venture projects in portfolios managed by VCs and BIs. Likewise, the set of criteria to evaluate the status of active projects and to decide whether to continue or “kill” them.

Finally, after having completed the initial phases of the research and gathered relevant data, we would like to:

- Develop and present our own conceptual model of what we consider a satisfactory portfolio management of New Venture projects, composed by three main phases based on frameworks suggested by previous authors.

1.3 Research question

The revision of the mentioned objectives and the background of the topic have led to formulate the following question, which this research is encouraged to answer:

_How do Business Incubators and Ventures Capital firms in Sweden manage issues as the selection and control of their portfolios of New Ventures projects?_
1.4 Definition of main concepts

Before deepening into the theory and frameworks defined for this study, it is appropriate to delineate certain critical concepts that will be recurrently referred to during this research. The literature review section will provide additional definitions from different authors but researchers considered accurate to establish a common understanding of how these concepts will be used in this study.

**New Venture Project**
A New Venture Project constitutes a type of project, and therefore is generally defined as “a temporary endeavour undertaken to create a unique product or service” (Project Management Institute (PMI), 2004). Nonetheless, more specifically, our conception of New Venture projects is based on the description as “projects that have always been used for delivering change as innovation and that evolve from distinct phases since the submission of initial business ideas towards becoming a high volume production firm (Galbraith, 1982; Hobday, Rush, & Joe, 2000). Likewise, another peculiarity is that they are more focused to manage time, quality and cost (Frederiksen & Davies, 2008).

**Business Incubator**
The most basic concept of Business Incubator that underlies the study is suggested by Peña (2002), who defines a Business Incubator as a popular policy aimed to promote venture creation. However, a broader definition is used in this study, which was proposed by Grimaldi & Grandi (2005), who describe incubation as a link among technology, capital and know how in order to leverage entrepreneurial talent and accelerate the development of new companies. This link includes processes which encompass the economics and social aspects of starting a business. This support program assists with expertise, networks and tools they need to establish and accelerate to growth and success.

**Venture Capital firm**
A Venture Capital firm is an organization whose main role is raising financial resources from wealthy individuals and investing them in entrepreneurial start-ups. A wider notion for VCs outlined in this research is extracted from Bottazzi & Da Rin (2002, p.235), who describe Venture Capital firms as organizations pursuing “financing young, unlisted dynamic ventures through equity or equity like instruments by limited partnerships of professional investors who raise funds from wealthy and/or institutional investors”.

**Project Portfolio Management (PPM)**
This study largely has used as a basis the contributions of Archer & Ghasemzadeh (1999) on project portfolio, who define it as a group of projects that are carried out under the sponsorship and/or management of a particular organization and must compete for scarce resources. Additionally, regarding PPM researchers selected the definition of Kendall & Rollins (2003), who consider PPM as a process in terms of six major responsibilities: determining a viable project mix that is capable of meeting the goals of the organization, balancing the portfolio, monitoring the planning and execution of chosen projects, analyzing portfolio performance, evaluating new opportunities, and providing information and recommendations to decisions makers. Within this analysis of portfolio performance, the decision of accelerate, kill or deprioritize projects is made, as stated by Cooper et al. (1997a).
1.5 Significance of the study

This research is considered significant because it proposes the combination of two relevant themes of which there is a plethora of previous studies (New Venture projects and PPM). In the case of New Venture projects, it is widely accepted that it creates dynamism in the economy of nations, thus confirming its validity. And the role of PPM as a resource optimizer and decision-making facilitator makes it a key tool. The proper combination of these two factors will originate a potentially useful methodology suitable for individuals dealing with projects coming from outside their organization and with a growing need of enhancing their productivity such as Business Incubators and Venture Capital firms. Furthermore, no studies about PPM entirely devoted to the analysis of its relation with New Venture projects were found.

1.6 Delimitation of the study

This thesis has been carried out based strictly on information extracted from Business Incubators and Venture Capital firms in Sweden. This consequently excludes any other geographical area. Furthermore, it has not considered other types of organizations that support entrepreneurial start-ups such as Science Parks, Business Parks or others that do not constitute what according to the classification of the European Commission (2002) is a Business Incubator. Finally, this research intends to describe the main stages of the developed conceptual model (Feasibility analysis, Portfolio selection & prioritization and monitoring & control) following a broader context, rather than necessarily deepening on a particular phase within it.

1.7 Structure of the Study

This thesis has been divided into seven chapters (See figure 1). This first chapter has introduced the background of the study, indicating its importance and the existing gap of knowledge. Research objectives, research question and delimitations have been established, and the definitions of the relevant concepts have been presented. Chapter 2 deals with the philosophical and methodological approaches and types in which the research has been based on. Chapter 3 corresponds to the Literature review, which lays out theoretical dimensions of the research and has two main pillars. The first focuses on the New Ventures framework, outlining both Business Incubator and Venture Capital firms, and revising the common literature existing in both topics concerning New Venture projects. The other part of the review examines the Project Portfolio Management concept and again its relation to New Venture projects. In the end, the literature is consolidated for later present the developed conceptual model. Chapter 4 specifies the research design, including the methods employed to collect information and other relevant issues. Chapter 5 presents the main findings and analyzes the empirical data obtained through interviews and questionnaires. Chapter 6 discusses the results from the empirical findings, comparing and contrasting them with what authors from current literature have asserted. Chapter 7 contains concluding observations and recommendations for current practitioners involved in this topic, as well as suggestions of areas for further research.

Finally, it is noteworthy to clarify that we have not followed a traditional structure regarding the methodology (usually both research methodology and design are
consolidated in a single chapter), because we preferred to completely divide the underlying scientific and philosophical approach of our study from the practical course of action in collecting and analysing data. And this practically oriented method chapter can be certainly located after the literature review chapter. Furthermore, since the research is based on more than one method, we considered more convenient to make the reader familiar with them as well as with other important aspects that influenced the practical side of our research, immediately before presenting the findings and discussion.

Figure 1. Structure of the Thesis. Source: Authors
2.1 Introduction

This chapter presents the philosophies, approaches and types of methodologies related to our research. To develop the research methodology we follow the approach proposed by Saunders, Lewis, & Thornhill (2007) called “the research onion”. This approach starts with the definition of the research philosophy, followed by the explanation of the research approach, and finally the selection of strategies, choices, time horizons and techniques and procedures for the data collection and data analysis (Saunders et al., 2007). In our particular case, we present a research methodology that allows the reader to distinguish the choices that we have made in terms of how our view of the nature of the world is and how this nature can be studied and understood within this work. It is necessary to specify that in this section we limitate the explanation to the concepts related to our research within the model of “research onion” and not all of them. For a better understanding of this methodology we suggest to see figure 2. At the end of this chapter we present a summary of our own approach to be followed for this study.

Figure 2. Research methodology adapted from the “Research Onion”

Source: Saunders et al. (2007, p.132)
2.2. Research philosophy

There are three major ways of thinking about research philosophy: ontology, epistemology and axiology. **Ontology** is concerned with the nature of reality which can be separated in objectivism and subjectivism. **Epistemology** concerns what constitutes acceptable knowledge in a field of study and can be divided in positivism, realism and interpretivism. **Axiology** studies judgments about value (Saunders et al., 2007). In the following paragraphs every research philosophy is described in a deeper manner related to our approach.

The central point of the **Ontology** is the question concerned with the nature of social entities. This nature could be considered as ‘objectivism’, which reveals that the position of social entities exists in reality above the actions of social actors concerned with their existence, or ‘subjectivism’ where the social phenomena are created from the perceptions and actions of those social actors concerned with their existence (Saunders et al., 2007). Clearly our world view, which serves as the basis for the development of this research, is of a subjective type. This subjectivism in our research is defined from the perceptions and actions taken by social actors as managers and business coaches, within the Business Incubators and Venture Capital firms. These perceptions and actions are expected to be captured and identified through a direct contact with these actors, using semi-structured interviews and self-administered questionnaires (See section 4.4) to understand more clearly how they create their own PPM framework for New Venture projects.

Bryman & Bell (2003) relate **Epistemology** as the question of what is or should be acceptable knowledge within a discipline. Saunders et al. (2007) present three epistemological positions: positivism, interpretivism and realism. **Positivism** adopts the philosophical posture of the natural science in order to explain that the only phenomena that will lead to the production of data are the ones than can be seen. The collection of these data is likely through the use of existing theory to develop hypotheses that will be tested to contribute in the development of that theory (Saunders et al., 2007). **Interpretivism** advocates that it is necessary to be aware of the differences between conducting research among people rather than objects (Ibid). Interpretivism comes from two intellectual traditions such as ‘phenomenology’, how individuals make sense of the world around them (Bryman & Bell, 2003) and symbolic ‘interactionism’, which is the process of interpreting the social world around the individual (Saunders et al., 2007) and the way this individual acts on the basis of this imputed meaning (Bryman & Bell, 2003). The last epistemological position is **realism** which considers that what the senses show as reality is the truth, independent of the human mind (Saunders et al., 2007).

In terms of the epistemology in our research, the collection of the data is more related with a philosophy of **interpretivism**. We have embraced this philosophy because our research is conducted among individuals rather than objects, due to the subjective view of the world in our ontological approach. In this sense, our data is collected based on perceptions and actions of experienced managers and the way how they make sense of the world around them which is more related to the intellectual tradition of phenomenology. Nevertheless, this study also follows in part a positivist philosophy given the fact we use a review of theory to define some assumptions, a conceptual model, and the structure of the questions to be used in the interviews and questionnaires,
but it is clear that this theory has not been used to develop hypothesis and test them as this philosophy suggests.

The last branch of philosophy, Axiology, studies judgments about value and asserts that values of the researcher play an important role in all stages of the research process if it is sought to have credibility in the results. The values are reflected in the choice of philosophical approach, data collection techniques and the topic of research (Saunders et al., 2007). To ensure credibility in the results, this thesis follows a triangulation technique consisting in using more than one method or source of data in the study of our social phenomenon. This technique validates the usage and combination of interviews and questionnaires in this study.

2.3. Research Approaches

It is possible to identify two different approaches to develop the research process in business studies. In the first approach, known as Deductive, the researcher infers a hypothesis, which must be subject to empirical examination, based on the theory related to that domain (Bryman & Bell, 2003). Some characteristics of this deduction process are the search to explain causal relationships between variables, the need to operationalize the concepts in a way that enables the facts to be measured quantitatively, and the generalization of the results which makes necessary the selection of significant samples (Bryman & Bell, 2003). This approach can be linked to the research philosophy of positivism which recommends the use of existing theory to develop a hypothesis that will be tested. The second approach is identified as Inductive and it is characterized because the theory is created as an outcome of research based in observations (Bryman and Bell, 2003) and typically associated with a qualitative research type. The followers of the inductive approach criticize deduction because of its tendency to construct a rigid methodology that does not permit alternative explanations of what is happening (Saunders et al. 2007). The inductive approach is related with the research philosophy of interpretivism, more specific with phenomenology. Despite the great differences between these two approaches, as Saunders et al. (2007) affirm, it is possible the combination of both within the same piece of research.

In this study, the adopted research approach is a combination of deduction and induction. The deductive approach is relevant in the use of a review of theory to determine some assumptions, to prepare the questions for interviews and questionnaires, and to determine a conceptual model which will be useful to accomplish both the research purposes and the research question. However, our main approach is inductive. Our intention is to contribute in the creation of new theory in the PPM applicable for New Venture projects, based on the findings obtained from the interviews and questionnaires. Furthermore, this chosen approach is also associated with what is conceived as a qualitative research type, which is mostly the method this study seeks to follow.
2.4. Research types

The type of research depends on what is the objective or the purpose that the researcher expects to reach with the study. These types can be separated into exploratory, descriptive and explanatory studies. Exploratory studies are particularly useful to clarify the understanding of a problem. Descriptive studies are used to have a clear picture of the phenomena prior to collection of the data, however they are thought more as means to an end rather that the end itself. Explanatory studies emphasize on revising a situation or a problem in order to explain the relation between variables and the reasons of those relations (Saunders et al., 2007). After analysis of these concepts and given the characteristics of this study, we decided to locate our research as descriptive. The main argument to support this choice is that we seek to have a clearer picture of how the PPM process is undertaken by organizations as Business Incubators and Venture Capital firms in Sweden. Additionally, we consider that a descriptive study is much better suited to our purposes of: first, identify the role of both Business Incubators and Venture Capital firms within the entire process of Project Portfolio Management, and second, discover whether, in practice, both BIs and VCs employ the PPM tools and methodologies suggested by authors from the literature, and to what extent.

2.5. Our research methodology in this study

We undertake a descriptive analysis of how the portfolios of New Venture projects are managed both by Business Incubators and by Venture Capital firms in Sweden. We intend to describe all the framework of PPM in the New Venture industry starting from the projects proposal submissions, then going through the feasibility analysis and the selection and prioritization of these projects, and then finally getting to the monitoring and control to decide whether projects continue or are killed.

This descriptive study is characterized for having a qualitative approach in which the data is collected following a philosophy of interpretivism, where the research is conducted among people rather than objects. More specifically the research is included in the intellectual tradition of phenomenology, because the data is collected based on the perceptions of experienced managers and the way how they make sense of the world around them. However, we also use a part of positivist philosophy following a deductive approach in the sense that we employ the review of theory to delineate some assumptions and to structure the questions to be used in the interviews and questionnaires. Nevertheless, it is clear that our main approach is inductive and that we are trying to create part of new theory based in observations typically associated with qualitative research type.
CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

This chapter develops a review of the recent research in Project Portfolio Management (PPM) and New Ventures projects framework in three sections. The first section begins outlining the literature and conceptual models for the New Ventures framework. This section starts explaining the concept of New Ventures and then examines the role of Business Incubators and Venture Capital firms as a means to support the growth of these New Ventures. The second section explains the origin, definition, selection process, monitoring and control process, and the tools used in Project Portfolio Management. In this segment a literature review is done highlighting relevant authors and models that have contributed with the development of this field of study. In the last section, a literature review is undertaken linking both concepts Project Portfolio Management and New Ventures in order to describe the knowledge gap that some authors have observed and suggested the need to conduct future research in this area.

3.2 New Ventures framework

In this section the interest is to outline the existing framework for the development of the New Ventures. As stated previously, New Ventures have wide recognition and importance in the economy due to its role as boosters of its growth. One example of this importance could be appreciated in the fact that over the past decades, there has been no comparable source of new jobs and business innovation (Chen, 2009). This review of the existing body of literature has geared us to two main promoters of New Ventures that must be considered: Business Incubators (BIs) and Venture Capital firms (VCs). The relation between these two New Ventures supporters is that VCs are the financial actors and the BIs provide, to VCs, a deal flow of potentially attractive projects to invest in, ensuring they have been properly evaluated and, at the same time, decreasing the search cost for new firms and the perceived risks connected with the potential investments (Aaboen, 2009).

Theoretical background that supports this premise is the study conducted by Chen (2009) to assess the performance of New Ventures through examining the impacts of technology commercialization from a resource-based view. Figure 3, demonstrates how the author proposes these two main types of resource sources, both Business Incubators and Venture Capitals firm, and highlights the relevance of organizational resources and innovative capabilities as factors for success of the New Venture.
3.2.1. New Venture projects

For effective research purposes, in this part the review of literature has been deepened in the definition of New Ventures as projects, and the importance of VCs and BIs within this New Ventures framework. A project is a temporary organization that involves complex, non-repetitive tasks and results in unique or highly customized output (Frederiksen & Davies, 2008). Many projects are organized between suppliers and clients through the organization of a market, while others arise within the firms (Frederiksen & Lorenzen, 2005). New Ventures can be seen as projects because they have always been used for delivering change as innovation (Hobday et al., 2000) and evolve from distinct phases since the submission of initial business ideas towards becoming a high volume production firm (Galbraith, 1982). Although New Ventures can be considered as projects, it is important to mention that traditional project management tools often perform poorly when there are unforeseen uncertainties (De Meyer, Loch & Pitch, 2002), because they are more focused to manage time, quality and cost, rather than innovation and learning (Frederiksen & Davies, 2008).

3.2.2. Business Incubators

The first hint of what is now known as Business Incubator was established in 1959 in New York when Charles Mancuso rented space in his Batavia Industrial Center to guide starting companies with their growth process (Aerts et al., 2007). Today, the number of BIs in the world rises to 3000, which one third is placed in North America, 30% in Western Europe, 20% in the Far East, 7% in South America, 5% in Eastern Europe and 5% in Africa, Middle East and other regions (European Commission, 2002). These facts show that BIs are still a contemporary model for supporting businesses.

There are different definitions for Business Incubators. Peña (2002) defines BI as a popular policy aimed to promote venture creation. Aerts et al. (2007) identify incubators as an environment especially designed to hatch enterprises. Grimaldi & Grandi (2005) label incubation as a link among technology, capital and know how in order to leverage entrepreneurial talent and accelerate the development of new companies.

Business Incubators are important for New Venture projects because they provide entrepreneurs with the expertise, networks and tools they need to make their ventures successful and assist them by offering diverse support services. Among the services it is
possible to find assistance in developing business and marketing plans, building management team, obtaining capital, access to other professional services, information and external networks (Lalkaka, 2002; Grimaldi & Grandi, 2005; McAdam & McAdam, 2008). In addition, incubators provide a clustering effect (McAdam & McAdam, 2008), flexible space shared equipment and administrative services (Grimaldi & Grandi, 2005). Depending on the type of agent that owns the BI, this proactive role is generally motivated by a desire to participate in regional economic development efforts and also serves to develop and gain benefits from partnerships with new companies (Matkin, 1990; Mian, 1997). A case pointed out by Autio & Klofsten (1998) describes how current incubators ideas offer formal business support programs, tailored to the different stages in the growth and development of the firm.

**Organizations considered Incubators**

In order to delineate the focus of this study is necessary to separate incubators from other organizations also dedicated to supporting entrepreneurs. The European Commission (2002) evaluates the position of the organizations that support entrepreneurs in one matrix (See Figure 4), relating the technological focus level and the management support. In the matrix is possible to find six different types of organizations. The organizations with low technological level focus are: *Industrial Estate* where the level of support is very low and it is limited to renting a space for the entrepreneur, *Managed workshop* that has a medium level of support, and *Multi-purpose Business Incubator* with a high level of management support. If the technological level is medium, the types of organizations that offer a support to the entrepreneurs are: *Business Park* (low), *Enterprise Centre* (medium) and *Business & Innovation Centre (BIC)* with high support in the right side of the matrix. The organizations with high level of technology focus can be seen. They are *Science Parks* (Low support), *Innovation Centre* (Medium support) and *Technology Centre* (High support). According to these characteristics European Commission (2002) classifies only BIC, Technology Centre and Innovation Centers as Business Incubators (Aerts et al., 2007), and therefore only them will be considered for this study.

![Figure 4. Position of the Business Incubator](source: European Commission (2002, p.6)
Types of Incubators

Business ideas do not all have the same potential. This potential depends on ‘structural’ characteristic as the size of target market, the industrial sectors involved and the business innovativeness (Grimaldi & Grandi, 2005). These characteristics are the reason to explain the existence of various types of Business Incubators. A classification of these incubators has been carried out by authors as Grimaldi & Grandi (2005). These authors identify four different types of incubators which are: Business innovation Centers (BICs), University Business Incubators (UBIs), Independent Private Incubators (IPI), and Corporate Private Incubators (CPIs). The first two types are public incubators while the last two have a private nature.

The main objective of public incubators is to reduce the costs of doing business by offering a set of services ranging from the provision of space, infrastructures and facilities, to more elaborate services, as well as by offering access to technical and managerial expertise and assistance in business plan development. Of the public incubators, the pioneer and most popular is the Business innovation Centre (BIC). Its main incubating activity consists in offering a set of basic services to tenant companies, including the provision of space, infrastructure, communication channels, and information about external financing opportunities, visibility, etc. (Grimaldi & Grandi, 2005). On the other hand, the relevance of University Business Incubators (UBI) has substantially increased. The UBI is an innovative system designed to assist entrepreneurs, particularly entrepreneurs in technology, in the development of new firms (Suk Lee & Osteryoung, 2004). This type of incubator corresponds to the evolving trend on the part of some entrepreneurial universities for a more direct involvement in supporting the development of innovative new businesses (Mian, 1997).

Private incubators are for-profit organizations that have as purpose the quick creation of New Ventures and take in return a portion of equity of the project as a fee. The ways of making financial resources for these incubators include charging service fees or taking percentage of the revenues from incubated companies. They aspire to help entrepreneurs by providing capital in the pre-seed, seed and other early investments, and offering services as business guidance, connections to their networks, managing abilities, hiring and payroll (Grimaldi & Grandi, 2005). These private incubators can be segmented in two categories: Corporate Private Incubators (CPIs) and Independent Private Incubators (IPIs). CPIs are incubators owned and set up by large companies aiming to support new independent business units and IPIs are incubators set up by single individuals or by groups of individuals who invest their own money in the new companies and hold an equity state (Grimaldi & Grandi, 2005).

Best practice incubator models

It is widely known that running Business Incubators represent the investment of significant amounts of resources, and therefore, best practice incubator models become a decisive issue in the agenda. Bergek & Norman (2008) assert that the identification of best practice incubator models requires to describe and differentiate between different incubator models and to appraise their outcomes in relating them to their original goals. The author also developed a framework to distinguish incubator models describing three of its components: selection, business support and mediation. It is feasible that the
mentioned framework in combination with appropriate outcome indicators, it can be used to identify best practice models or to distinguish between different models that are equally effective in achieving certain goals (Bergek & Norrman, 2008).

Another significant factor for success is that since New Ventures usually are on the cutting edge in the area of their core technology, the capacity of the incubator management to offer relevant support for the development of this technology and to provide access to a pool of relevant contacts is critical (Scillitoe & Chakrabarti, 2010). In order to enable New Ventures learning of technological-know skills, networking interactions through the incubator management are encouraged.

3.2.3 Venture Capital firms

The concept of Venture Capital firm (VC) was born in 1946 when George Doriot, Karl Compton, Merril Grisold and Ralph Flanders create an organization called American Research and Development (ARD). This company raised money from wealthy individuals and invested them in entrepreneurial start-ups. Today, VCs have become the closest form of financial intermediation to boost the New Venture projects, especially in industries as biotechnology, information technology (IT) and e-commerce (Bottazzi & Da Rin, 2002). The importance of VCs can be described by Bygrave & Timmons (1992) when they affirm that “Venture capital plays a catalytic role in the entrepreneurial process, offering fundamental value creation that triggers and sustains economic growth and revival”.

Venture Capital firms are organizations seeking “financing young, unlisted dynamic ventures through equity or equity like instruments by limited partnerships of professional investors who raise funds from wealthy and/or institutional investors” (Bottazzi & Da Rin, 2002, p. 235). VCs typically raise funds from outside investors such as pension funds and wealthy individuals, invest in a portfolio of entrepreneurial companies, and obtain returns from successful exits through sales (Li & Mahoney, 2009). Another definition for VCs considers them as specialists in developing small and potentially high growth companies by becoming in their active owners through investments and with the purpose to realise a substantial profit on the investment after some years (Isaksson, 2000; Sahlman, 1994). It is widely known that VCs strategic operations highly impact their project portfolio investments and that they have had an increasingly important impact on corporate innovation, job creation and economic growth (Li, 2008). This can be explained because they play an important role on the board of directors of the companies, in which they invest, helping to set the strategy and to recruit key employees. Chan (1983) finally highlights the role of VCs in reducing the adverse selection problem in the market for entrepreneurial capital.

MacMillan et al. (1988) empirically found three different types of VCs, classified according to their involvement strategy types: the ‘Laissez faire’ group, which is barely involved, the “Moderates” group that is judiciously involved and the “Close trackers” group, with a high involvement.
Stages in Venture Capital firms

Given that uncertainty is a constant in an environment of New Ventures, Venture Capital firms have been encouraged to deal with this fact positively; (Li, 2008) indicates that market uncertainty encourages Venture Capital firms to delay since market uncertainty increases the value of holding the current choice to invest. On the other hand, in the presence of competition and project-specific uncertainty, Venture Capital firms may find it optimal to invest sooner, either to avoid losing the option to invest subsequently or to obtain information about the costs and benefits of Venture projects.

The stages of Venture Capital financing process can be divided in four: seed finance, start-up finance, expansion finance and later stage finance (Bottazzi & Da Rin, 2002). Seed finance corresponds to small investments that allows the verification whether the project is feasible and economically attractive, Start-up finance relates to the investment in operating the firm helping with the organization and definition of corporate strategy, Expansion finance is defined as the investment done to reach industrial-scale production upgrading the production facilities and attracting more employees with an additional financing and finding clients and suppliers. And finally, the Later stage finance concerns with the investment to help the firm become a market leader and unleash its earning, potential preparing it for a trade sale or Initial Public Offer (IPO).

3.3. Project Portfolio Management

As a basis of this study is to situate New Venture projects under a scheme of Project Portfolio Management, it is also required to examine relevant literature regarding this topic.

3.3.1. Origins of Project Portfolio Management

Project Portfolio Management has its origins in the theory developed by Markowitz (1952) in his paper entitled “Portfolio Selection”. In this paper it is presented a financial theory, known as Modern Portfolio Theory (MPT), which consists in selecting an optimal portfolio of investments, through diversification, which would offer a maximum level of returns with a certain level of risk (Sanchez, Robert & Pellerin, 2008). “Thirty eight years later in 1990, Markowitz shared a Nobel Prize with Merton Miller and William Sharpe for what has become the dominant approach used to manage risk and return within financial markets” (Levine, 2005)

In line with Markowitz’s approach it is possible to define a project portfolio as a collection of projects that maximizes the portfolio value in terms of strategic goals for a given level of risk (Sanchez et al., 2008). This concept of MPT has later been applied to the field of project management, and has become the basis of Project Portfolio Management. According to Levine (2005), one of the first applications of Markowitz theory was in 1981 with Warren McFarlan who related MPT practices to the management of IT in an article entitled “Portfolio Approach to Information Systems”, in which employs a risk-based approach to select and manage IT projects. This theory later led to what is now known as Project Portfolio Management and since then, its practices have been adopted particularly in areas of IT and R&D (Levine, 2005).
3.3.2. Definition of Project Portfolio Management

Several attempts have been made to define the concept of Project Portfolio Management. A basic definition of PPM is given by Archer & Ghasemzadeh (1999) who define a project portfolio as a group of projects that are carried out under the sponsorship and/or management of a particular organization and must compete for scarce resources. Other authors consider PPM as a dynamic practice; Cooper et al. (1997a) define PPM as a dynamic decision process where new projects are evaluated, selected and prioritized; and existing projects may be accelerated, killed or deprioritized. Kendall & Rollins (2003) consider PPM as a process in terms of six major responsibilities: determining a viable project mix that is capable of meeting the goals of the organization, balancing the portfolio, monitoring the planning and execution of chosen projects, analyzing portfolio performance, evaluating new opportunities, and providing information and recommendations to decisions makers. Levine (2005) defines PPM as a set of business practices that brings the world of projects into harmony with the strategies, resources, and executive oversight of the enterprise. One more practical definition has been provided by the Project Management Institute (PMI), (2006) considering PPM as a process that includes identification, prioritization, authorization, management and control of projects and programs to achieve specific strategic business goals.

In general, different authors agree that there are two main components in the PPM process. The first one is related to the prioritization and selection of the projects by evaluating benefits, risks, alignments, and other business and project factors (Levine, 2005). The second component is linked to the monitoring and control of active projects in the portfolio against both the project goals and the selection criteria to ensure a maximization return of the portfolio (Levine, 2005).

3.3.3. Phases within PPM relevant for this study

There is a plethora of literature on PPM, and hence it is appropriate to restrict this review to its phases pertinent for this study. The following are critical aspects within PPM, with their approaches, frameworks and tools outlined and whose understanding is necessary for the development of the subsequent chapters:

Project Portfolio Selection

Aalto (2001) identifies three main frameworks to explain the Project Portfolio Selection process. The first framework is proposed by Archer & Ghasemzadeh (1999) defining five different stages in the process of selection, these stages are: pre-screening, individual project analysis, screening, optimal portfolio selection and portfolio adjustment. The second framework is known as “Strategic Buckets model” proposed by Cooper, Edgett & Kleinschmidt (1997b); this is a top-down method that is based in the principle that implementing strategy equates to spending money in specific projects. And the last one is developed by Spradlin & Kutoloski (1999) who use a strategy-table approach to select the projects.

Archer & Ghasemzadeh (1999) define “project selection” as the periodic activity in selecting a portfolio, from available project proposals and projects currently underway,
that meets the organization’s objectives without exceeding available resources. The authors propose a framework that attempts to simplify and organize the project portfolio selection process based on five different stages that are displayed in figure 5 and explained below.

- **Pre-screening**: This stage includes a feasibility analysis and an estimation of the parameters needed to evaluate each project.
- **Individual Project Analysis**: The projects are evaluated individually through the calculation of a set of parameters based on estimates available from feasibility studies and/or from a database of projects that were previously completed.
- **Screening**: Project attributes from the previous stage are examined to reduce the number of projects to be considered in the portfolio selection stage. The projects are eliminated if they do not meet pre-set criteria except for those which are mandatory or are required to support other projects that are still being considered.
- **Optimal portfolio Selection**: The interdependencies, competition of resources and timing among the various projects are considered and compared with the value of each project determined from a common set of parameters established for each project.
- **Portfolio adjustment**: Consists in achieving a balance among the projects selected. This requires interactive displays on certain portfolio dimensions, such as risk, size, and short term vs. long term.

**Figure 5.** Framework for Project Portfolio Selection

**Source:** Archer & Ghasemzadeh (1999)
Other model for project selection is the *Strategic Buckets model* which is proposed by Cooper et al. (1997b). This model considers the idea that implementing strategy equates to spending money in specific projects. The model is developed in six steps which are explained below and are presented in figure 6.

*Strategic & Money Buckets*: Management makes the decisions on where they want their money to be spent. This enables the creation of “envelopes of money” or “buckets” and requires the management to choose across the strategic dimensions in the organization.

*Project Buckets and Prioritization*: Existing project are classified into buckets which they are prioritized according to the strategy.

*Determining the spending by each bucket*: It is determined the desire spending by each bucket according to the strategic allocation done earlier.

*Gap Analysis*: The existing projects are categorized by bucket and the total current spending of each bucket is calculated. The spending gap between what is and what should be can be identified.

*Project ranking within each bucket*: The projects are ranked within the bucket using either scoring models or financial criteria.

*Portfolio is ready*: The selected portfolio firmly links spending to the business’s strategy. Different criteria can be used for different types of projects. It is not necessary to get a unique ranking criteria that fits all projects, because this model first allocate money to buckets and then prioritize projects within each bucket.

![Figure 6. Strategic Buckets Model](image)

The last framework is the one proposed by Sprandlin & Kutoloski (1999), which consists in allocating resources in terms of identified opportunities, and implements the concept of strategy-table. This model is divided in five steps, which are shown in figure 7 and explained below.

*Framing of the problem*: The first step consists in identify opportunities for the business. A project team of experts, from various functional areas, is assigned to do this identification. For each opportunity there is a list of the resources already allocated to it.

*Building an alternatives table*: Consists in a meeting to brainstorming alternative courses of action for each opportunity and construct a table known as “alternatives table”.

*Creating a Strategy Table*: A meeting is held in order to create strategies or alternatives portfolios from the alternatives table.
Evaluating Individual opportunities: The candidate portfolios are compared with their expected NPV and other measures agreed.

Evaluating the portfolios: Consists in aggregating the cash flows when combining the portfolios, and also the impact of failure of each project on the value of the portfolio is estimated. At the end, it is made the portfolio selection.

![Strategy Table approach for project selection](image)

**Source:** Sprandlin and Kutoloski (1999)

**Project Portfolio Monitoring and Control**

Research on PPM has been redirected during recent years. Dawidson (2006) arguments that, during the last decade, the research on Project Portfolio Management has been expanded into a more complete management approach. This means that the current focus now is not only on the tools to select projects but also the management process of the portfolio. Besides the effective selection of the projects for the portfolio, there is also the need to monitor and evaluate any conditions that could change the status and performance of each project. This is necessary to consider whether the project should remain in the portfolio or if this should be killed (Levine, 2005).

Levine (2005) identifies two techniques that are available to support the management, monitoring and control of the project pipeline. These techniques are: Earned Value Analysis and the Stage-Gate process. The first one, Earned Value Analysis, provides information about project performance against the plan; with this information the team can evaluate the termination of a project prior to completion, change the priority of the project or reallocate resources if the project presents certain deficient performance. The second one, Stage-Gate process, is composed by stages that are separated by a decision point called gate (Levine, 2005). At the end of each stage, a cross functional team evaluates the status of active projects within the portfolio to make effective Go/Kill decisions at each gate. This evaluation is done against a list of criteria, such as strategic fit, technical feasibility, market attractiveness, and competitive advantage (Cooper et al., 2000).

According to Müller, Martinsuo, & Blomquist (2008), there is a knowledge gap in portfolio control techniques and how they relate to portfolio management in different contexts. These authors developed a study in 133 organizations examining the project portfolio control as a potential factor that contributes to portfolio management performance. The main result of the study shows that organizations with different governance styles differ in their use of different portfolio control practices.
Project Portfolio Management Tools

PPM tools are significant because they allow managers to assess projects according to different criteria. The original portfolio tools of the 1960s and 1970s were highly mathematical employing techniques as linear, dynamic and integer programming. For managers these tools were perceived as too complex to understand and use. In recent years, new methods for PPM have been introduced to assist in the selection and review of all projects. (Cooper et al., 1999; 2001). Cooper et al., (2000) classify those new methods and tools according to the goals of PPM. This classification is explained below:

**Goal 1. Value Maximization:** The tools used to assess project value are financial methods such as Net Present Value (NPV) and Expected Commercial Value (ECV), checklists and scoring models. The financial methods are the most popular of the various project selection and prioritization methods used by 77% of the businesses studied by Cooper et al. (2001). Checklists are among the least popular portfolio tools with only 3% of the businesses; this method tends to be viewed more as a supporting tool. And scoring models are fairly popular among managers with 38% of businesses using those (Cooper et al., 2001).

**Goal 2. Balance:** These tools are used to achieve a desired balance of projects in terms of number of parameter such as long term vs. short term, high vs. low risks, etc. These tools are visual charts such as *bubble diagrams* relating risk-reward and *pie charts* that show the breakdown in number of projects or spending by project types. (Cooper et al., 2000). In practice Cooper et al. (2001) found that bubble diagrams are popular tools with 41% of the businesses in the study using them, but they appear more to be supporting tools in the decision.

**Goal 3. Strategic Direction:** This kind of tools ensures that the final portfolio of projects reflects the business strategy. Strategic Buckets approach is used by some leading firms to ensure that portfolio spending reflects their strategic priorities (Cooper et al., 2000). This method is employed by the 65% of the business studied by Cooper et al. (2001).

3.4. Project Portfolio Management and New Venture projects

After having carried out a review of New Venture projects and PPM independently, in order to shape our research, literature studying the relationship of both themes was also scrutinized, and it was possible to find contributions of some authors. Schoen et al., (2005) propose a model for the project management of innovation and product development projects called multiple spiral model. This model includes the elements of separate spirals for the invention and innovation processes. The authors applied the model in a Business Incubator and one of their recommendation is that portfolios of projects can be evaluated or developed based on expertise in different phases of the process. Nevertheless, authors fail to explain in depthe how to deal with all the process in a PPM perspective.

Loch, Solt & Bailey (2008) find that, in the field of New Ventures are required different management approaches from those used for traditional projects. The management approaches for New Ventures projects include a combination of trial and error learning (i.e. flexible definition of New Venture model) and selectionism (i.e. running multiple
parallel trials and choosing the best performing approach ex post). These different management approaches could be a valid statement to justify the lack of research in project management applied to New Venture projects. Frederiksen & Davies (2008) establish a connection between the literature on project business and studies of entrepreneurship illustrating how firms develop vanguard projects where there is no existing client to venture into new technologies or markets. Midler & Silberzahn (2008) explore how to manage the start-up development through a succession of exploration projects, articulating three bodies of knowledge: project management, organizational learning, and entrepreneurship.

Bakker et al. (2010) report the results of a survey among 2000 Dutch SMEs in 2006 and 2009 focused on inter-organizational project Ventures. Their findings show that Ventures predominantly solve repetitive rather than unique tasks, which give support to the claims that project management should pay more attention to inter-organizational forms of project organization. Bakker et al. (2010) also considered necessary to balance the project portfolios of many group of organizations that engage in inter-firm project ventures due to the increment of their size and complexity. However, they recognize a gap of knowledge in this area and propose, for future research, to study the added complexity involved in managing a portfolio of simultaneous projects with different partners.

From the articles analyzed previously it is possible to distinguish an existing lack of knowledge in how the project portfolio of New Venture projects is managed, as suggested by Bakker et al. (2010). This could be explained due to the different management approaches that a New Venture Project requires according to Loch et al. (2008). Although it was not possible to find a direct relationship between PPM and New Venture projects in the literature, we consider feasible to cover this lack of knowledge using two different approaches: the first one consists in linking New Ventures projects with R&D projects that have high technical and market uncertainty (Mac Millan & Gunther, 2000). This relation is important, because there is an extensive literature for PPM in R&D projects that could be used to understand how PPM is applied in New Venture projects. The second approach involves using studies that have been conducted in Business Incubators and Venture Capital firms related with specific stages of the model proposed by Archer & Ghasemzadeh (1999) as screening, selection and monitoring for New Ventures. Below are exposed these two approaches with their respective authors and models proposed.

3.4.1. Project Portfolio Management in R&D Projects

R&D projects and New Ventures Projects

In the literature it is possible to find some authors that establish a link between New Venture projects and R&D projects. This is the case of the studies done by Cassiman & Ueda (2006) and Mac Millan & Gunther (2000). Cassiman & Ueda (2006) present a model to analyze how an established firm can exploit some innovation projects when it has a limited commercialization capacity. Authors propose that innovations can be exploited as an internal venture, as an external venture by a new start-up firm, or simply not commercializing at all. The main finding of this study is that, on average, innovations commercialized through internal ventures have a higher degree of
cannibalization than innovations commercialized through external ventures, and that more profitable established firms generate more profitable external ventures. However, a serious weakness with this article is that it does not analyze how the management of these projects should be and how the firm can maximize the value of its projects portfolio.

Mac Millan & Gunther (2000) consider that uncertain but promising R&D projects should be treated as real options depending on their degree of technical and market uncertainty. They classify these options as: positioning options, scouting options and stepping-stone options. The first ones, positioning options, are designed to preserve the company’s right to compete in the future in the technological area. The second, referred to scouting options, are used to create information about customer and market conditions. And the third, stepping-stone options, provide the path for an organization’s long-run technology strategy. The main difference between stepping-stone and scouting options is that scouting options are related with technologies that R&D are confident to develop whereas stepping-stone options consider the creation of a new technological competence base with attractive opportunities. Mac Millan & Gunther (2000) suggest that managing a portfolio of investments such as stepping-stone options must be done with the sort of discipline used by Venture Capital firms, in which funding decisions are made only when key milestones are reached and many assumptions have been tested. They also recommend that with stepping-stone options, the organization has a lot of learning to do on market and technical fields. Mac Millan & Gunther (2000) also developed a matrix where it is explained the different R&D types of projects in which New Venture projects could be consider as stepping-stone options with high technical and high market uncertainty. See Figure 8.

![Figure 8. Types of R&D projects](source: Mac Millan & Gunther (2000))
In conclusion, it is possible to state that there is a relationship between New Venture projects and the R&D projects that are characterized to have a high technical and market uncertainty (Mac Millan & Gunther, 2000) and those that the companies decide to commercialize through an external venture as a new start-up firm (Cassiman & Ueda, 2006). This statement allows the use of the theory in PPM applied for R&D projects in our research.

**Approaches of PPM for R&D projects**

There are many approaches of PPM for R&D projects in the literature. A possible reason for this is the fact that R&D industries are characterized by high uncertainty and the pressure to innovate, which provides the motivation for the usage of tools to evaluate and manage the portfolio of projects in the organization (Chien, 2002). Nevertheless, many authors of PPM tools for R&D projects have presented some approaches that are so mathematically elaborated that in the real life managers cannot understand and, as a consequence, the usage of such tools is very scarce (DePiante & Jensen, 1999). Some examples of these models are developed by Loch & Kavadias (2002), Tian, Ma, & Liu (2002), Sun & Ma (2005), Eilat, Golany, & Shhtub (2006), Carlsson, Fullér, Heikkila, & Majlender (2007), Huang, Chu, & Chiang (2008), Solak, Clarke, Johnson, & Barnes (2010), Wei & Chang (2011), among others.

There are other types of models that can be applied in practice with the tools that were mentioned in section 3.3.3 of this work. Among those models it is important to mention Cooper et al. (1997b), with the “Strategic Buckets” model, explained in the section 3.3.3, and the R&D Project portfolio Matrix (Hsuan, 2001) which is exposed below. Other studies are DePiante & Jensen (1999) who develop a practical R&D project selection scoring tool and Chien (2002) who uses a framework to evaluate alternative portfolios of R&D projects.

Hsuan (2001) proposes the R&D Project Portfolio Matrix as a tool that contributes in the identification of projects in terms of their benefits to customers and their competitive advantage. These matrix is a guide for the managers in the decision making process, including an appropriate specification of R&D projects, a classification of the projects in terms of their technical advantage and benefits to the customers, management of risk and balance of the portfolio and the prioritization of the projects. This matrix is divided in four quadrants: STAR, FLOP, FAD and SNOB (see figure 9). STARS are R&D projects with a high competitive advantage and high benefits to customers, being equivalent to projects with successful innovations or products. FLOPs offer no competitive advantage and have low benefits to customers, which it is unlikely to bring positive returns for the firm. FADs are projects with products developed under imitation or in mass production which are characterized by high benefits to customers but low competitive advantage. And finally, SNOBs are projects for first generation products that have high technical advantages but the benefit to customer is not perceived clearly. (Hsuan, 2001).
Authors agree that there are two important components in the PPM process. The first one is related to the prioritization and selection of the projects by evaluating benefits, risks, alignments, and other business and project factors (Levine, 2005) and the second is the monitoring and control of active projects in the portfolio (Levine, 2005). Archer & Ghasemzadeh (1999) propose a framework that attempts to simplify and organize the project portfolio selection process based in five different stages: pre-screening, individual project analysis, screening, optimal portfolio selection, and portfolio adjustment. With respect to monitoring and control, Cooper et al. (2000) propose a technique called “Stage-Gate process”. At the end of each stage, a cross functional team evaluates the status of active projects within the portfolio to make effective Go/Kill decisions. This evaluation is done against a list of criteria, such as strategic fit, technical feasibility, market attractiveness, and competitive advantage. (See section 3.3.3).

Although it was not possible to find a study that develops all the PPM process for New Venture projects, the literature review presents other studies that develop some stages of this process as: screening, selection and monitoring and control, in both Business Incubators and Venture Capitals. The main authors and their ideas from these studies are introduced below.

**Screening of New Venture projects**

Lumpkin & Ireland (1988) suggest four different factors to carry out the screening of Venture projects. These factors are: financial ratios, personal characteristics of management team, marketing skills, and market factors. Aerts et al. (2007) study the screening practices within the European context. They found that 97% of the incubators use a set of screening factors to evaluate potential tenants, most of incubators (76%)
have a selection committee for the admission of new tenants and in 24%, of the incubators that apply screening, the selection decision rests on the judgement capability of one person. Among the main factors that are considered in the screening stage, Aerts et al. (2007) found that for 61% of the incubators the market is very important, the management team of the tenant is also important (27%), the number of financial screeners is very limited (6%) and the screen on a balanced set of screening factors are exceptional (6%). To summarize, this study demonstrated that European incubators do not screen their potential tenants on a wide and diversified set of criteria, some of them rather use approximate data as business plan and the composition of the team.

Selection of New Venture projects

Allocation of resources is crucial for BIs and VCs because they are not sufficient to assist all New Venture projects. Due to this constraint, it is important to make effective and efficient decisions of allocation in a reasonable manner (Lumpkin & Ireland, 1988). In the following paragraphs it is outlined the studies that explain some approaches for the selection process of projects in both BIs and VCs.

Selection in Business Incubators:

Bergek & Norrman (2008) define selection in the incubators as decisions concerning which ventures to accept for entry and which to reject. The authors state that researchers seem to agree that selection is an important incubator management task, since is the basis for the effective resource allocation, with respect to both individual incubators and to the general economy. Bergek & Norrman (2008) also propose a model to define for selection strategies, used by incubators, that depend on the criteria used and the flexibility or strictness in applying them. In terms of criteria, selection could be focused primarily on the idea or focused primarily on the entrepreneur or the team, whereas for the evaluation of flexibility or strictness, two basic approaches are distinguished: “picking in the winners” where the incubator managers try to identify a few potentially successful ventures ex-ante and “survival of the fittest” approach where the incubator managers apply less rigid selection criteria.

If both approaches are combined, the result is the definition of four different strategies to select New Venture projects within incubators. These strategies are: survival of the fittest and idea, survival of the fittest and entrepreneur, picking the winners and idea, and picking the winners and entrepreneur. In the first strategy, the portfolio will presumably consist of a quite large number of idea owners with immature ideas related to different fields, the second has a resulting portfolio which will be diversified and consist of entrepreneurs/teams with strong driving forces, the third strategy is focused in a highly niched portfolio within a narrow technological area, while in the last strategy the portfolio is composed of a few handpicked and carefully evaluated entrepreneurs commonly with ideas coupled to research areas of a nearby university (Bergek & Norrman, 2008). The model proposed can be seen in the figure 10.
Selection strategies in Business Incubators

Figure 10. Selection strategies in Business Incubators
Source: Bergek & Norrman (2008)

Selection in Venture Capitals:

Evaluation and selection of New Venture projects for the portfolio in Venture Capital firms is a difficult task to undertake due to the high level of uncertainty associated with potential financial and strategic benefits and the lack of appropriate tools of measurement (Yang, Narayanan, & Zahra, 2009). For a VC it is costly to evaluate and find projects for its portfolio, some important factors to explain this cost are in: planning, market research, self-selection, recruitment policies and support facilities (Eldridge, 2007). Some of the factors and competences considered by VCs to evaluate and select the new projects for their portfolios are explained below:

Petty (2009) discusses that the process related to VCs decision making has received less attention resulting in informative descriptive models, and identifies four different groups of potential factors to consider in this process: product characteristics, market characteristics, company’s financial position and outlook, and the characteristics of the entrepreneur or management team. According to this author, the decision making is a dynamic process in which the firm is continually weighting the selection criteria over the time. And that will impact on VCs by having the need to impose more constraints in the selection as projects go through different stages.

Yang et al. (2009) arguments that in order to make more fruitful investments decisions, VCs needs to develop two capabilities: selection capability and valuation capability. Selection capability corresponds to the ability to identify portfolio companies with exceptional promise to generate high financial returns in the short and long term as well as strategic benefits. While valuation capability is the ability to evaluate portfolio companies accurately in terms quality and to reach a fair price through negotiation. This capability allows VCs to not to overpay for the New Ventures target. These two capabilities can be developed only through the accumulation of three types of experiences: experience intensity, experience diversity and acquisitive experience Yang et al. (2009). Experience intensity deals with the number of repetitions in the learning-by-doing process, experience diversity is gained solving a diverse range of problems associated with subjects of interest, and acquisitive experience refers to the experience
borrowed from others. A representation of this model can be seen below in the figure 11.

![Figure 11. Model of selection and valuation capabilities in VCs](chart)

**Figure 11.** Model of selection and valuation capabilities in VCs

**Source:** (Yang et al., 2009)

**Monitoring and Control**

VCs are more willing to exercise control over projects by spending more time in the initial analysis and by replacing management when it is needed (Carter & VanAuken, 1994). VCs are concerned that entrepreneurs will not want to liquidate a project even if they have information that reveals the project has negative net present value for shareholders. This situation motivates VCs to monitor and control these projects with increasing frequency (Isaksson, 2000). Nevertheless, Eldridge (2007) suggests that the control rights should be allocated to the party which has more marginal ability to influence the returns. This author identifies four mechanisms through which VCs perform their monitoring role: specific shareholder agreements, differentiated shareholders rights, board membership, and intense relationships with the management.

**3.5. Our Conceptual Model**

The literature review presents a lack of knowledge in the practices executed by managers of portfolios of New Ventures projects, to select, prioritize, monitor and control this particular type of projects. Nevertheless, Mac Millan & Gunther (2000) suggest that New Ventures projects could be considered as R&D projects with a high technical and market uncertainties. Categorizing New Ventures projects as R&D projects could give an interesting relationship of this research with conceptual models proposed by other authors in the R&D projects field.
The literature review also describes other studies that develop some stages of this PPM process as: screening (Lumpkin & Ireland, 1988; Aerts et al., 2007), selection (Bergek & Normman, 2008; Petty, 2009; Yang et al., 2009), and monitoring and control (Carter & VanAuken, 1994; Isaksson, 2000; Eldridge, 2007), in both Business Incubators and Venture Capitals. From all these studies, it has been determined a conceptual model based in the frameworks proposed by Archer & Ghasemzadeh (1999), Cooper et al. (1997b; 2000) and Hsuan (2001) and complemented with the models proposed by Bergek & Normman (2008) in selection strategies within Business Incubators and by Yang et al., (2009) with the selection and valuation capabilities in Venture Capital firms. The proposed conceptual model is presented in figure 12 and it is explained below.

In figure 12 it can be noticed that to analyze the management of New Ventures projects portfolio it is necessary to follow three different phases. The first one is called *Feasibility Analysis Phase* (Phase 1) and includes the pre-screening, individual project analysis and screening of the different project proposals as suggested by Archer & Ghasemzadeh (1999). This part of the process is normally undertaken by Business Incubators, and this is a reason to propose the use of the selection strategies model developed by Bergek & Normman (2008). The second phase is known as *Portfolio Selection and Prioritization* (Phase 2), which is mainly performed by Venture Capital firms. This phase consists in developing different tools to select the projects and prioritize according to the three main goals suggested by Cooper et al. (2000) which are value maximization of the portfolio, alignment with the strategies and balance of the portfolio. For the value maximization goal, managers can use tools such as financial methods, scorings or checklists. For the alignment with strategies managers could use the “strategic bucket model” recommended by Cooper et al. (1997b). And for the Balance of the portfolio goal it is proposed to use the R&D project portfolio matrix (Hsuan, 2001), bubble diagrams and pie charts. In this phase it is also important to mention the role of the experience of Venture Capital firms, which can be approached with the model of selection and valuation capabilities proposed by Yang et al. (2009) The last phase in the process is known as *Monitoring and control* (Phase 3), and consists in the project development and the evaluation process using the approach of Stage Gate (Cooper et al., 2000), together with the successful completion or failure of the project.

This section shows the model as a result of the review of literature, but in the chapter 6 this model is explained more deeply considering not only the theory but also the results obtained in this research.
Figure 12. Proposed model for PPM of New Venture projects

Source: Authors
CHAPTER 4

RESEARCH DESIGN

4.1 Introduction

In this chapter we explain the research design of our study. We start by listing the existing types of research designs, according to the literature, and describing the cross-sectional design together with the reasons that influenced our decision to choose it for our study, also looking for a proper answer to our research question. In the second part we give details about the choice of the research context to undertake the research design and our study. After that, we describe some data collection methods available and define our approach to collect the data, as well as the selected research strategies, highlighting the chosen techniques and their importance to our study. We also provide information regarding the scheme of the interviews, the respondents, the actual data collection process using both Interviews and Questionnaires and how the analysis was carried out once findings were obtained. Finally, we emphasize the arguments given to guarantee reliability and validity of the study and conclude defining the ethical considerations to develop the study.

4.2. Types of Research Design

Bryman & Bell (2003) argument that a research design provides a framework to the collection and analysis of data, where its choice reflects the decisions about the priority given to different dimensions in the research process. They examine five different types of research designs: experimental design, cross-sectional or social survey design, longitudinal, case study and comparative design. At the beginning, the possibility to use a case study as an approach to design the research was considered, but this frequently involves a longitudinal element, where the researcher is often a participant of an organization or some organizations for many months or years, conducting interviews over a lengthy period (Saunders et al., 2007). For this reason this design method was not considered. Our interest, however, is not to delve into all types of research designs but to concentrate on the cross-sectional study, which was eventually chosen as the approach to collect and analyze the data in this thesis.

“A cross-sectional design entails the collection of data on more than one case and at a single point in time” (Bryman & Bell, 2003, p.48). The most important aspects that characterize a cross-sectional design are that this approach allows the analysis of more than one case and the collection of data at a single point of time. Both features are relevant to our study, the first because it fits the nature of our study to describe in more than one case, and the second because in fact data in this study has not been collected in stages but rather carried out in a single time period.

The cross-sectional design involves using different research strategies, and is beneficial for our study because it allows collecting both quantitative and qualitative data. The typical form to collect quantitative data in this type approach is the social survey research or structured observation on a sample at a single point in time; while the
typical form to collect qualitative data is through the use of qualitative interviews or focus groups at a single point in time (Bryman & Bell, 2003). Both research strategies were selected for this study and will be deeply explained in subsequent sections.

4.3. Choice of research context

This study has been clearly defined as concentrated exclusively on New Venture projects in Sweden, but it is also necessary to outline certain features of the current state of the context where research will be done, and which had an impact on the choice of the subject. Studies related to New Venture projects previously done in Sweden are various. Some studies are focused in Business Incubators and Science parks, whereas others are focused on Venture Capital firms in Sweden. Some examples focusing on the first type of studies are explained as follows: Lindholm & Klofsten (2008) analyze a potential mismatch between supply and demand, and the effect that different forms of business support have on this divergence; they compare data on the support supplied by Swedish incubators and science parks, with information on New Technology Based Firms (NTBF’s). Bergek & Norman (2008) apply a selection framework on sixteen (16) swedish incubators that were supported by the government VINNKUBATOR programme; this study seeks to develop a framework that could serve as basis for identifying best practice incubator models in terms of selection, business support and mediation. Hansson & Hedin (2007) investigate small and young companies motives for internationalization conducting a survey with companies that are members of nine Swedish Business Incubators and Science Parks. Lindelof & Lofsten (2003) examine the performance of Science Parks surveying a total of two hundred seventy three (273) NTBFs, of which 134 were in a Science Park and 139 were not, and conclude that Science Parks showed significantly greater emphasis on firm characteristics as innovation ability, competitor and market orientation, sales and employment growth, high profits, etc.

An example of studies focusing on Venture Capital firms in Sweden is the one conducted by Lindholm & Cetindamar (2000), who analysed the supply and demand of innovation financing by using a database of ninety four (94) firms. Authors outlines basically two findings, the first states that under the conditions of limited VC supply, acquisitions are used to compensate for the financial constraint; and the second affirms that the funding of NTBFs varies between different industrial sectors, particularly between manufacturing and service sectors. Isaksson (2000) also presents some preliminary results of a survey sent to all Venture Capital companies in Sweden describing the Venture Capital firms exit strategies. Finally, Cetindamar & Jacobsson (2000) examined the evolution of the Swedish Venture Capital industry collecting information from a sample of 99 firms. Their findings suggest that Sweden is among the leading countries in VC industry in the European Union with focus on the IT and biomedicine sectors, but this industry is not mature yet.

Although some studies in Sweden related to New Venture projects framework were found, it was not possible to find any study focusing on the entire process since the moment of submitting the project proposal, doing the feasibility analysis, selecting the projects and at the end the monitoring and control of those New Venture projects. These studies are normally focused on one of the two types of organizations, either Business Incubators or Venture Capital firms. And this significant peculairity determines the
reason why they do not consider all PPM process for New Venture projects, because in order to do it is necessary to consider both types of organizations in the same study. This fact influenced us to become interested in conducting a descriptive study in Sweden to understand what comprises the PPM process for New Ventures since the moment where the business proposals are submitted to the BIs until the moment the VCs exit the new start-up.

Another characteristic feature of this study is the non-traditional context in which it intends to apply the PPM process. Conventionally, the entire PPM process is performed inside organizations, whereas in the case of this proposed framework of New Venture projects, it is divided into two parts: the first is carried out by the BIs and the second by VCs.

4.4. Research strategy and Data collection methods

The research strategies can be used for exploratory, descriptive and explanatory research (Yin, 2003, cited in Saunders et al. 2007, p.135). The contribution of these strategies is that they will enable to answer the research question and meet the objectives of the research. Their choice will depend in the extent of existing knowledge, the amount of time and other available resources, and the philosophical underpinnings (Saunders et al., 2007). It is also convenient to mention that these strategies are not mutually exclusive and that it is possible to combine some of them during the research process.

It is possible to use mixed methods during the research process to collect the data. These mixed methods use both quantitative and qualitative data collection techniques and their analysis could be carried out through a mixed method research, where the quantitative data is analyzed quantitatively, and qualitative data is analyzed qualitatively, and mixed model research, where the analysis of the data is done gathering quantitative data and converting it into narrative to be analyzed qualitatively or vice versa (Saunders et al., 2007). Nonetheless, multiple methods are useful if they provide better opportunities for the researcher to answer the research questions and allow them to better evaluate the findings (Tashakkori & Teddlie, 2003, cited in Saunders et al., 2007, p.146).

The basis of this qualitative study suggests the usage of interviews as the most suitable tool for collecting primary information. And this is because our research question involves multiple phases within PPM performed by more than one subject (in our case BIs and VCs). In the business research interview, the role of the interviewer is to elicit from the interviewee, all manner of information, and this in addition to the answers, includes behavior, attitudes, norms, beliefs and values (Bryman & Bell, 2003). Authors also assert that although there are many different types of research interviews, the sort that is predominantly employed in survey research is the Structured Interview, which use questionnaires based on a predetermined set of questions within a standardized schedule, and usually with pre-coded answers (Saunders et al., 2007).

Nevertheless, given the complexity of the PPM process being proposed, its low level of standardization and the high diversity in the nature of respondents, we decided to use semi-structured interviews, which in contrast to those discussed above, are less standardized. “Semi-structured interviews provide the opportunity to ‘probe’ answers,
where you want your interviewees to explain, or build on, their responses” (Saunders et al., 2007, p. 315). In this type of interviews researchers prepare a list of topics and questions to be covered, although these might differ from interview to interview. This usually happens because questions or topics can be added or omitted depending on the flow of the conversation (Saunders et al., 2007). Additionally, other important characteristic of this sort of interview approach for our study is given by the flexibility they allow the researcher to return or skip to a question whose content can be strengthened by newly-arisen data. In fact, specifically in the case of the Venture Capital manager (See appendix 1), its semi-structured condition enabled the interviewers to smoothly conduct and collect significant data in an interview that involved complex interconnected phases.

An important aspect to prevent the diversion of the research process from the original research question and objectives is to explore and assess different methods of data collection and choose the most appropriate. It was determined that along with research interviews, self-administered questionnaires are the most common methods in business research. With a self-completion questionnaire, respondents answer questions by completing the questionnaire themselves (Bryman & Bell, 2003). Furthermore, Saunders et al. (2007) recommend that although questionnaires in some cases may be used as the only data collection method, it is more convenient to link them with other methods in a multiple-methods research design. This is precisely what is sought to develop a more ambitious research. Saunders et al. (2007) also cite different questionnaire designs depending on how it is administered and the amount of contact possible with the respondents. This study particularly, in addition to semi-structured interviews, used *Self-administered questionnaires*, administered electronically using the internet. We used them in order to expand the scope of our research. Additional reasons to use these questionnaires are that first, they are effective in getting additional perceptions from other managers of BIs and VCs around Sweden and second, they allow having a quick reply from the respondents in the shortest time possible. Finally, these questionnaires were also relevant because they allowed collecting information similar to that which could be obtained through very structured interviews, using closed questions and providing specific options to choose from (See appendix 6 and 7), which were considered relevant and included as a result of the interviews outcome.

Summarizing, in this thesis, our research strategy to collect the data is based in a *mixed model research method* using both quantitative data, collected from questionnaires which were sent to twenty one (21) Business Incubators and sixty (60) Venture Capital firms in Sweden, and qualitative data, collected from *semi-structured interviews* with managers and/or business coaches of four (4) Business Incubators and one (1) Venture Capital firm. In this method, the quantitative data is converted into narrative to be analyzed qualitatively.

### 4.5 Scheme of the Interviews

As noted previously, there are several types of interviews and consequently, each seeks a different goal. Additionally, within this category of non-standardized discussion, authors describe as most common face-to-face and telephone interviews, and with internet-mediated interviews increasingly gaining popularity due to the advantage they provide of overcoming geographical barriers (See Figure 13). Nonetheless, Face-to-face
interviews were considered appropriate for this research because they allow greater dynamism and interaction among participants, as well as because of the low impact geographical barriers had in this research.

![Diagram of Interview Types]

**Figure 13.** Forms of Interview  
*Source:* Saunders et al. (2007, p.146)

The questions for the interviews were characterized by being open and were developed following the framework proposed in the literature review (see figure 12 in section 3.5). It is important to make clear that were built two different types of interviews, one for Business Incubators and the other for the Venture Capital firms (See Appendices 1, 2 and 3), due to the nature of the research where the first part of the process is covered by BIs and the second by VCs. For each interview a total of fifteen (15) questions were prepared to cover all the stages in the PPM process.

### 4.6 Interviews participants

The profile of the people that were contacted for the interview was deeply analyzed to ensure appropriate usefulness. Interviewees group consisted of managers of three (3) incubators, a business coach of one (1) incubator and a CEO of a venture capital organization. Since the interest of the research encompasses all the process of Project Portfolio Management, it was relevant to interview mainly the individuals in charge of the strategic management of the New Venture projects but also to understand the operational part especially the feasibility analysis of the projects.

In addition, we consider important to mention that we are aware that a higher sample of VC firms for interviews would have enhanced even more the quality of this research. In order to overcome this issue, the self-administered questionnaires were developed and indeed a greater level of response was attained. However, a more detailed explanation is provided in section 4.10. The summary of the interviews is shown in the table 1.
### Table 1. Interviews’ information for the research

<table>
<thead>
<tr>
<th>Type of Organization</th>
<th>Position of the respondent</th>
<th>Duration of Interview</th>
<th>Date of Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venture Capital (VC)</td>
<td>CEO</td>
<td>45 min 36 sec</td>
<td>Nov. 04th, 2010</td>
</tr>
<tr>
<td>Biotech Incubator</td>
<td>CEO</td>
<td>36 min 38 sec</td>
<td>Nov. 16th, 2010</td>
</tr>
<tr>
<td>Business Incubator</td>
<td>Business Coach</td>
<td>55 min 43 sec</td>
<td>Nov. 17th, 2010</td>
</tr>
<tr>
<td>Business Incubator</td>
<td>Project Manager</td>
<td>44 min 41 sec</td>
<td>Nov. 22th, 2010</td>
</tr>
<tr>
<td>Business Incubator</td>
<td>Operations Director</td>
<td>45 min 10 sec</td>
<td>Nov. 26th, 2010</td>
</tr>
</tbody>
</table>

### 4.7. Data collection process (Semi-Structured Interviews)

The initial collection of the data was executed after contacting four (4) incubators and one (1) Venture Capital Firm in the city of Umeå which is located in the north of Sweden. Search engines on Internet were used to find these organizations setting as a first criterion Business Incubators and Venture Capital firms that were present in the region; the main reason to use this criterion were the constraints in time and resources. As soon as the organizations were found, the next step was to visit their website and obtain the direct contact, as email, address, or telephone number, of the people who could be relevant to interview in this process. The following step was to contact the person preferably at the beginning visiting the company and asking for an appointment directly, or in other cases we asked for recommendations to contact other companies every time we interviewed one person; in this case was easier to have the contact by email or telephone referring the recommendation.

Once the contacts agreed to be interviewed, expectations and objectives were established and the length of time required was agreed following Saunders et al. (2007) recommendations. After that and prior to the interviews, each of the interviewees were sent, well in advance, a file containing the questions to be formulated at the meeting. The message also included a request for consent to record the interview, to which respondents fully agreed with the single condition that confidentiality agreements were respected. Recording is indispensable for a complete account of the series of exchanges in an interview to be available; where researchers are frequently interested not just in what respondents say but also in the way they say it (Bryman & Bell, 2003, p. 353).

The recording of the interviews, consequently led to their transcription, which was mostly conducted immediately after the end of the interview in order to enlarge its productivity, as well as because this process usually consume four times the amount of time recorded. In some cases it was necessary to contact back the interviewee to ask for further information or clarification regarding a particular question; this was possible due to a prior agreement that was reached.
4.8 Data collection process (Self-administered Questionnaires)

With the results extracted from the interviews, the literature review and questionnaires completed in previous studies related to PPM as Pennypacker (2003) and Stadnick (2007), two questionnaires were developed and sent to other incubators and venture capitals in other regions of Sweden. Both questionnaires were self-administered, referred and filled electronically using internet (Saunders et al., 2007); the tool employed for this procedure was the Umeå University Survey system. The intention was to avoid the well-known problem of low response rate, and so the questionnaire was made as short as possible in order for it to be less likely to deter potential respondents from answering (Bryman & Bell, 2003). Therefore, the first questionnaire had a total of twelve (12) questions to the incubators covering the stages of feasibility analysis and selection of projects; while the questionnaire to the Capital Ventures firms had a total of fifteen (15) questions covering the stages of portfolio selection, portfolio prioritization and monitoring & control of the portfolio.

The selection of the sample of venture capitals was done through the members of SVCA (Swedish Venture Capital Association). SVCA is the trade association for participants in the Swedish venture capital market and it is composed by 126 members of the investing firms, private equity firms and pension funds and others who invest in venture capital funds, 78 associate corporate members that offer different services for venture capital and growth, 49 members are private individuals who invest in growth companies called business angels and 17 angel investor network members (SVCA, 2010). Among the 126 investing firms we selected the ones focused on New Venture projects and with direct contact information (name of the contact, position in the company, and email address). The persons selected in the sample have a managerial position in their firms, having roles as CEOs, general partners, directors, portfolio managers and CFOs. The final sample for the survey was composed by a total of 60 Venture Capital firms.

In the case of Business Incubators, a similar process was followed with the SISP (Swedish Incubators and Science Parks) which is a trade association with the 90% of all Swedish Parks and Incubators as members (SISP, 2010). The Association has a total of 55 members, in which we have identified 25 incubators in all the regions in Sweden.

A total of eighty one (81) questionnaires were sent by email, sixty (60) to Venture Capital firms and twenty one (21) to Business Incubators because the other 4 were previously interviewed in Umeå. The questionnaires were uploaded in the platform Lime Survey with the authorized access by the webmaster of USBE (Umeå School of Business). A good response of these questionnaires depends on the recipient being motivated to answer the questionnaire and to send it back (Saunders et al., 2007). To ensure a high level of response we created a good design for the questionnaire, we used a cover letter explaining the objective of the survey, giving thanks for the participation and guaranteeing the confidentiality of the information (See Appendices 4 and 5) and we did a follow up, sending two more emails, reminding the filling of the questionnaires (Bryman & Bell, 2003; Saunders et al., 2007). Of the sixty (60) questionnaires sent to Venture Capital firms, a total of thirteen (13) were answered which represents a 21.66% of the total. Whereas for the Business Incubators, twenty one (21) questionnaires were sent of which seven (7) were answered representing a 33.33% of the total. Summarizing, of the eighty one (81) questionnaires, twenty (20) were answered representing a 24.69% of total. A higher rate of return was expected; however, this
research is not focused on getting a significant sample but rather on examining the management practices and opinions related with the New Venture projects portfolio. For the purpose of this study this is sufficient information since, especially incubators, are small organizations with one manager and couple of business developers with a changeable level of formalized attachment to the organization (Aaboen, 2009).

4.9 Analysis of empirical findings

After the collection of data, this study contains two more sections dedicated to the presentation of the empirical findings and their discussion. First of all, because of its source the data collected from each interview (both from BIs and VCs) was defined as qualitative denoting all non-numeric data that have not been quantified and are product of the chosen research strategies (Saunders et al., 2007). After its collection, it was transcribed and resulted in a body of shapeless textual material not straightforward to analyze (Bryman & Bell, 2003). The data was analyzed independently and became of immense value because it contributed to define the main points that composed the self-administered questionnaires, which in turn were later forwarded to BIs and VCs in other areas of Sweden.

Once the data, collected from both research techniques, was available, it was divided according to the type of respondent. And once this was completed, in the case of BIs, findings are presented following each of the PPM phases in which they are in charge of the New Venture projects as defined in the conceptual model proposed in Figure 12 (page 30). Similarly happens with VCs, where results are displayed consistently with the PPM phases they manage. In other words, what has been done is first a classification of the data into meaningful categories that enabled the identification of key patterns. And then the data was unitized with associated input from other respondents in order to assign relevant elements to the appropriate category, as recommended by Saunders et al. (2007, p. 479). This was done to consolidate the findings obtained from both interviews and questionnaires prior to their analysis, as displayed in Figure 14.

![Figure 14. Structure for the analysis of empirical findings](image-url)

In order to be more specific, we considered convenient to outline the main categories that were defined to classify the findings. These categories basically refer to stages...
within the PPM process according to the organization (BIs and VCs) in which they occur (See table 2). However, more in depth information is provided in chapter 5.

Table 2. Categories for analyzing findings

<table>
<thead>
<tr>
<th>Business Incubators</th>
<th>Venture Capital firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>General pre-screening</td>
<td>Optimal portfolio selection</td>
</tr>
<tr>
<td>Individual project analysis</td>
<td>Portfolio adjustment</td>
</tr>
<tr>
<td>Screening</td>
<td>Monitoring and control</td>
</tr>
<tr>
<td></td>
<td>Successful completion</td>
</tr>
</tbody>
</table>

For the discussion of findings, a similar approach was employed. In this section again was used the framework showed in Figure 12. The three main stages through which a New Venture Project passes (Feasibility analysis, Portfolio selection and prioritization and monitor and control) were formed with the data already categorized and consolidated in each phase of the overall PPM process. In this case the organizations responsible (BIs and VCs) are subject of discussion according to the stage they obtain incidence and their functions are actually contrasted with the practices mentioned in the existing literature.

4.10 Quality of the research

The quality of a research is established and assessed by two important criteria: validity and reliability (Bryman & Bell, 2003). Validity refers to the integrity of the conclusions generated from a piece of research, whereas reliability is more concerned with the possibility of having repeatable results from the study. These criteria apply perfectly for the quantitative research; however, there has been discussion about the significance of these criteria in the qualitative research, which is the relevant for our study. According to Bryman & Bell (2003), there are two approaches to adapt both reliability and validity from quantitative to qualitative research. The first approach consists in assimilating reliability and validity the same way as quantitative research with a little change in their meanings. The second position corresponds to judge both criteria according to quite different criteria from those used by quantitative researchers (Bryman & Bell, 2003).

Within the first approach, LeCompte & Goetz (1982, cited in Bryman & Bell 2003, p.288), recognize that reliability is a difficult criterion to meet in qualitative research because it is not possible to ‘freeze’ a social setting and the circumstances of an initial study to make it replicable. However, they suggest some strategies such as the need to adopt a similar social role by the original researcher in order to replicate the study. Regarding validity, the prolonged participation in the social life of a group over a long period of time allows the researcher to ensure congruence between concepts and observations as internal validity; meanwhile external validity corresponds a problem for qualitative researchers because of their tendency to employ case studies and small samples (LeCompte & Goetz, 1982, cited in Bryman & Bell 2003, p.288).

In the second approach, Lincoln & Guba (1985,1994, cited in Bryman & Bell 2003, p.288), propose two primary criteria for appraising a qualitative study: trustworthiness and authenticity. Trustworthiness is made up of four criteria: credibility, transferability, dependability, and confirmability. Credibility parallels internal validity, transferability
parallels external validity, dependability parallels reliability, and confirmability parallels objectivity. Each of these criteria is significant to our study and are to be analyzed within its own context.

The credibility of our findings concerns with both “ensuring that research is carried out according to the canons of good practice and submitting research findings to the members of the social world who were studied for confirmation that the investigator has correctly understood that social world” (Bryman & Bell, 2003, p. 288). One technique recommended to ensure this credibility of our findings is known as triangulation. This technique strengthens a study by combining more than one method or source of data in the study of social phenomenons (Patton, 2001, cited in Golafshani 2003). This condition is fulfilled in our research because we use semi-structured interviews in different types of organizations such as Business Incubators and Venture Capital firms, and we combined these interviews with the use of a self-administered questionnaires submitted to other organizations in Sweden that are part of our target in the study.

As stated previously, certainly a larger sample of interviewed VC firms would have contributed to enrich the quality of the study as is the case of BIs. This constraint was due to the limited access to these sorts of organizations researchers faced. Nevertheless, we believe this research maintains its credibility because of the satisfactory evidence obtained from the anonymous self-administered questionnaires, which basically contained, though more structured, the key questions interviews did. Additionally, the data obtained is sufficient given the type of this study as descriptive, which according to Saunders et al. (2007), is conceived as a mean to an end rather than the end itself. Our interest is to focus on understanding the process, under the context of the previously defined philosophy of phenomenology, rather than reaching to firm conclusions, and for this purpose, the information acquired is adequate.

The transferability corresponds to the possibility to transfer what we have found in the study to another context or to another time. In general qualitative findings tend to be oriented to the contextual uniqueness and significance of the side of the social context being studied (Bryman & Bell, 2003), This study complements the work done by other authors in Sweden regarding the BIs industry (Lindelof & Lofsten, 2003; Hansson & Hedin, 2007; Lindholm & Klofsten, 2008; Bergek & Norrman, 2008) and the VCs industry (Lindholm & Cetindamar, 2000; Isaksson, 2000; Cetindamar & Jacobsson, 2000). With this study it is possible to take information from those previous studies and integrate them in a PPM framework offering a valuable knowledge to the BIs and VCs in Sweden, which may try to learn from it and use it in order to become more strategic and effective in the management of their portfolio of New Venture projects. Our ambition with this descriptive study is to get an initial understanding of the framework of PPM for New Venture projects in Sweden, but later it would be possible to undertake a study with a larger sample that may be object to a statistical analysis and the transferability of the study to other time and context could have a higher level.

Dependability corresponds with the fact that researchers should adopt an ‘auditing’ approach (Guba & Lincoln, 1994, cited in Bryman & Bell 2003). This requires that all the complete records -problem formulation, selection of research participants, fieldwork notes, interview transcripts and data analysis decisions- are kept in an accessible manner (Guba & Lincoln, 1994, cited in Bryman & Bell 2003). It is possible to ensure an auditing approach in our study not only because it has been continuously reviewed in
follow-up meetings with our supervisor, but also because all the relevant information for this thesis is accessible for any possible reviewer.

Confirmability is concerned with ensuring that researchers have acted in a good faith, understanding that complete objectivity is impossible in business research (Guba & Lincoln, 1994, cited in Bryman & Bell, 2003). To guarantee the confirmability of this study, the researchers have taken some measures that are clearly explained in depth in the section of ethical principles for the study.

From the above arguments and the deep explanation of our research design, it is possible for us to ensure both reliability and validity of our study.

4.11. Ethical principles in the research

The research design needs to consider the extent to which the data should be collected from a research population that is unaware of the fact they are the subject of research and so have not consented (Saunders et al., 2007). Ethical principles can be classified into four main areas whether there is: a harm to participants, a lack of informed consent, an invasion of privacy or deception is involved (Diener & Crandall, 1978, cited in Bryman & Bell, 2003, p.539). Harm to participants is addressed by advocating care over maintaining the confidentiality of records and anonymity of accounts, in this case if a respondent’s identity is to be revealed, the respondent must first have been told to whom the information would be supplied and the purposes for which it will be used, and also, the researcher must ensure that information will not be used for other purposes than the research. Informed consent means that respondents should be told, at the beginning of the interview, if observation techniques or recording equipment are to be used. Invasion of privacy, personal information concerning research participants should be kept confidential. Finally, deception occurs when authors represent their research as something other than what it is (Bryman & Bell, 2003).

USBE (2010) recommends to include in our thesis the existing ethical guidelines for social science research. To ensure that our research fulfills these requirements, we have followed some practices in the data collection process: First, there was a direct contact with each interviewee explaining the purpose of our research and giving our compromise that the information collected had only academic purposes. Second, in the beginning of each interview, we asked for permission to the respondent to use recording equipment and we expressed our availability to show him/her the record again in case it was needed. Third, the identities of all the respondents from the interviews and the survey and their organizations, are not revealed in this study. Fourth, the people who received the self-administered questionnaire by email were informed about the anonymity and confidentiality of the survey in the covering letter (See Appendices 4 and 5).
CHAPTER 5

EMPIRICAL FINDINGS

5.1. Introduction

This chapter is developed based on the conceptual model proposed in the section 3.5 (See Figure 12, p. 30). This model is used to describe the management of New Venture projects portfolio following three phases: Feasibility Analysis phase, Portfolio Selection and Prioritization phase, and Monitoring and Control phase. Habitually, the first phase is undertaken by Business Incubators, and the other two phases are carried out by Venture Capital firms; however, there are some activities in the process that can be shared by these two types of organizations. Our approach for this chapter consists in developing and explaining our findings through the different phases of our conceptual model. These findings are aligned to meet the research purposes and the research question that were raised in chapter 1. The structure of the chapter consists in illustrating the findings for both organizations, BIs and VC Firms, following the conceptual model proposed. Within the findings for Business Incubators, the presented steps in the PPM process for New Venture projects are: pre-screening, individual project analysis and screening; while for Venture Capitals firms the findings shown are related with the: optimal portfolio selection, portfolio adjustment and monitoring and control.

5.2. Business Incubators

Business Incubators principally meet the first phase of the PPM process with relation to the feasibility analysis phase (see figure 12 in section 3.5). The next section presents the findings obtained for this phase. Initially it is presented the pre-screening stage which corresponds to the first filter for selecting New Venture projects in terms of strategic areas where the BIs decide whether or not to accept these applications. In second place, the individual project analysis stage is covered which is mostly focused on the findings in the criteria to analyze business ideas and to prioritize these projects. Finally, in the screening stage some data with the procedures of monitoring and control of the projects during their incubation process are outlined.

5.2.1. Pre-screening

The pre-screening stage is what, according to interviewees, corresponds to the first filter for selecting New Venture projects. Due to the different types of business incubators used for this study, the strategic areas in which each one focuses vary. Nevertheless, empirical evidence shows that generally, and except for certain cases where the incubator specializes on a single area, any venture project is admitted as long as certain additional conditions are met. These conditions are not necessarily related to the project itself but rather to its origin. This occurs because of the close bond that exists between incubators and universities. The case of the Business Coach in the Business Incubator confirms this statement:
“Given our orientation towards supporting ideas from students and researchers from our sponsoring University, basically every single idea coming from that source is welcome; in fact, it is the University which determines the target group”

Results from the questionnaire show that most of the respondents alleged to have no preference for specific projects. The main objective of this approach is obtaining a broad mix of different projects that will allow appropriate balance of the portfolio. Of those incubators aimed at a specific sector, both interviewed sources and survey respondents agree that there is a group of strategic areas in which Sweden has focused in recent times, which are Biotech, IT, Service Industry and Clean tech projects (See Table 3)

Table 3. Strategic areas in which most of the interviewed incubators focus

<table>
<thead>
<tr>
<th>The type of projects that your organization mostly work with are:</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotech projects</td>
<td>0</td>
</tr>
<tr>
<td>IT projects</td>
<td>1</td>
</tr>
<tr>
<td>Health care projects</td>
<td>0</td>
</tr>
<tr>
<td>Services industry projects</td>
<td>1</td>
</tr>
<tr>
<td>No specific focus in any type of projects</td>
<td>4</td>
</tr>
<tr>
<td>Other → Industrial &amp; Cleantech projects</td>
<td>1</td>
</tr>
</tbody>
</table>

The lack of orientation towards a strategic area in particular does not prevent incubators from establishing priorities that will influence when deciding which project to support. They clearly seem to be looking for diversification in their portfolio composition, preferably complementary with some of those projects already in incubation status.

“Although we do not have a defined model to prioritize incoming projects, we permanently seek to broaden the project diversity; therefore, we always prioritize projects that will contribute to this aim. A prominent reason to follow this strategy is the better output they obtain from each project, as well as the cooperation between those that may have complementary business or necessities” (Project Manager in Business Incubator).

On the other hand, when there is a focus on one area, usually entails establishment of more specific priorities that will serve as determinant filters and thus simplifying the feasibility analysis within the pre-screening stage:

“Our main focus is pharmaceutical and diagnostics projects that require laboratories and facilities for chemical tests, and we are very open as long as projects belong to this category. However, since this field is quite broad, priority is given to innovative projects resulted from the best research environments and that will mean a new and good quality invention. Additionally, more relevance is given to projects focusing on the infection disease area.”(CEO of Biotech Incubator).
Interviews accurately determined that the resource constraints affecting the selection of projects are diverse depending on the type of incubator. Those specializing in healthcare and biotech projects are normally capable to work with every project considered feasible. This occurs because in order to be eligible, a project must meet more complex requirements and should undergo further evaluation. These projects need to be more than merely preliminary research, and therefore they start directly in the development phase, and from that stage the incubator evaluates if its funding would be able to make a difference and upgrade the project to the next level and then find partners to obtain additional funding. Anyhow, if a project can overcome these barriers, it was asserted that incubators usually can allocate up to 5 million SEK for a project when it is really promising.

On the other hand, when it comes to BIs working with projects in different areas, resource constraints are not related to the monetary issue because generally the incubator does not provide financial support. Limitations rather correspond to physical space, storage capacity and the availability of coaches, who incidentally, are not only coaches but should also be specialists in the area in which entrepreneurs operate.

5.2.2. Individual project analysis

The criteria for project assessment correspond to the evaluation to be made to the proposed venture project, and more specifically to its business plan, once the basic eligibility requirements previously discussed are met. Developing criteria for assessing projects and communicating these in a transparent manner helps Business Incubators to improve the analysis of the project proposals. These criteria are varied and range from general to specific, as well as additional criteria applicable depending on the type of incubator. Furthermore, the criteria are not limited to the evaluation of the idea itself but also of the individual or team that will be in charge of bringing it further. In general, the criteria for project assessment (See Table 4) in which most incubator representatives insist can be fragmented into two levels: micro and macro. Regarding micro level, aspects such as the idea potential, innovation level, scalability (idea growth potential), novelty and uniqueness, ability to deliver customer value, segment and the type of customers targeted are considered critical. Other prominent criteria are the advantages the idea will provide over competitors, the strategy designed to attain sustainability and its business model and budget. Other factors also considered but with a lower level of criticality are the focus on untapped markets, projects with high technical feasibility and low resource consumption. With respect to the macro level, most incubators focus their scrutiny on the quality of the market research carried out, market size and growth, as well as of the industry, examining the existing competitors and current entry barriers.

<table>
<thead>
<tr>
<th>Criteria for Business Ideas (projects) assessment you mostly use in the organization are:</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Uniqueness</td>
<td>2</td>
</tr>
<tr>
<td>Targeted to focus on unexploited markets</td>
<td>1</td>
</tr>
<tr>
<td>Allows a greater competitive advantage</td>
<td>2</td>
</tr>
</tbody>
</table>
Technical feasibility | 1  
Low Resource consumption | 1  
Other: Delivered customer value | 3  
Ability to export potential |  
Sustainability in its business model |  
-Growth, team, customer needs |  

The criteria for assessing the quality of the individual or group responsible for the project presented many factors. Those, however, ranked highest by interviewees are the willingness of the project owner to become an active entrepreneur, the spirit and motivation, the goals of the team, contacts network and capacity to develop the idea alone or the sort of external individuals needed. In addition to the assessment of general factors related to the venture project and its market, specific criteria were identified for more specialized incubators. In these cases projects are also judged by the viability to find a partner on the way of its developing phase because some projects (ex. biotech projects) involve huge investments and they rarely are able to bring a new drug to the market by its own financial capacity. It is usually a large or middle-sized pharmaceutical company at least who acts as a sponsor. Within this same category, an additional criterion was identified which is based on the issue of forecasting future revenues.

“Our organization works within a complex industry and deals with early stage projects that will not generate any revenues while they are still here developing with us during some years. And thus, assessment at least at this point is not focused on future revenues but rather on analyzing if the project will fulfill a significant current or future need in the market. It also analyzes if the project is targeted to treat a disease with up to now low success solutions such as cancer or a specific infectious bacteria that have become resistant to existing pharmaceuticals” (CEO of Biotech Incubator).

As a result, the problem of future revenues will play a larger role in later stages, when further development is achieved and therefore a need for funding has arisen; because investors typically require a precise value of a project before disbursing capital.

In the questionnaire, the main new methods for project assessment introduced to assist in the selection and review of all projects were considered; as well as a category related to the opportunities evaluation (See Table 5). Results show that there is no factor where incubator evaluation committees rely on more than the experience of their own board; closely followed by checklists procedures. Other alternative tools such as financial indicators and scorings showed presence in the analysis but with lower usability level.

<table>
<thead>
<tr>
<th>The tools you use in your organization for prioritizing projects are:</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td></td>
</tr>
<tr>
<td>Financial indicators</td>
<td>1</td>
</tr>
<tr>
<td>Checklists</td>
<td>3</td>
</tr>
<tr>
<td>Scorings</td>
<td>1</td>
</tr>
<tr>
<td>Experience of decisions makers</td>
<td>4</td>
</tr>
</tbody>
</table>
On the other hand, outcomes of the interviews intensified the hegemony of the “Experience” as the primary tool of evaluation. They displayed that incubators generally base their project selection and prioritization on their own experience and knowledge acquired from previous works, and for this purpose they use databases to gather the information. Additionally, it was found that their executives have been active in the industry for 15 years on average.

“In general no technical tools are employed, but rather the experience of the board of the incubator, as well as the experience the project owners claimed they have. We perceive our organization as a place where entrepreneurs are permitted to fail and thus acquire the experience for further challenges. For this reason, no tool for prioritizing is used strictly” (Project Manager in Business Incubator).

5.2.3. Screening

Data obtained indicate, within the screening stage, that incubators conduct a procedure of monitoring and control of the projects they support. This procedure is fairly standard and similar within each other. It usually consists of a first meeting between the entrepreneur and the business coach and the goals and milestones the project is required to meet are set, as well as what the entrepreneur expects to achieve with this incubation period, for which typically a 2-year horizon is established. After that, additional meetings are organized from time to time to discuss all the new inflow and maintain a continuous update of the projects situation.

“This information is delivered to the incubator board and they closely maintain contact with the coach as well as the project owner. Moreover, the contract signed in the earlier stage also states the expectations the entrepreneur is in charge to fulfill” (Project Manager in Business Incubator).

Nonetheless, it is important to highlight that although these milestones are set beforehand, incubators do not impose what entrepreneurs should do and when; they prefer to preserve their flexibility approach and provide them freedom to operate and decide on how to develop their project. Furthermore, there is usually no business coach in charge of controlling all the projects overall, it is rather one business coach in charge of a project or a certain group of projects who after a period will communicate the advancements attained as stated by the Business Coach in a Business Incubator:

“Reports summarizing what has happened around the projects being developed are delivered to the board every third month on average”.

When interviewees were asked about under what conditions they resolve to close a project, first of all they pointed out this stage is full of complexity and it is not possible to designate specific parameters to kill projects. This is because ideas are so raw at the beginning that is difficult to have a final word at that stage. Furthermore, as mentioned previously, the success of the project is usually determined by the level of motivation and commitment of entrepreneurs. The Business Coach in BI, arguments that the more the entrepreneurs work the more help they will obtain from the incubator, which contributes to accelerate or decelerate the development pace.
In the case of technological BIs, the closing decision is more complex. This is stated by the CEO of the biotech incubator regarding this decision:

“This phase is complicated to fulfill because usually in this kind of projects, when its team is working on complying the plan they have previously agreed upon, if this fails, there is usually a strong reason and they have to propose an alternative solution that might perfectly work. As a result, in this field is not convenient to act so decisive and suspend the project straightaway if they do not exactly follow the project plan. However, the aim is to fail as quickly as possible if failure is looming; and additionally, our organization usually do not incubate projects for a period longer than 2 years” (CEO of Biotech Incubator).

Nevertheless, in cases when stagnation of the project is caused by its owner and his/her decisions, respondents indicated that the most common reason is the loss of focus from the original idea. Moreover, although with less likelihood, failure to meet milestones, failure to solve customer need and low development of entrepreneurial vocation and competences were also mentioned (See table 6). Finally, interviewees also pointed out they decide to close a project at least temporarily, when entrepreneurs fail to attend regularly to project tracking sessions that are continuously organized.

Table 6. Most common reasons for inactivity and consequent failure of New Venture projects

<table>
<thead>
<tr>
<th>In your consideration, the current most common reasons for project inactivity and consequent failure are:</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of focus from original project</td>
<td>2</td>
</tr>
<tr>
<td>Failure to meet milestones</td>
<td>1</td>
</tr>
<tr>
<td>Waste of resources</td>
<td>0</td>
</tr>
<tr>
<td>Other: Delivered product/service fails to entirely solve customer need</td>
<td>1</td>
</tr>
<tr>
<td>Low development of entrepreneurial vocation and competences</td>
<td>1</td>
</tr>
</tbody>
</table>

The work undertaken by BIs is very important for the VC firms, because the first ones contribute in the growth and maturation of the New Venture projects to a stage that is attractive to VCs in terms of their feasibility and compliance with investment requirements. In our findings we have seen that the relationship between both organizations is limited to serving as a contact for entrepreneurs to obtain funding, but clearly there is a general lack in ensuring the alignment between the needs presented by VC firms and the supply of projects that have completed the incubation process. Some of the impressions gained on this transition process and the difficulties encountered can be seen in the next statement:

“Being able to decide that incubating process has been developed enough and that is time to start operations and sales is the most difficult decision many project owners face. For instance, IT project owners usually spend lot of time adding some new feature to make the software salable for targeted customers
“rather than approaching them and obtain product acceptance as it is” (CEO of Venture Capital Firm).

However, today there are organizations that work together linking the BIs and the VCs, especially around universities. In this case there is a greater coordination with respect to the needs expressed by the VCs and projects that come from the BIs.

“Although there is no exclusivity for our VC firm, we usually get all the most promising candidates from our allied BIs. The entrepreneurs present their ideas, which are in an already mature enough stage to need capital and to take the idea to the next level. We also get some external projects or early seed companies and we invest from 1.5 million SEK at the initial phase to a maximum of 3 million SEK in any individual project” (CEO of Venture Capital Firm).

After consulting the BIs, the interest is now focused on the role that VC firms have in the PPM process for New Venture projects. In the next section, we present our findings regarding the way the Venture Projects are selected, prioritized, monitored and controlled by VC firms.

5.3. Venture Capital firms (VCs)

Venture Capital firms mainly meet the last two phases within the PPM process: portfolio selection and prioritization, and monitoring and control (See figure 12 in section 3.5). In the following section, the collected data, in a detailed manner is presented, which relates to both phases. The first part presents the optimal portfolio selection step, including the main goals for portfolio of projects in VC firms and tools used by managers to select and prioritize projects. The second part shows the findings related with the portfolio adjustment which relates to how is the balance of these portfolios, the tools used to manage this balance, and how aligned are the VCs portfolio with their strategies. The third part illustrates the monitoring and control findings, and finally how is the successful completion of the projects within the portfolios. These data illustrates not only the questions related to each phase in the process and a possible interpretation, but also the comments obtained during the interviews that could complement, in an appropriate manner, the understanding of these findings.

5.3.1. Optimal Portfolio Selection

The criteria used to select the projects depend of their nature. However, there are some general criteria, used by many firms, which can be considered as crucial in the moment to select a New Venture Project for their portfolio. Among these criteria it is possible to mention, in order of importance: unique products or services that attend to a real need of the customer, potential market with a high expected growth, high barriers to entry ensuring a long-term protection for the business idea, strong management team in terms of experience, competence and quality, good and realistic exit prospects with a defined opportunity in terms of financial returns and time.

After considering these criteria, the next step consists in prioritizing the projects due to resources constraints. This prioritization is done according to three main objectives:
value maximization of the portfolio, alignment of the project with the strategy of the venture capital firm, and balance of the portfolio. From the interview this fact is clearly expressed in the following comment:

“If four (4) business ideas are received with the same feasibility level and equal ability to maximize value, those that would enable a better balance of the current portfolio would be considered as a priority, considering again both maturity and strategic area” (CEO of Venture Capital Firm).

In the questionnaire, it was requested to the respondents to number in order of importance the main goals when they were making decisions and managing their portfolio of projects. Most of the respondents agreed that the main goals are to maximize the value of the portfolio and ensure a strategic alignment. While the goal related with balancing the portfolio was not considered by the companies as the most important. (See table 7).

Table 7. First ranking of the main goals for PPM within Venture Capital firm

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value Maximization</td>
<td>6</td>
</tr>
<tr>
<td>Balance of the Portfolio</td>
<td>0</td>
</tr>
<tr>
<td>Strategic alignment</td>
<td>4</td>
</tr>
<tr>
<td>Non completed</td>
<td>3</td>
</tr>
</tbody>
</table>

Regarding the tools that managers use to select and prioritize the New Venture projects, there is a clear trend to use the experience of decision makers as the most important instrument (See Table 8). This importance can be supported with the results obtained from the question where the respondents had the option to choose as many tools they use in practice. These tools are: financial indicators, checklists, scorings, and experience of decision makers. The most popular answer from all of them is experience of decision makers; in second place it is situated financial indicators, and checklists in the third place. It is clear in our questionnaire that scorings are not used very often by VC firms, to make selection and prioritization decisions (See Table 8).

Table 8. Tools used by VCs’ managers to select and prioritize projects

<table>
<thead>
<tr>
<th>Are opinions of senior people and key decision-makers in your business captured in order to make project decisions?</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Answer</td>
<td></td>
</tr>
<tr>
<td>No answer</td>
<td>1</td>
</tr>
<tr>
<td>Yes (Y)</td>
<td>12</td>
</tr>
<tr>
<td>No (N)</td>
<td>0</td>
</tr>
<tr>
<td>Non completed</td>
<td>0</td>
</tr>
</tbody>
</table>
The tools that you use for the prioritization and selection of New Venture projects in your portfolio are. (Please choose as many tools as you use).

<table>
<thead>
<tr>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Indicators</td>
<td>6</td>
</tr>
<tr>
<td>Checklists</td>
<td>5</td>
</tr>
<tr>
<td>Scorings</td>
<td>2</td>
</tr>
<tr>
<td>Experience of decision makers</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Our interview with the CEO of the VC firm gives a possible explanation to the fact that decisions are based more on experience than on any other tool. In the next statement the CEO of the VC argues why financial tools are not very used to decide what projects to select:

“It is considered that traditional financial instruments such as (NPV, IRR, DCF) would be suitable if they would work with companies with past records, but we work with start-up projects with no history, no revenues, no expenditures and no employees, and therefore it is complicated to make predictions. In contrast, prioritization is rather based on the experience of investor board, they determine the likelihood of success each project has based on the idea itself, its current stage and the market analysis” (CEO of Venture Capital Firm).

In terms of the lack of use of diagrams and analytical charts in the making decision process for VCs, it is possible to mention the following:

“With the limited amount of data that exists concerning the future of the company and the market they strive to penetrate, it is complicated to elaborate a comparable analytical charts or diagrams because even if an entrepreneur defines a market for a product or service, is very common that this approach deviates to a smaller niche within it or broaden over seeking for settling in the most appropriate market. As a result, employment of such tools would be meaningless” (CEO of Venture Capital Firm).

5.3.2. Portfolio Adjustment

Although the balance of the portfolio is not the main goal for respondents’ portfolios (see Table 7), there is still an interest to know how VC firms adjust their portfolios due to its implication with the risk management and its impact on the results. Most of VCs have considered, during the decision making process, what the right balance of projects for their portfolios is, and they prefer to use the experience of decision makers than other tools as pie charts and bubble diagrams to analyze the balance of the portfolio (See Table 9). Another important point to mention is the types of criteria that VC firms judge to balance their portfolio of projects. In the questionnaire, respondents had the possibility to select as many options of criteria they use to balance their portfolio. These criteria are: level of risk, short term vs. long term, and size of the projects. According to the results, the different criteria have an equivalent significance for the VCs when adjusting portfolios (See Table 9).
Table 9. Balance of portfolios in VCs surveyed

<table>
<thead>
<tr>
<th>Have you ever considered what the right balance of projects for your portfolio is?</th>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No answer</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes (Y)</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>No (N)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Non completed</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The tools that you use to ensure the balance of your portfolio are. (Please choose as many as you use).</th>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pie charts</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Bubble diagrams</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Experience of decision makers</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The balance of your portfolio is mainly based on (choose as many options as you consider):</th>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level of risk</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Short term vs. Long term</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Size of the project</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
</tr>
</tbody>
</table>

The arguments extracted from the interview confirm the results presented in Table 9, where there is an interest by the VCs to have a balanced portfolio but its definition depends mostly in the experience of the decision makers. Our interviewee asserted the following:

“There are no set rules or preferences for any specific project, but nevertheless, we seek for a diversified and balanced portfolio across both maturity and our areas of interest. Focusing on only one area is considered unsustainable, but in short, the allocation among projects will vary between both maturity and areas of expertise depending on what the deal flow is” (CEO of Venture Capital Firm).

Regarding strategic alignment goal, the main finding is that most of organizations have defined priority areas according to their strategy when deciding in what kind of projects to invest. Most of the questionnaire respondents admitted to have a strategic priority (See Table 10).
Table 10. Strategic Alignment in VCs

| Do you have priority in strategic areas when deciding in what kind of projects to invest? |
|---------------------------------|---------|
| Answer                          | Count   |
| No answer                       | 0       |
| Yes (Y)                         | 9       |
| No (N)                          | 2       |
| Non completed                   | 2       |

5.3.3. Monitoring and Control

From the data collection, our findings suggest that there is a strict monitoring and control by VC firms over the projects. This control can be evidenced because most of the organizations claim having identified which projects bring more financial resources in the portfolio and which projects have the lowest risk. In general, firms define some milestones in the project life cycle that enable them to decide whether or not continuing funding them (See Table 11).

Table 11. Monitoring and control of VCs portfolios

| Do you know which projects make the most money in your portfolio? |
|---------------------------------------------------------------|---------|
| Answer                                                        | Count   |
| No answer                                                     | 0       |
| Yes (Y)                                                       | 11      |
| No (N)                                                        | 1       |
| Non completed                                                 | 1       |

| Do you know which projects have the lowest risk in your portfolio? |
|------------------------------------------------------------------|---------|
| Answer                                                           | Count   |
| No answer                                                       | 0       |
| Yes (Y)                                                         | 10      |
| No (N)                                                          | 2       |
| Non completed                                                   | 1       |

| Do you define some milestones in the life of your projects to decide whether or not continuing funding them? |
|----------------------------------------------------------------------------------------------------------|---------|
| Answer                                                                                                   | Count   |
| No answer                                                                                                 | 0       |
| Yes (Y)                                                                                                   | 9       |
| No (N)                                                                                                    | 2       |
| Non completed                                                                                             | 2       |

The impressions taken from the interview, related to the monitoring and control phase, are shown below.
In respect to the use of milestones, to decide whether to keep investing or abandon the project, the CEO of the VC firm expresses the following:

“Monitoring and control depends on how the investment has been structured from the beginning. Sometimes, a project owner has a good record of managing finances and they are given the whole amount, however most of the cases work with milestones. Entrepreneurs are given a first lump but will not receive more financial help until they have reached the next milestone, for instance, having signed a contract with a customer, production of prototype, etc. This control also varies depending on the company and its needs like recruitment of special staff likes a CEO, a consultant or a marketing specialist. And therefore, there cannot be a standard procedure to determine milestones” (CEO of Venture Capital Firm).

The board of the organization plays an important role in the monitoring and control phase of the process. Regarding this role, some findings from the interview are shown in the next statement:

“In order to minimize losses resulted from investments on unsuccessful projects; executives from outside the board are allowed to have a seat in it to review and have insight into the projects all the time, and thus this will enable to determine any flaw at a very early stage and make a decision whether to continue, to sell or to liquidate the project. On the other hand, when one or more projects are demonstrating outstanding performance, they tilt the portfolio according to where success is observed, and so the issue of balancing the portfolio becomes quite volatile” (CEO of Venture Capital Firm).

The main criterion used by VCs to decide whether to continue funding an active project or to close it, is clearly market attractiveness. This criterion is the preferred by the questionnaire respondents over other criteria such as strategic fit, technical feasibility and competitive advantage, in order to define the continuity of a project within the portfolio (See Table 12).

Table 12. Criteria used to evaluate the status of active projects in VCs portfolios

<table>
<thead>
<tr>
<th>Please number, in order of importance, the criterion used for the evaluation of the status of active projects in order to keep funding them (1 is the most important and 4 is the least): [Ranking 1]</th>
<th>Answer</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Fit</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Technical Feasibility</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Market attractiveness</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Competitive advantage</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Non completed</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

5.3.4. Successful completion

To measure the level of satisfaction and success of VC firms in their process with New Venture projects, a series of questions were conducted in the questionnaire (See Table
These questions were developed using a rating approach, where the options were organized from one (1) to five (5). The scale of one (1) corresponds to a *Very Low level*, while the scale of five (5) represents a *Very High level*. After making the rating, a weighted average is calculated for each question.

The answers reflect in general a high level of support of the portfolio of New Ventures to the strategy of the firm, and a high level of increase in the value of the portfolio compared with the financial resources spent on it. While there is a medium level of the rate of successful projects within the portfolio as well as the satisfaction that VC firms have with the performance of their portfolios (See table 13).

### Table 13. Level of satisfaction and success of VCs with their portfolios of projects

<table>
<thead>
<tr>
<th></th>
<th>Very Low (1)</th>
<th>Low (2)</th>
<th>Medium (3)</th>
<th>High (4)</th>
<th>Very High (5)</th>
<th>Aver. Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>The support of your portfolio of New Ventures to your business’s strategy is:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>The total value of your portfolio, compared with the money spent on it, is:</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td></td>
<td>3.6</td>
</tr>
<tr>
<td>The rate of successful projects in your portfolio has been:</td>
<td></td>
<td>5</td>
<td>4</td>
<td>1</td>
<td></td>
<td>2.8</td>
</tr>
<tr>
<td>The level of satisfaction with your expectations in success rates and profit performances is:</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td></td>
<td>3.2</td>
</tr>
</tbody>
</table>

### Summary

The development of interviews and questionnaires has yielded different findings in the process of PPM for New Venture projects. Within this process, BIs are responsible in large extent for the ‘feasibility analysis phase’, where the criteria depend on whether the BI is specialized in some areas or if it operates in multiples sectors. In the first case, the criterion corresponds to the need of the projects to meet higher technical demands. While in the second case, the priority consists in achieving diversification of the projects that are involved in the incubation process.

On the other hand, VC firms are primarily responsible for the ‘selection and prioritization phase’ and ‘monitoring and control phase’. The first phase, selection and prioritization, is mainly carried out based on the experience of decision makers than on other tools such as financial indicators, checklists and scorings. Another important aspect of this phase is the portfolio adjustment where clearly there is an interest from VC firms to have a balanced portfolio to minimize risk in their investments. The last phase, Monitoring and Control, demonstrates the use of milestones by VCs to determine whether to continue investing in the projects or close them. Finally, findings related with the completion of the projects were presented, where in general there is a satisfaction with the results in the performance of the VCs, although it also demonstrates a great potential for improvement in the rate of successful projects.
CHAPTER 6

DISCUSSION OF RESULTS

6.1. Introduction

The aim of this chapter is to discuss the results obtained from the empirical findings section (chapter 5) and comparing these findings with the theories and tools found in the literature. This chapter is focused on finding the answers to the research question and to meet the purposes of the research. It starts analyzing the three main parts of the PPM framework for a New Venture Project: feasibility analysis, portfolio selection and prioritization, monitoring and control. The analysis is done through comparing what have been found in the research with what theory and other authors suggest. This analysis ensure an identification of the role of both BIs and VC firms within the PPM process and a recognition of the practical use of PPM tools and methodologies suggested in the literature review (chapter 3). It also facilitates the understanding of the frameworks and tools used in other sectors as R&D and their relation and application in New Venture Project portfolios, and a definition of the set of criteria to select, prioritize and evaluate New Venture projects. At the end, a model proposed by the authors is presented, which is explained step by step and can be adopted by BIs and VC firms in order to improve the PPM process within their organizations.

6.2. Feasibility Analysis

The feasibility analysis corresponds to the stages of pre-screening, individual project analysis and screening of New Venture projects. This phase is mainly undertaken by Business Incubators.

Pre-screening stage:

Business incubators apply a first filter to the new project proposals. Depending on the type of incubators, there is a variation of the strategic areas in which each one focuses. Authors as Grimaldi & Grandi (2005) identify four different types of incubators: Business innovation Centers (BICs), University Business Incubators (UBIs), Independent Private Incubators (IPI), and Corporate Private Incubators (CPIs). The first two types are public incubators while the last two have a private nature. However, in our study we found a new type of hybrid Business Incubators which is a mix between public and private, because they receive funding from governmental organizations but also receive financial resources from contributions such as the rent of their facilities to the entrepreneurs. Empirical evidence shows that generally, except for the case of specialized incubators which are focused in specific areas, any New Venture Project is received at this stage of pre-screening. This finding is especially valid in University Business Incubators (UBIs) and Independent Private Incubators (IPI).
Individual Project Analysis:

In terms of the criteria used by the incubators to analyze and screen New Venture projects, it is possible to argue that they are varied and range from general to specific depending on the type of BI. Our findings indicate that criteria for project assessment can be classified into two levels: micro and macro. Regarding micro level, the analysis is focused in aspects as the idea potential, the management team, innovation level, scalability, novelty and uniqueness, ability to deliver customer value, segment and type of customer targeted. With respect to macro level, most incubators focused their analysis to the quality of the market research carried out, market size and growth, examining competitors and current entry barriers. These findings correspond to the results obtained by Aerts et al. (2007) showing that there is diversity of criteria when analysing projects within Business Incubators.

Regarding the selection of New Venture projects in the incubators, Bergek & Norrman (2008) have classified them into two different criteria: focused primarily on the idea and focused primarily on the entrepreneur or the team. At the same time, they classify the flexibility of these decisions based on two basic approaches: “picking in the winners”, where the incubator managers strive to identify a few potentially successful ventures ex-ante and “survival of the fittest” approach, where incubator managers apply less rigid selection criteria. The result from combining the decision and flexibility criteria is the definition of four different strategies to select New Venture projects within business incubators. These strategies are: survival of the fittest and idea, survival of the fittest and entrepreneur, picking the winners and idea, and picking the winners and entrepreneur. An explanation of these strategies can be found in the section 3.3.3 of this work.

In our research we have found that interviewed Business Incubators usually follow three of the strategies determined by Bergek & Norrman (2008). There are some incubators that follow a ‘survival of the fittest and entrepreneur strategy’ selecting the projects based on a diversification objective and strong driving forces for the teams, other incubators are specialized in specific technological areas, as healthcare and biotech, following a ‘picking the winners and idea strategy’, and the third type of identified incubators follow a ‘survival of the fittest and ideas strategy’ with a strong link with the universities and receiving a quite large number of ideas from students related to different fields. Nevertheless, it was difficult to identify the type of incubators that follow a ‘picking the winners and entrepreneur strategy’ with a portfolio composed of ideas of few handpicked and carefully evaluated entrepreneurs.

Screening:

A study done by Lumpkin & Ireland (1988) suggests that there are four factors to perform the screening of these projects: financial ratios, management team, marketing skills and market factors. Other authors as Aerts et al. (2007) agree with these factors, finding that the most important considered by Business Incubators in the screening stage are the market and the management team. However, they find that in general, European Business Incubators do not screen the projects with a wide and diversified set of criteria using, in many cases, only the business plan and the composition of the team as information to evaluate the projects.
In our study we have found that the screening of New Venture projects depends on the types of incubators and projects. If the incubator is specialized in specific areas, as those focused in healthcare and biotech projects, the feasibility analysis must be concentrated in meeting more complex requirements. While if the incubator follows multiple areas, the main objective must be the diversification of the portfolio. This diversification allows the cooperation and creation of synergies for the projects inside the incubator.

It was also found that generally, decisions about supporting New Venture projects are based mainly on the experience of their own board following checklists procedures. Other tools as financial indicators have a low usability in this analysis, contrasting to what is proposed by Lumpkin & Ireland (1988) who consider the analysis of financial ratios as a main criteria used by Business Incubators. This issue can be justified by the fact that incubators normally do not provide financial support, and their contribution usually correspond to physical space, storage capacity and capacitation.

The process undertaken by the Business Incubators within the PPM process, is very important for the Venture Capital firms, since they are receiving more mature projects in terms of feasibility and preparation which certainly can reduce them costs specially in the evaluation of their potential businesses and finding promising new companies (Eldridge, 2007). Conversely, we have not found a strong link between these two types of organizations. The link only relies on bringing the contact to the entrepreneur to sell the idea to potential investors, but there is not proper guidance in the process and recurrently entrepreneurs have a lack of information of what the Venture Capital firms are expecting. This situation causes VC firms to receive many proposals that do not meet their requirements or that belong to other areas of interest originating high costs in the search and evaluation. And for the entrepreneurs this process is also a disadvantage because it can be discouraging due to the encountered difficulties to convince possible investors (Eldridge, 2007).

Another important aspect to consider is related with the level of investment of VC firms regarding the stage of development of the project. European VCs invest much less in seed and start-up projects and focus more on expansion projects (Eldridge, 2007). This situation leaves many projects without being considered, due to their early stage progress, even if they have the possibility to be successful in the future. The case of United States is different since VCs’ main concern is usually the investment in early stage ventures (Eldridge, 2007). An appropriate way to ensure the success of New Venture projects is integrating in one single organization the role undertaken by both BIs and VCs. This type of integration allows the alignment of the early stage projects fulfilling the needs of VCs and reducing the costs of searching and selection. In our study, we have identified some organizations with these characteristics, but it is necessary to increase their number in Sweden to ensure the support in the development of early stage projects around the country.

In general, based on our findings, we have also identified that the role of Business Incubators within the PPM process of New Venture projects is oriented to the feasibility analysis of the projects and to the support in the maturity of the idea. Other stages in the process such as portfolio prioritization and selection, and monitoring and control, do not have a strong influence from BIs. The selection and prioritization is based mainly on the idea and the management team, using the experience of the decision makers and limitated by resource constraints as physical facilities instead of financial resources. Regarding the monitoring and control, this stage usually consists of meetings between
the business coach and the entrepreneur to define the goals and maintain a continuous update of the project situation. Unlike Business Incubators, VC firms focus more on the stages of selection and prioritization of projects and monitoring and control, rather than on feasibility analysis within the PPM. For this reason the next stages of the PPM process are based on the practices undertaken by VCs on New Venture projects.

6.3. Portfolio Selection and Prioritization

As presented and explained in the previous section, Business Incubators have a main role in the feasibility analysis of New Venture projects within the PPM process, while Venture Capital firms are more concerned about the selection and prioritization of these projects and their monitoring and control. The following section explores the phase of selection and prioritization of New Venture projects linking what we have found in our research with what other authors propose through different studies and theories. This phase can be divided into two stages: optimal portfolio selection and portfolio adjustment. The first one corresponds to the selection of projects that ensure a value maximization and strategic alignment of the portfolio, while the second stage refers to achieve a balance in the portfolio.

Optimal portfolio selection:

Cooper et al. (2000) argue that the goals of PPM are three: value maximization, balance of the portfolio and strategic direction. In our results can be noticed a clear trend of value maximization of portfolios as main goal for the VCs when they are selecting and prioritizing New Venture projects in their portfolios; yet this selection needs to be aligned to some strategic directions as specific areas and specific types of projects. From our findings, it can be asserted that having a balanced portfolio is not as important goal as the other two goals for the VCs interviewed or surveyed.

Regarding the tools that managers use to select and prioritize projects according to every goal, it is possible to mention financial tools, scorings and checklists to ensure value maximization of the portfolio (Cooper et al., 2001); strategic buckets model (Cooper et al., 1997b) to reach an alignment with the strategies; and Bubble Diagrams (Hsuan, 2001) or Pie charts to achieve a balanced portfolio. However, there is another “tool” that is mainly used by managers to select and prioritize projects in an overall point of view in the search of accomplishing simultaneously the three PPM goals. This “tool” is the Experience, and can be classified in three types: experience intensity, experience diversity and acquisitive experience (Yang et al., 2009). Below is outlined how managers actually use these tools in practice, as well as a comparison between this identified practical use and what other authors suggest in existing literature.

Experience of decision makers was identified by the majority of Venture Capital firms in our sample as the most important instrument used to select and prioritize their portfolios. These organizations agree to consider the opinions of senior people and key decision makers in order to make project decisions above other tools and instruments. According to Yang et al. (2009), this experience can be gained through the repetitions in the learning by doing (experience intensity), solving a diverse range of problems associated with subjects of interest (experience diversity), and borrowing experience
from others (acquisitive experience). In general individuals in charge of making the decisions, which normally is the board of the VC firms, have been working in this industry for a long time, and thus they have had the opportunity to gain experience simultaneously through the three different ways previously cited.

These experiences are useful to develop a selection capability, which is the ability to identify portfolio companies with high financial return potential in the short and long-term, and a valuation capability, ability to evaluate portfolio companies in an accurate way in terms of quality and to reach a fair negotiation (Yang et al., 2009). Selection capability is present within the portfolio if it maintains a satisfactory financial performance and more strategic benefits are generated by the investments (Yang et al., 2009). On the other hand, valuation capability is better when the VCs programs assign to its portfolio a lower value (Yang et al., 2009). We consider that in the stage of New Venture projects selection, having people with high selection capability is essential for VC firms, especially because this ensures effective compliance with the objectives of value maximization and strategic alignment, which in turn are the main goals in their portfolios. Alternatively, the valuation capability is more useful for the stage of adjustment of the portfolio, when deciding where to invest based on resources constraints. Both capabilities are necessary in the decision process, to make an effective PPM of New Venture projects.

Understanding that experience is the most important tool to select and prioritize projects, it is interesting to know what is the use that VC firms do in relation with their specific goals of value maximization and strategic alignment.

In terms of value maximization of the portfolio, from the tools suggested by Cooper et al. (2001), VC firms mainly use financial indicators and checklists to select and prioritize their projects. On the other hand, there is not a very frequent use of scorings in this part of the process. In relation to the strategic alignment goal, most of the VCs have defined the priority areas according to their strategy when are deciding in what type of projects to invest. This fact supports the model proposed by Cooper et al. (1997b) of Strategic Buckets where organizations make decisions and prioritize according to their strategic dimensions and determe the total amount that will be spent in each bucket of projects.

**Portfolio Adjustment:**

Even though reaching a balance of the portfolio is not the main goal for VC firms, most of them admitted to have considered the right balance of their portfolios at least once, and this balance is attained according to different criteria as: level of risk, term and size of the projects. In addition to experience, in our findings, VCs also use pie charts and bubble diagrams. A useful tool that these organizations could use in the future regarding the balance of their portfolios is the matrix proposed by Hsuan (2001) which is developed based on two criteria: competitive advantage of a firm and benefits provided to customers. For every set of projects, there is a set of competitive advantages and benefits they may bring to customers. The matrix is divided in four types of projects: STARs have a high competitive advantage and high benefits to customers, FLOPs offer no competitive advantage and limited ability to bring benefits to customers, FADs are characterized by high benefits to customers but weak competitive advantages and SNOBs are characterized by high competitive advantages but unable to fully meet
customer needs. A balanced portfolio should contain a variety of projects that enable VC firms to achieve the growth and profit objectives aligned with its strategy without taking unnecessary risk. Hsuan (2001) suggests that a balanced portfolio should contain STARs, FADs, SNOBs and sometimes FLOPs. This could apply for companies that running R&D projects, but in the case of VCs is more convenient to balance their portfolio investing in FADs and STARs. FADs are important because they can provide high revenues without having the risks of being first movers, while STARs bring the highest revenues from successful innovations or products. SNOBs could be recommended in some cases, but they take more time and require high investments to become STARs; as it was stated in the empirical findings section, in most of the cases VC firms have a policy of exit between three (3) to five (5) years, which is certainly not enough time to be successful in this transformation process. An explanation of the characteristics of this matrix and the types of projects can be found in the section 3.3.3.

6.4. Monitoring and Control

Monitoring and control of New Venture projects is made mostly by Venture Capital firms and correspond to the project development, the gate evaluation and its successful completion or failure. This can be argued as the monitoring and control by Business Incubators usually consists of a first meeting, where the goals and meetings are set, and then consecutive meetings are held to maintain a continuous update of the project progress. Although these milestones are set, incubators prefer to preserve flexibility and provide entrepreneurs some relative freedom to decide on how to develop their projects. In the case of Venture Capital firms there is a more strict control. This control consists in defining specific milestones in terms of results and some conditions in terms of the level of investment to decide whether or not continuing funding the projects. If the project accomplishes the results during the milestone, VCs are going to be willing to invest more capital to start a new stage, but in the case the project cannot meet the goals set the VC firm decides either to terminate or suspend the project and redefine new goals and deadlines.

This approach of monitoring and control clearly follows the model proposed by Cooper et al. (2000) known as Stage-Gate process. The Stage-Gate process is composed by stages that are separated by a decision point called gate; at the end of each gate, a cross functional team evaluates the status of active projects within the portfolio, making effective Go/Kill decisions based on a list of criteria such strategic fit, technical feasibility, marketing attractiveness and competitive advantage. In the case of the VC firms from our sample, the main criterion used in this decision point is the market attractiveness of the project. These stages can be divided in four: seed finance, start-up finance, expansion finance and later stage finance (Bottazzi & Da Rin, 2002). Seed finance is related to small investments to verify if the project is feasible and economically attractive, start-up finance is applicable to the investment focused on the organization and definition of corporate strategy, expansion finance is made to reach industrial-scale production and, finally, the later stage finance helps the firm to become a market leader and unleash its earnings.

The exit stage, within the PPM process, corresponds to the moment when the Venture Capital firm decides to withdraw its participation in the New Venture Project. In this part of the process, it is expected to have established a new company within the
portfolio. This exit can be done due to two possible scenarios: the *successful completion of the project*, which corresponds to have a new company with the possibility to offer the expected return of the investment and fulfil the expected objectives established by the VC firm; or the *failure of the project*, which occurs when the new company cannot accomplish the VC expected goals. If there is a successful completion of the project, VCs may exercise their exit from the project in four different ways: (i) Initial Public Offering (IPO), when the new company is offered in a public sale on an established market through the issuance of shares, (ii) Acquisition, when the whole new company is sold to another company, (iii) Secondary sale, when the VC sells its participation in the new company only, and (iv) Buyback or MBO, when either the entrepreneur or the management of the new company buys back the VC participation (Isaksson, 2000). If there is a failure of the project, the VC firm may decide to reconstruct, liquidate or declare bankruptcy of the new company (Isaksson, 2000). Our findings suggest that, in the VCs surveyed, there is a high level of increase in the value of the portfolio compared with the money invested on it; and there is a medium level of satisfaction with the performance of their portfolios in terms of the rate of successful projects. These findings allow arguing the need for a model that supports in an appropriate way the management of New Venture projects portfolio in terms of selection and control thus ensuring greater success in a better satisfaction and performance for the VCs.

In the previous sections, it has been given an analysis that contributes in finding an answer for the research question of *How do Business Incubators and Ventures Capital firms in Sweden manage issues as the selection and control of their portfolios of New Ventures projects?*. The selection and control of the portfolios of New Venture projects is clearly explained in the analysis based on our findings. The management involves all the process form the moment the Business Incubator receives project proposals until the moment the VC firm decides to abandon the project. This management is explained more deeply in the section 6.5, where our proposed model is described step by step.

6.5. Our proposed model

As a result of the findings from this descriptive study and based on the review of literature, it is possible to recommend a model of Project Portfolio Management for New Venture projects. This model is developed in the two types of organizations studied: Business Incubators and Venture Capital firms. BIs develop the first phase of the process which is known as *Feasibility Analysis*, consisting in three steps: pre-screening, individual project analysis and screening. VC firms undertake the second and third phases in the process. The second phase is the most important in the process and consists in the *selection and prioritization* of the projects, while the last one is *monitoring and control* of the projects within the portfolio to ensure their successful completion or the decision to leave the projects. This model adds value because allows to understand how is the management process of New Venture projects portfolio in a conceptual framework. In this manner, it is possible to understand, in a more descriptive way, how is the selection and control of this type of portfolios based on the combination of two approaches: first, the tools and methodologies for PPM of R&D projects, and second, studies carried out within BIs and VCs that are related with specific stages in the process. This better understanding of the process, which has not been possible to find in other models, helps in filling the gap that has existed between the application of PPM tools and methodologies and the New Venture projects management. It is expected that managers and the other key actors who make decisions in both BIs and VC firms.
can use this model as a guide, not only following the process but also using the tools that are suggested within the framework besides their experience. At the end, the implementation of our proposed model can be an useful support to ensure the development and maturation of the New Ventures sector, not only in Sweden but also in other countries. A detailed explanation of our model is done below and it is shown in the figure 15.

The PPM process follows the next steps:

1. *Project Proposals:* Business Incubators receive proposals for new projects with innovative business ideas. These projects come from different sources such as students, teachers or professionals with experience in the field.

2. *Pre-screening:* Business Incubators set some priorities in deciding what projects to consider and to make a feasibility analysis. These priorities are set depending on the type of Business Incubator. If they are specialized in specific areas such as IT or biotechnology, for example, priority will be receiving projects related to these areas. On the other hand, if the BIs accept proposals from different areas, their interest will be focused on obtaining a diversification of projects, so that they can complement and achieve a synergy between them.

3. *Individual project analysis:* The individual analysis of projects is not only based on the evaluation of the idea but the project team. This analysis can be divided into two levels: micro and macro. The criteria for evaluating projects at the micro level are potential idea, level of innovation, novelty and uniqueness, the type of client and the ability to create value. At the macro level, BIs focus on market research in terms of size and growth potential, existing competitors and entry barriers in the industry.

4. *Screening:* The screening of Business Incubators depends on the selection strategies they have set. Bergek & Norrman (2008) propose a model consisting of four (4) strategies for identifying projects to be supported in the BIs. These strategies depend on whether the focus is primarily on the idea or if it is primarily on the entrepreneur or team. It is therefore recommended to BIs to identify which type of strategy is being followed, and whether this strategy suits their needs. These strategies are explained in a deeper way in section 3.4.2 and figure 9.

In the case of VC firms, the ideal is not investing resources to do the screening of projects. It is expected that the result of work from BIs is to have a developed and mature enough project to meet their requirements. To attain this expectation, there should be a very close relationship between VCs and BIs, which is not only limited to a funding relationship, but a complete link where the incubation process is generated initially in order to fully meet the requirements of the VC firms.

5. *Optimal Portfolio Selection:* BIs make a selection of projects that will be supported by the provision of resources such as facilities and advice. This part of the process is done according to the availability of these resources and it is provided if the project meets the expected criteria in the screening
stage. However, the optimal portfolio selection is much more critical in the work being performed by VC firms. The model proposes VCs to base their decisions not only on the use of the experience but also looking to use some tools to meet three key objectives in their portfolios: value maximization, strategic alignment and balance of portfolio.

Regarding the experience, VCs are advised to use the model proposed by Yang et al. (2009) concerning the selection and valuation of a capabilities (See section 3.4.2 and Figure 10). In order to optimize the portfolio in terms of value maximization, we recommend using tools such as financial tools, scorings, and checklists. While to ensure alignment with the strategies, we recommend using the Strategic Bucket Model proposed by Cooper et al. (1997b) (See Section 3.3.3 and Figure 6).

6. **Portfolio Adjustment:** The adjustment in the VC firms’ portfolio is based on maintaining a balanced portfolio of projects. This balance can be analyzed using tools such as the matrix proposed by Hsuan (2001) which allows evaluating the projects based on two criteria: competitive Advantage of a firm and benefits provided to customers. (See section 3.3.3)

7. **Project Development and Monitoring and Control:** The project development is accompanied by a permanent monitoring and control executed by the VCs. This stage is based on the model proposed by Cooper et al. (2000) which is known as the Stage-Gate process. As the project reaches a new stage, it is necessary to invest additional capital; otherwise VC firms redefine project goals and milestones, or simply abandon it.

8. **Successful completion or failure:** VCs usually have policies to exit these projects within a time horizon of 3 up to 5 years. These exits can be done in several ways: (i) Initial Public Offering (IPO), (ii) trade sale, (iii) secondary sell, (iv) Buy back and, in case of failure, (v) reconstruction, liquidation or bankruptcy. (Isaksson, 2000)
Figure 15. Project Portfolio Management model of New Venture projects

Source: Authors
CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1. Introduction

This chapter presents the conclusions obtained from our research. It starts with general conclusions in order to answer the research question and to meet the purposes of the research. Then, it is followed by the main contributions of this study compared with other previous studies and a description of the limitations encountered during the research process. Finally, some recommendations are specified for Business Incubators and Venture Capital firms and some suggestions for future research are presented.

7.2. General Conclusions

To answer the research question of *How do Business Incubators and Ventures Capital firms in Sweden manage issues as the selection and control of their portfolios of New Ventures projects?*, it is necessary to establish the general conclusions for each of the purposes of this study. It is expected that meeting all of these purposes, we can have an answer for this research question. These general conclusions are shown below:

*Identification of the role of both Business Incubators and Venture Capitals firms within the entire process of PPM:*

The PPM of New Venture projects, normally is undertaken by two types of organizations: Business Incubators and Venture Capital firms. This is a clear distinction with the other studies for PPM which are strictly focused on how the project portfolio is managed inside only one organization. The main contribution of BIs in this framework is in the feasibility analysis of the projects and the support for their development and growth, so they can be attractive for future investors as the Venture Capital firms. VC firms usually are more focused on the selection and prioritization of these projects for their portfolio and monitoring and control.

Once Business Incubators have finished the feasibility analysis and have supported the projects to be developed and attain more maturity, the next step is to find possible investors that can provide more capital. This process done by BIs is very important for Venture Capital firms, because it allows them to receive more mature projects in terms of feasibility and preparation (Eldridge, 2007); however, our findings showed that there is a feeble link between these two organizations. Business Incubator contacts the entrepreneur with the Venture Capital firm, but there is a lack in the transition related to the guidance in this process for the entrepreneurs and that by themselves is complex to acquire knowledge about what are the criteria considered by VCs when deciding to invest or not. This lack in the transition can be solved, if the BIs and VCs work more aligned, and in some cases they could merge in one organization that offers the entrepreneurs all the stages in the PPM process. Another issue is that in Europe, VC firms invest less in seed and start-up projects and focus more on expansion projects (Eldridge, 2007), leaving many potential successful projects in the edge. Nevertheless,
in Sweden there is a higher interest from VC industry, of focusing more in early stage investments in areas as IT and biomedicine (Cetindamar & Jacobsson, 2000).

**Practical use of PPM tools and methodologies suggested by the literature:**

In practice, the PPM process is managed mainly based on the experience of the decision makers than on the use of the tools suggested by theory. However, we consider that the use of our recommended framework and the tools suggested by the literature could be an important complement to the use of this experience. This importance lies in the effective support that those tools can offer especially in the selection and prioritization of New Venture projects. Tools such as scorings, checklists and financial indicators can contribute to the value maximization of the portfolios, while the use of the strategic bucket model developed by Cooper et al. (1997b) can facilitate the alignment of the portfolio with the strategies, and finally the bubble diagrams matrix (Hsuan, 2001) could be useful to achieve a balanced portfolio. In the case of monitoring and control, it is clear the use of the Stage-Gate model (Cooper et al., 2000) by VC firms, although these organizations do not identify the model, in practice they use it when deciding whether to continue or kill a project in the portfolio.

Although there is a general satisfaction with the results obtained, in terms of the successful completion of these projects, we still consider that the use of these tools is important because the Swedish VC industry is not mature yet (Cetindamar & Jacobsson, 2000).

**Frameworks and tools used in other sectors, as R&D projects portfolios, their relation and application in portfolios of New Venture projects:**

The PPM approach for New Venture projects differs from the approach suggested by authors such as Archer & Ghasemzadeh (1999), Cooper et al. (1997b) and Spradlin & Kutoloski (1999). The main reason to describe this difference is that in the field of New Ventures projects, the required management approaches are not the same from those in the traditional ones. They include a combination of trial and error learning, and running multiple parallel trials to choose the best performing approach expost (Loch et al., 2008). Nevertheless, it is possible to link this type of projects with R&D projects characterized by high market and technical uncertainties. This link allows the use of many PPM theories that have been developed in the R&D sectors, due to the fact that these industries are characterized by high uncertainty and the pressure to innovate, which provides the motivation for the use of tools to evaluate and manage the portfolio of projects in the organization (Chien, 2002).

**Set of criteria to select, prioritize and evaluate New Venture projects:**

The criteria used to conduct a feasibility analysis depend on the type of incubator and the type of project. In the case of specialized incubators and high technically intensive projects, the analysis is more focused on how the project meets complex requirements. While, if the incubator is multipurpose, the main criterion to consider is the possibility of diversification that the project can bring inside the structure of the organization. Our
findings show that the criteria for project feasibility analysis can be classified into two levels: micro and macro. Regarding micro level, the analysis is focused on aspects as the potential of the idea, the management team, innovation level, scalability, novelty and uniqueness, ability to deliver customer value, segment and type of customer. Regarding macro level, most incubators focused their analysis to the quality of the market research carried out, market size and growth, competitors and current entry barriers. As it is possible to observe, there is a diversity of criteria used by Business Incubators in Sweden when analyzing the feasibility of projects. This finding is aligned with the study done by Aerts et al. (2007), who demonstrate that European incubators do not screen their potential tenants on a wide and diversified set of criteria.

In terms of monitoring and control, it is clear that VC firms in Sweden follow a Stage-Gate process, which is composed by stages and at the end of each one a team evaluates the status of the active projects within the portfolio. VCs set some milestones according to four stages of funding: seed finance, start-up finance, expansion finance and later stage finance (Bottazzi & Da Rin, 2002), and every time the project meets the goals in every milestone the investment continues until the next stage. If the project does not meet the goals, the decision would be to liquidate the project or reevaluate the goals. Something interesting occurs when the project is passing to a new stage, the need for financial resources increases, and that is why monitoring and control is crucial for the accomplishment of the goals in the VCs portfolio, which are mainly value maximization and strategic alignment.

**Importance of our conceptual model for an optimal portfolio management of New Venture projects:**

Our conceptual model helps in the understanding of how is the management process of New Venture projects portfolio. This description is based on the combination of two approaches: first, the tools and methodologies for PPM of R&D projects, and second, studies done within BIs and VCs that are related with specific stages in the process. Managers and other key actors who make decisions in both BIs and VC firms can use this model as a guide in the process using the suggested tools besides their own experience. This implementation could be useful to ensure the development and maturation of the New Ventures sector in Sweden.

**7.3. Contribution of the study**

This study contributes to the understanding of how project portfolio of New Venture projects is managed. This understanding is assumed using two different approaches: linking New Ventures projects with R&D projects that have high technical and market uncertainty (Mac Millan & Gunther, Crafting R&D Project Portfolios, 2000), and examining studies focused on Business Incubators and Venture Capital firms related to specific stages of the model proposed by Archer & Ghasemzadeh (1999) as screening, selection and monitoring for New Ventures.

Although it is possible to find studies in Sweden related with the New Venture projects framework, it was not possible to find any study focused on all the process since the moment of submitting the project proposal, doing the feasibility analysis, selecting the
projects and at the end the monitoring and control of those New Venture projects. We perform a descriptive study in Sweden to understand how is the PPM process for New Ventures since the moment where the business proposals are submitted to the Business Incubators until the moment the early stage Venture Capital firms exit the new start-up.

This study also contributes to the development of the Venture Capital market in Sweden, which is not mature yet (Cetindamar & Jacobsson, 2000), through a proposed model that was developed by the authors of this thesis. This model is based on the framework recommended by Archer & Ghasemzadeh (1999) and complemented with some PPM tools suggested by Cooper et al. (1997b, 2000), Hsuan (2001), Bergek & Norrman (2008) and Yang et al. (2009). (See Figure 15, p. 64)

7.4. Limitations of the study

This is a descriptive study, characterized by constraints on time and resources. Due to these restrictions, there are some limitations in the study that have to be considered by the readers. These limitations are clarified below:

(i) The interviews were conducted in organizations from the same region in Sweden. For this reason, we tried to reach out to organizations in other regions of the country through online self-administered questionnaires. However, the response rate to these questionnaires was not very high.

(ii) The research has been conducted only in BIs and VC firms from Sweden to develop our conceptual model. But we believe it is better to start a descriptive study focused on a specific target as Sweden and then replicate the study to other geographical areas.

7.5. Recommendations for BIs and VCs

Although there is a good dynamic in the sector of New Venture projects in Sweden, it is still under development to be more mature. Given the fact that these projects are structured, developed and implemented in two different organizations, such as BIs and VC firms, a proper coordination between them is necessary. This coordination ensures the success of these projects and the compliance of the requirements established by VCs after completing the incubation process. This situation can be improved through two alternatives. The first concerns the integration of the two organizations into only one that can handle the whole process of PPM, which begins from the submission of proposals and ends when the VCs decide to exit the new company. The second alternative is continuing the same dynamic of the sector, but with VC firms focusing more on investments in early stages of development of these New Venture projects. Regarding the second option, the industry in Sweden has an advantage which is that VCs are increasingly more focused on providing seed and start-up capitals (Cetindamar & Jacobsson, 2000), while in the rest of Europe most VCs are specialized on providing expansion capital (Eldridge, 2007).
We believe that the use of additional tools, besides the experience of decision makers, can be an important booster for the PPM process, contributing in the development and maturity that the BI and VC sector in Sweden requires (Cetindamar & Jacobsson, 2000).

7.6. Further research directions

This research took a first step towards understanding the dynamics of New Venture projects within the framework of PPM. The next step consists in raising the awareness of this perspective within the Business Incubators and Venture Capitals. This awareness will allow BIs and VCs in Sweden to employ the tools and model suggested, therefore in the future it will be possible to replicate this study and make comparisons between the current situation and the scenario after having implemented the model.

No definitive conclusions can be made with this study because of its descriptive nature. As Saunders et al. (2007) argument, descriptive studies are thought more as means to an end rather than the end itself. For this reason we recommend for future research further this area. This deepening can be done through an explanatory study. However, to undertake this explanatory study it is necessary to obtain a larger sample which allows the use of a proper statistical analysis in order to test the findings presented in this study.

This research was undertaken exclusively in Sweden. Hence, for future research it would be opportune to spread the study to other countries and make comparisons among them. This comparison will allow to ascertain whether the practices provided in this study applies only for the special case of Sweden or if these findings are more related with the industry than with a particular country.

Finally, it is also possible to study in depth what are the consequences and differences of applying PPM in the context of the different types of Business Incubators and Venture Capital firms. In this study we provide a general description of the PPM in both types of organizations, but we do not delve, for example, into understanding if there are differences in the process in the case the BIs are public, private or hybrid.
REFERENCES


APPENDICES

APPENDIX 1. Interview guide with CEO of Venture Capital

Screening
- What kind of parameters do you usually consider for assessing the feasibility of a project?
- How do you obtain the information for computing these parameters?
- Prior to selection stage of the projects, do you apply a previous filter? How? Which criteria do you use?
- Within your portfolio, are there any projects considered required or mandatory to support other projects still being considered?

Optimal project selection
- What are the main goals with your portfolio of projects?
- Which tools do you use to ensure the maximization of the value of your portfolio?
- How do you ensure the strategic alignment of the projects with the vision of the Capital Venture? Do you use any tools?

Portfolio Adjustment
- How is your portfolio composed? How do you balance your portfolio? Are there any tools you use?

Strategic Buckets (Cooper)
- Do you have any priority when deciding in what kind of projects to invest? Any strategic areas? If yes, why those areas?
- Do you have any pre-set budget to invest in each area?
- Do you use the same criteria to select the projects in different areas?
- How do you carry out the prioritization and selection of the projects?

Monitoring and Control
- How do you determine the value of your portfolio and the level of risk?
- How do you monitor and control the projects in your portfolio? Any methodology or tool?
- What are the milestones to be met to decide whether or not continuing funding the projects?
- How do you evaluate the status of active projects to decide whether to continue or abandon the project? Are there any criteria you use?
APPENDIX 2. Interview guide with manager of Business Incubator

- Do you have any priority when deciding in what kind of business ideas to support? Any strategic areas? If yes, why those areas?
- What kind of parameters do you usually consider for assessing the feasibility of a project?
- Prior to project selection stage, do you apply a previous filter? How? Which criteria do you use?
- Are there any resource limitations to conduct the project selection?
- Do you employ some tools to support the decision process of selecting projects? What kind of tools?
- After selecting the project, how is the following procedure, which are the subsequent phases and how is management of them?
- How do you support projects to obtain funding?
- How do you evaluate the status of active projects to decide whether to continue or abandon the project? Are there any criteria you use?
- From past experiences, how successful have been the projects promoted by the Business Incubator?
- What sorts of coming challenges have been sighted for the New Ventures and the incubators?
APPENDIX 3. Interview guide with business coach of Business Incubator

- How is the business coach process done?
- How is the feasibility analysis of the projects done?
- What kind of parameters do you usually consider for assessing the feasibility of a project?
- Do all the business coaches use the same parameters to analyze the projects? Or are they different according to the sector?
- How do you obtain the information for computing these parameters?
- Prior to selection stage of the projects, do you apply a previous filter? How? Which criteria do you use?
- Are there any resources limitations to select the projects?
- Do you use some tools to support the decision process of selecting projects? What kind of tools?
- After selecting the project, how is the following and management of it?
- When the project is selected, is there any department or person that manages the portfolio of different projects?
- What kind of support do you give to the venture projects?
- How do you help projects to get funding?
- How successful have been the projects promoted by the incubator?
- What kind of challenges have you seen for the New Venture projects and the incubator?
APPENDIX 4. Covering Letter for the questionnaire (Venture Capitals)

Portfolio management of venture projects

This survey is part of a research project, developed by the Umeå School of Business (USBE), in the program of Master in Strategic Project Management European (MSPME) to understand better what are the management practices of the portfolio of projects in venture capitals. We would greatly appreciate your contribution to this study. Please answer the questions freely. Your responses are used only for academic purposes and they will not be given to any other organization. All the information you provide will be treated in the strictest confidence.

The questionnaire should take you about five (5) minutes to complete.

We hope you find completing the questionnaire enjoyable, and thank you for taking the time to help us with this research project. If you have any queries or would like further information about this project, please contact us on juca0004@student.umu.se or caju0007@student.umu.se.

The questionnaire can be found in the following link:
http://survey.usbe.umu.se/students/index.php?sid=94743&lang=en

Thank you for your help.

Juan Camilo Arbeláez and Carlos Centeno Burbano
Master in Strategic Project Management European (MSPME) (www.mspme.org)
Umeå School of Business (USBE)
Umeå University
APPENDIX 5. Covering Letter for the questionnaire (Business Incubators)

Analysis of venture projects within Business Incubators

This survey is part of a research project, developed by the Umeå School of Business (USBE), in the program of Master in Strategic Project Management European (MSPME) to understand better what the management practices of venture projects in Business Incubators are. We would greatly appreciate your contribution to this study. Please answer the questions freely. Your responses are used only for academic purposes and they will not be given to any other organization. All the information you provide will be treated in the strictest confidence.

The questionnaire should take you about five (5) minutes to complete.

We hope you find completing the questionnaire enjoyable, and thank you for taking the time to help us with this research project. If you have any queries or would like further information about this project, please contact us on juca0004@student.umu.se or caju0007@student.umu.se.

The questionnaire can be found in the following link:
http://survey.usbe.umu.se/students/index.php?sid=44553&lang=en

Thank you for your help.

Juan Camilo Arbeláez and Carlos Centeno Burbano
Master in Strategic Project Management European (MSPME) (www.mspme.org)
Umeå School of Business (USBE)
Umeå University
APPENDIX 6. Survey questionnaire for Venture Capitals

**Project Portfolio Management within Venture Capitals**

**Venture Capitals**
Companies that provide financial capital to projects in early-stage and with high-potential growth.

* q1: Are opinions of senior people and key decision-makers in your business captured in order to make project decisions?

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* q2: Have you ever considered what the right balance of projects for your portfolio is?

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* q3: Do you know which projects make the most money in your portfolio?

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* q4: Do you know which projects have the lowest risk in your portfolio?

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* q5: Do you have priority in strategic areas when deciding in what kind of projects to invest?

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* q6: Do you define some milestones in the life of your projects to decide whether or not continuing funding them?

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* q7: Please number, in order of importance, the main goals when making decisions and managing your portfolio of projects. (1 is the most important and 3 is the least).
Please number each box in order of preference from 1 to 3

- Value Maximization
- Balance of the Portfolio
- Strategic alignment

* q8:

Please number each box in order of importance, the criterion used for the evaluation of the status of active projects in order to keep funding them (1 is the most important and 4 is the least):

- Please number each box in order of preference from 1 to 4
  - Strategic Fit
  - Technical Feasibility
  - Market attractiveness
  - Competitive advantage

* q9: The tools that you use for the prioritization and selection of New Venture projects in your portfolio are. (Please choose as many tools as you use).

Please choose *all* that apply:

- Financial Indicators
- Checklists
- Scorings
- Experience of decision makers
- Other:

[Only answer this question if you answered 'Yes' to question 'q2 ']

* q10: The tools that you use to ensure the balance of your portfolio are. (Please choose as many as you use).

Please choose *all* that apply:

- Pie charts
- Bubble diagrams
- Experience of decision makers
- Other:

[Only answer this question if you answered 'Yes' to question 'q2 ']  

* q11: The balance of your portfolio is mainly based on (choose as many options as you consider):

Please choose *all* that apply:

- Level of risk
- Short term vs. Long term
- Size of the project
- Other:
* q12: The support of your portfolio of New Ventures to your business’s strategy is:

Please choose *only one* of the following:

- Very High
- High
- Medium
- Low
- Very Low

* q13: The total value of your portfolio, compared with the money spent on it, is:

Please choose *only one* of the following:

- Very High
- High
- Medium
- Low
- Very Low

* q14: The rate of successful projects in your portfolio has been:

Please choose *only one* of the following:

- Very High (More than 80%)
- High (60% to 80%)
- Medium (40% to 60%)
- Low (30% to 40%)
- Very Low (Less than 30%)

* q15: The level of satisfaction with your expectations in success rates and profit performances is:

Please choose *only one* of the following:

- Very High
- High
- Medium
- Low
- Very Low

Submit your survey.
Thank you for completing this survey.
APPENDIX 7. Survey questionnaire for Business Incubators

Analysis of venture projects in Business Incubators

| Business Incubators | Organizations designed to accelerate the successful development of entrepreneurial companies through business support resources and services, offered both in the incubator and through its network of contacts. |

* q1: The type of projects that your organization mostly work with are:

Please choose *all* that apply:
- Biotech projects
- IT projects
- Health care projects
- Services industry projects
- There is not a specific focus in type of projects

Other: [ ]

* q2: The criteria for prioritization of Business Ideas (projects) you mostly use in the organization are:

Please choose *all* that apply:
- Project Uniqueness
- Targeted to focus on unexploited markets
- Allows a greater competitive advantage
- Low resource consumption
- Technical feasibility

Other: [ ]

* q3: The tools you use in your organization for prioritizing projects are:

Please choose *all* that apply:
- Financial indicators
- Checklists
- Scorings
- Experience of decisions makers
- No tools are used to prioritize projects

Other: [ ]

* q4: The approach of making the decision to choose which project to support and which to select after feasibility analysis is:
Please choose *only one* of the following:

- Bottom up (involvement of all business coaches)
- Top down (Board of director)
- Both

* q5: What you consider the major challenges of the business idea to develop and become actual companies are?

Please choose *all* that apply:

- Setting up proper organizational structure
- Obtaining fundraising for long term projects
- Commitment of the project owner to bring the idea through each developing stage
- Finding business partners
- Legal compliances

Other:

* q6: Please rank, in terms of relevance, the types of support you provide as organization for crystallizing the Business Ideas (1 is the most relevant and 5 is the least):

Please number each box in order of preference from 1 to 5

- Active fundraising support
- Provide expertise coaching through the development of the project
- Establishing contacts and network access
- Legal support
- Training and seminars

* q7: In your consideration, the current most common reasons of project inactivity and consequent failure are:

Please choose *all* that apply:

- Loss of focus from original project
- Failure to meet milestones
- Waste of resources

Other:

* q8: The background of executives in charge of coaching the business ideas mostly is:

Please choose *only one* of the following:

- Academic coaches
- Practitioner coaches

* q9: Is the Project Portfolio Management discipline used within your organization to manage the business ideas?

Please choose *only one* of the following:
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>q9</td>
<td>[ ] Yes [ ] No</td>
</tr>
</tbody>
</table>

[Only answer this question if you answered 'Yes' to question 'q9']

* q10: The importance of using Project Portfolio Management to select business ideas in your organization is:
  - [ ] Irrelevant
  - [ ] Moderately relevant
  - [ ] Relevant
  - [ ] Highly relevant

[Only answer this question if you answered 'No' to question 'q9']

* q11: Do all business coaches use the same parameters to analyze the projects?
  - [ ] Yes
  - [ ] No

* q12: How successful would you consider has been the performance of projects promoted by your organization?
  - [ ] Very High (More than 80%)
  - [ ] High (60% to 80%)
  - [ ] Medium (40% to 60%)
  - [ ] Low (30% to 40%)
  - [ ] Very Low (Less than 30%)

Submit your survey.
Thank you for completing this survey..