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# The effects of Venture Capital non-financial aid on the exit value of European Entrepreneurial Ventures

AN EMPIRICAL STUDY DONE ON THE NON-FINANCIAL EFFECTS OF VENTURE CAPITAL

Name Student: Daan Hofs

Student ID Number: 526771

Supervisor: PhD Jorn Zenhorst

Second Assessor:

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## Executive Summary

Venture Capital (VC) is the optimal source of financing for many entrepreneurs who are looking to spur growth and enter a new market or segment. The close interaction between an entrepreneurial venture (EV) and VC firms allows for an optimal exchange of resources and information. What distinguishes VC from other forms of financing is not only the monetary investment and the close interaction with an EV but also the types of non-financial aid each VC firm specializes in. Current literature has identified that these types of non-financial aid include specializations in operating activities, mentoring activities, strategizing activities, consulting activities, mandating activities, networking, recruiting, and legitimation. Although each form of non-financial aid can be categorized based on this classification, little is known about the individual effects of each type of non-financial aid and in which ways this influences the final exit value of an EV. Especially in Europe where VC investing is less developed compared to its counterpart in the US, it is important to understand how the types of non-financial aid influence an EV to further stimulate innovation. Therefore, this paper aims to answer the research question: *How does the non-financial support of Venture Capital firms influence the exit value of entrepreneurial ventures in Europe?*

To answer the research question, theoretical sub-questions which evaluate the current literature on VC deals are also reviewed. The first theoretical sub-question asked: what entails entrepreneurial ventures? Existing literature identified that many entrepreneurs are prone to have an entrepreneurial orientation that can lead them to only relinquish a larger share of their enterprise if the benefit/investment is large enough. This led to the first hypothesis: *There exists a significant positive effect of the size of the VC investment on the exit value of the EV.* The second theoretical sub-question asked: what entails venture capital? A VC investment entails both financial and non-financial aid including a network of experts in a specific field or industry. When the VC industry specialization matches that of the EV this would cause larger returns than when this is not the case and therefore the second hypothesis is: *There exists a significant positive effect of the industry specialization of the VC on the exit value of the EV when this matches the industry in which the EV operates.* When evaluating the next theoretical sub-question: what entails venture capital financial support, it was found that VC firms make use of incremental and/or lump sum investments to optimize the return of their investment as well. This led to the third and fourth hypotheses that: *There exists a significant positive effect of an incremental investment on the exit value of an EV,* and *There exists a significant positive effect of a lump sum investment on the exit value of an EV.* Finally, current literature identified that VC non-financial support would allow for improved

development and growth which generated the final hypothesis: *There exists a significant positive effect of different types of non-financial aid provided by VC on the returns of an EV.*

To evaluate the main research question and hypotheses a data sample of 150 European VC deals was constructed using the Preqin database. This database included the qualitative data points on the types of non-financial aid provided by VC firms and the exit value of the EV that they invested in. Controlling for the effects of the deal size, matching VC industry specialization to EV industry, incremental investments, and a lump sum investment, seven types of non-financial aid were regressed on the exit value of the VC share of the EV using a GLS regression. The Preqin database did not provide a measure for the legitimization non-financial aid and therefore this was not included in the analysis. This regression was also conducted using the interaction effects of specific match pairs of the types of non-financial aid. Finally, F-tests were conducted on firstly all the individual effects in the initial model and secondly, the interaction effects in the other model to test for total effects.

When looking at the results there is a significant positive effect of the monetary investment on the exit value of the EV. The variables for industry specialization matching and incremental investment are found to not even be significant at the lowest significance level. A lump sum investment is surprisingly found to have a significant negative effect on exit value possibly indicating a moral hazard problem when two VC firms invest together. Regarding the non-financial effects, it is found that only the Operating Activities non-financial aid and the interaction effect between Operating Activities and Strategizing Activities had a significant positive effect on the exit value of the EV at the 1% significance level. The F-tests indicate however that the total effects of all variables are significant at the 10% level in the initial model and at the 1% level in the model with the interaction effects. Due to these findings this paper proposes a new framework for understanding how non-financial effects influence the exit value of an EV. Rather than being comprised of the sum of the value added by each individual type of expertise, the total value added from non-financial support comes from the complementary effects of the types of aid being applied together. This is also seen in the sample as all the VC firms specialized in at least 3 types of non-financial aid.

Therefore, this paper proposes that future research analyse the complementary effects that each of the eight types of non-financial aid have on each other. This should then also be extended by finding a measure for legitimization non-financial aid. These measurements then indicate which combinations have the largest effect on the exit value of the EV.

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## Chapter 1: Introduction

### 1.1 Introduction to the Problem:

European Venture Capital (VC) is the cornerstone to modern EU development and investment. VC supports the growth of multiple start-ups and entrepreneurs by overcoming credit constraints and providing operational support. However, growth of European VC has been limited over the past decades inhibiting the evolution of innovation and efficiency. From 1990-2000 the amount invested by VC in the US increased by a factor of 80 whereas in Europe this increase was only by a factor of 12 (Botazzi & Da Rin, 2002). The European entrepreneurial financing market was previously characterised by large bank loans and debt and although venture capital has grown more over the past decades it is hardly at the optimal level to spur a new age of innovation (Botazzi & Da Rin, 2002).

Compared to other forms of financing, VC has an optimal investment structure to stimulate start-ups to enter new markets. Investing through a combination of debt and equity in multiple stages of development allows for each investment to optimally be applied to the growth stage of the EV. Through this EVs that have received VC financing are reported to have 8.3% significantly higher productivity growth compared to EVs that have not (Croce, Marti, and Murtinu, 2013). VC investment is also a strong signal to outside investors which further improves the development of innovation.

Although a VC investment is found to significantly affect the growth of multiple EVs, there is more to this form of private equity than the monetary investment. Comparing the effects of a VC investment to a participative loan in Spain, Quas, Marti and Reverte (2021) found that EVs that received a VC investment had significantly larger returns. This difference can be attributed to another unique part of VC investing, namely: the non-financial support. Next to a monetary investment into an EV, the general partner of a VC firm also provides support to optimize the EV strategy, daily operations, management structure, etc. Not only does VC bring with it expertise in different operational areas but also a large network of experienced managers and infrastructure providers. Through these networks and types of expertise VC can stimulate EV growth more than other forms of financing. As a VC firm's general partner has experience with different markets, they apply their knowledge to the development of different EVs. These forms of non-financial aid are what give VC an edge over other forms of private equity (Davila, Foster, and Gupta, 2003).

While the non-financial aid of VC seems to make it an optimal form of investing for an EV, very little is known about the effects of the different types of non-financial aid and how they impact returns. A VC investment aims to maximize the value of the EV at the exit,

which is when the VC receives its returns, however there is a high variability in the final exit values of an EV after accepting a VC investment. There is little consensus in modern literature about the impact of different types of non-financial aid and which type of non-financial aid is most relevant for an EV's development.

Therefore, this paper aims to contribute to the understanding of how a VC non-financial investment can contribute to the exit value of different EVs. By analysing a sample of European VC deals for which each type of non-financial expertise provided is known, their individual effects can be evaluated. This allows for a better understanding of the main channels through which VC non-financial investment becomes the optimal form of investing for an EV. The findings can then be applied to future research on the effects of VC for specific industries and sectors.

### 1.2 Central Research Question:

There is currently no consensus in modern literature about the relative significance of different types of non-financial aid and how these types influence the final exit value of the EV. Therefore, this paper aims to answer the question:

*How does the non-financial support of Venture Capital firms influence the exit value of entrepreneurial ventures in Europe?*

### 1.3 Theoretical Sub Questions:

To gain a better understanding of the effects of VC investing and the European EV climate, a literature study will be presented in Chapter 2 evaluating the current findings on VC. This section will answer some key theoretical sub-questions, starting with: what entails entrepreneurial ventures? Once the literature on the EVs is evaluated the other side of the deal, namely VC, will be investigated by posing the question: what entails venture capital? Then the literature study will be used to understand how venture capitalists invest and what their strategies imply for the effectiveness of their exit. This will be answered through the question: what entails venture capital financial support? Finally, to review the information on the non-financial effects of VC the literature study will answer: what entails venture capital non-financial support?

### 1.4 Possible Research Limitations:

The conducted research on European VC will contribute to the understanding of their non-financial effects and what types have the most significant effect on the exit value of an EV. Although the European VC market has grown over the past decades, there is still limited

availability of data on the types of non-financial expertise provided by different venture capitalists. Therefore, the analysis is limited to a smaller sample for which there is non-financial data available which may not necessarily be fully representative of the population. Another limitation is the time frame within which the research is conducted. The paper was completed within 3 months, which allowed for a comprehensive analysis of the data however there was not enough time to conduct an in-depth qualitative analysis through interactions with multiple VC firms. Hence, the analysis is limited to the quantitative data gathered from the sample and the qualitative analysis embedded in the sample as well.

### 1.5 Brief Thesis Chapter Descriptions:

To answer the central research question described in Section 1.2, a literature study will first be conducted in Chapter 2. This chapter aims to review existing literature and knowledge on VC investments to apply to the analysis and to use in answering the research question as well. The hypotheses will also be stated in Chapter 2. After this, the data sample and methodology used to answer the research question will be described in Chapter 3. Once the methodology is described, the results will be presented and explained in the results section in Chapter 4. Finally, the relevant conclusions and discussion points will be elaborated on to answer the research question in Chapter 5.

Key words: *Venture Capital (VC), Entrepreneurial Venture (EV), Non-financial effects*

## Chapter 2: Literature Study

To effectively analyse the non-financial effect of VC on European EVs, previous literature needs to be analysed. Chapter 2 provides a literature study on existing papers and studies regarding each of the theoretical sub questions specified in Section 1.3. Section 2.1 discusses the literature on entrepreneurial ventures including their characteristics, development, and attitudes towards finance. Then Section 2.2 analyses the development and characteristics of VC and VC financing. Section 2.3 evaluates the financial effects of VC and how VC financing differs from other forms of investing. Finally, Section 2.4 studies the types of non-financial effects of VC and what previous studies have identified about their significance. This literature study forms the base of the understanding of VC and its non-financial effects to answer the central research question.

## 2.1 What entails entrepreneurial ventures?

Before reviewing the different roles and effects that VC has on different ventures, it needs to be understood what characterizes an EV. Delmar and Davidsson (2000) show that most entrepreneurs are characterized by men, with self-employed parents and previous work experience. They measure that in Sweden 67% of the entrepreneurs are men. They also show that there are significant positive educational effects on the amount of entrepreneurial activity. Linking to the role of education, studies on entrepreneurship and new ventures have highlighted the role of an entrepreneurial orientation on the success of these ventures. Davis et al. (2010) argue that an entrepreneurial orientation entails that ventures strive for product innovation, take risks and are proactive. This definition has been widely accepted within the literature regarding the efficiency of EVs. It is argued that EVs that display these characteristics are more likely to experience higher growth and have a more profitable exit. Soininen et al. (2012) tested the role of an entrepreneurial orientation in Finland and measured that it increases 5-year growth of the EV by at least 8% at the 1% significance level.

When looking at the characteristics of European entrepreneurial firms, Bosma and Schutjens (2011) find that the extent of this entrepreneurial orientation differed per region and country. They found that population density has a significant impact on the entrepreneurial activity in a country and the optimism of these ventures about the future. Similarly, they showed that fear of failure and the fear of taking risks was positively linked to the unemployment rate in the different regions. Del Junco and Brás-dos-Santos (2009) also concluded that regional and cultural values influence entrepreneurial orientation however they did find that there were some key similar characteristics for European entrepreneurial ventures. Firstly, they found that European EVs display a high individualism index meaning that there is a propensity for entrepreneurs to develop their own time and management structures for their ventures. Linking to this they generally found low power distance values which indicate that EVs are independent, adaptable, and cautious. These characteristics are also in line with the entrepreneurial orientation as discussed by Davis et al. (2010).

Although the propensity for individualism by European entrepreneurial firms has been found to improve performance, this may provide some barriers to a financing. Glancey (1998) shows that many entrepreneurs want to stay in control of their venture and would rather not relinquish a large share of it. The desire to keep control may override the entrepreneur's capability to lead and manage the firm for effective growth. Regarding financing, this becomes especially difficult due to information asymmetries. EVs have very



little presentable information and their performance relies heavily on the actions of the founder/manager. This may lead to, as described by Ragozzino and Reuer (2007), an adverse selection problem for the entrepreneurial ventures as well. As entrepreneurs are already inclined to stay independent, financial aid will often only be accepted when the expected benefits are significantly high. Similarly, venture capitalists also undergo a long selection procedure until they decide to invest in an EV. VC firms typically fund less than 1% of the ventures they are potentially interested in (Ragozzino & Reuer, 2007). Therefore, the characteristics of the entrepreneur also play a significant role in the process of financing.

Overall, entrepreneurial ventures are characterised by an entrepreneurial orientation with the propensity to be individualistic, adaptable, and proactive. These characteristics however create an adverse selection problem for EV financing as well (Ragozzino & Reuer, 2007). Therefore, EVs only accept financing if this is large enough to stimulate growth significantly and VC firms invest more if they expect their investment to be more profitable. This leads to the first hypothesis that:

*Hypothesis 1: There exists a significant positive effect of the size of the VC investment on the exit value of the EV.*

## 2.2 What entails Venture Capital?

Building on the understanding of the relationships between an EV and a venture capitalist, it also needs to be understood what venture capital entails. VC is a form of private equity that is mostly structured as a limited partnership with a general partner that monitors the investments. The limited partners hold a share of a fund from which they receive returns at the exit of the investment and the general partner also often holds a small share and is given a carried interest in the investment (Sahlman, 1990). Botazzi and Da Rin (2002) describe VC investing with a two-part scheme, namely a “soft” non-financial form of aid and a “hard” financial investment (Botazzi and Da Rin, 2002, pg. 231). Next to a monetary investment in a new venture, the general partner also applies his/her network, market, and/or strategic expertise to the venture to further stimulate growth.

Due to this two-part scheme, a venture capitalist closely follows the industry in their area of expertise and applies their knowledge to new ventures within these specific industries (Botazzi and Da Rin, 2002). Hellmann and Puri (2000) show that VC firms invest mostly in innovators rather than imitators for this reason as well. Using their expertise in industries close to them, VC firms hope to push innovators in a market to a successful exit. This is also a key characteristic of VC as they are not long-term investors. When a VC enters into an

investment agreement it does so with the goal to exit within 4-7 years, often through an acquisition or an IPO. Due to the nature of entrepreneurial ventures, VC firms are only able to realize returns on their investment at the point of exit as there is no return on investment before this point (Schwienbacher, 2008). Therefore, to measure the effect of the VC investment on an EV, the exit value will be used as a dependent variable.

Although VC investing does create many opportunities for the different entrepreneurial ventures, this approach that is centred around the exit strategy does create what De Bettignies and Brander (2007) describe as a “double moral hazard problem” (pg. 810). Due to the information asymmetries and uncertainty surrounding the success of an EV, VC firms will demand a large stake in the venture to ensure larger returns. However, both the entrepreneur and the VC firm will be inclined to take more risks depending on the size of the share of equity of the other party. Florin (2005) describes how founders of EVs are often weary and careful when deciding to accept VC investment due to these uncertainties and the chance to lose ownership in an IPO or acquisition. Due to this double moral hazard problem a trade-off exists for an EV between the industry experience and expertise of a VC firm and the share of equity sold. Saetre (2003) argues however that the entire value of VC is not already realized in this trade-off. Especially the significance of the non-financial aid and human capital may make this double moral hazard problem obsolete as the benefits of industry network as well as structure and strategy expertise far outweigh the costs.

Jeng and Wells (2000) state that because of the additional non-financial aid VC has multiple benefits over other forms of private debt and equity. As VC firms often operate in select industries with limited information and devote a lot of time and resources to understanding them, their contributions are largest in these industries respectfully. Especially for EVs operating in these close markets, it is expected that VC firms specializing in their markets will have a significantly larger impact on the returns. This then leads to the second hypothesis:

*Hypothesis 2: There exists a significant positive effect of the industry specialization of the VC on the exit value of the EV when this matches the industry in which the EV operates.*

### 2.3 What entails Venture Capital financial support?

To distinguish the non-financial effects of VC from the financial effects, it also needs to be understood what VC financial support entails. Davila, Foster, and Gupta (2005) describe that multiple rounds of financing in an EV provides necessary resources and liquidity to enhance growth. They argue that the presence of a VC investment also signals

value to outside investors and therefore promotes growth regardless of the non-financial effects. It is shown that the monetary amount invested into an entrepreneurial venture has a significant effect on the number of employees which Davila, Forster, and Gupta (2005) use as a proxy for growth. They showed that in the first month after the financing occurred, employee growth was 78.3% higher compared to the month before at a 5% significance level.

VC financing also has benefits versus other forms of investing due to its unique investing structure. Marx (1998) explains that because VC firms finance EVs through a combination of debt and equity, it provides the VC with the option to intervene and improve the structure of the venture. VC firms often hold equity in a company through convertible preference shares and hold different types of debt. This provides the VC firms with the necessary incentives to promote growth through the convertible preference shares whilst also protecting them from the possibility of EV failure. This structure also helps partially tackle the information asymmetry and moral hazard issues discussed previously. Next to the balance in equity and debt, Smolarski and Kut (2011) describe that VC investments are also optimized through lump sum amounts and incremental investments. A lump sum investment is the joint investment by two VC firms in one EV. An incremental investment divides the total amount invested in stages depending on the development of the EV. These strategies allow VC firms to hedge more of their risk and have been shown to provide a stronger signal to outside investors as well. Smolarski and Kut (2011) measure through dummy variables that both lump sum amounts, and incremental investments have a positive effect between 20-39% on annual sales growth of a VC firm.

Bains and Wooder (2014) also illustrate that VC firms finance EVs in multiple stages namely Seed and Series A-C. Each series represents the development stage of the EV with the amount invested often increasing with each stage. They show that there has been a tendency for VC firms to invest more in later stages in Europe. When measuring the size of Biotech VC investments in the period of 2005-2011 they found that (including the effects of the Great Recession), the average investment size was between 10-12€ million.

When further measuring the effects of VC financing Croce, Marti, and Murtinu (2013) show that total factor productivity growth in VC backed European firms is higher compared to non-VC backed European firms after the first round of financing. They measured that VC backed firms have an 8.3% higher productivity growth which is significant at the 5% significance level. To ensure more accurate results they also tested for screening effects of VC firms on EVs however did not find significant differences between the VC backed and non-VC backed firms' pre-investment. Using a combination of Kruskal-Wald

tests and regression analyses their findings indicated that the VC investment had a significant effect on both short- and long-term productivity growth. They did distinguish this monetary effect from the non-financial effects however they did not attribute the non-financial effects to specific characteristics or strategies. Like Croce, Marti, and Murtinu (2013), Bertoni, Colombo, and Grilli (2011) tested for the significance of financial effects on 538 Italian new technology-based firms and found that VC investments significantly increased the ventures growth after the first financing round. They argued that because new technology-based firms are very financially constrained, VC has a significantly positive impact through their financial effects. They also showed that this positive effect was larger in the short run compared to the long run. Florin (2005) also measured the differences between VC firms with high amounts of backing and lower amounts of backing which he respectfully defined as having an equity stake above or below 30%. He found that the ventures with high VC backing do significantly better post IPO compared to low VC backed ventures.

Overall, previous literature has indicated that the financial effects of VC have a significant role on EVs. Specifically, investing in multiple rounds has been shown to hedge more risk for the VC and have a more significant effect on EV returns. Smolarksi and Kut (2011) argued that lump sum and incremental investments enhance the financial effects of VC. Hence these may also play a significant role in the exit value of the EV. Therefore, the third and fourth hypotheses state:

*Hypothesis 3: There exists a significant positive effect of an incremental investment on the exit value of an EV.*

*Hypothesis 4: There exists a significant positive effect of a lump sum investment on the exit value of an EV.*

#### 2.4 What entails Venture Capital non-financial support?

Finally, after looking at the financial effects, the different types of non-financial support and previous evidence of its impact needs to be evaluated. Davila, Foster, and Gupta (2003) describe that in addition to the monetary investment “venture capitalists bring a network of contacts with experienced infrastructure providers (such as accounting firms, law firms, and executive search firms) and potential professional managers,” (Davila, Foster & Gupta, 2003, pg. 691). Also, Chemmanur., Krishnan, and Nandy (2011) explain that next to this network, VC firms apply their experience and knowledge to better develop an EV’s strategy, structure, and incentive schemes. They measured that VC backed companies have larger total labour and material costs, but an increased total factor productivity compared to

non-VC backed firms also indicating higher quality labour and assets that are acquired because of a VC investment. Applying these non-financial effects to the EV, Luukkonen and Maunula (2007) describe that VC firms often take board positions within the EV and spend most of their time on monitoring and evaluating an EV's strategy. Therefore, it is expected that these non-financial types of aid have a significant effect on a venture's returns.

Due to the large variety of definitions for the types of non-financial aid that VC firms can employ, Large and Muegge (2008) designed a classification for the different types that will be used in the regression analysis as well. They describe eight value added inputs for which two are externally oriented and the remaining six are internally oriented. The externally oriented value-added inputs are Legitimation, which entails an improved reputation with respect to other EVs due to the presence of a VC investment, and Outreach, which entails an improved connection with other investors due to a VC investment. Regarding the internally value-added inputs, Large and Muegge (2008) firstly describe Recruiting, which is the acquisition and implementation of professional and capable managers. Secondly, Mandating Activities entail the development of the performance, structure, and measures of the EV in combination with incentive schemes. Thirdly, Strategizing entails the emphasis on the long-term growth of the firm and its success. Fourthly, Mentoring Activities describe the informal coaching and development of the team that is conducted by the general partner. Fifthly, Consulting Activities are the formal planning and structure that is applied to the firm through the general partner as well. Finally, Operating Activities entail the VC firm's support in the daily operations of the venture and optimizing its daily performance. The types of non-financial aid and their descriptions are outlined in Appendix 1.1. Due to the variety and personalized forms of non-financial aid that VC firms provide, the classification by Large and Muegge (2008) summarizes the relevant types which can be applied in other research studies. This metric will be applied to the analysis of the data to evaluate which type of non-financial aid has the most significant effect on the EV's returns.

In their literature review Large and Muegge (2008) showed that non-financial aid in the form of Operating Activities was mentioned most in other papers as having a significant effect on the returns of different EVs. When looking at the demand of the different types of non-financial aid by EVs however, Riepe and Uhl (2020) find that most European start-ups are looking for externally oriented value-added inputs such as connections with outside investors and other commercial activities. These may also provide an indication of which non-financial effects play the most significant role in VC investing.

To quantify the non-financial effects of VC, Quas, Marti, and Reverte (2021) compared the returns of Spanish EVs that received VC backing to EVs that received government loans. They argue that government loans strictly provide monetary aid and therefore the differences in returns between the two types of financing can be attributed to the non-financial aid. Using the difference-in-difference method, they indicate a positive and significant effect of 62.26% on the increase of total sales of the non-financial aid from venture capitalists compared to the government loans. Similarly, St-Pierre, Nomo, and Pilaeva (2011) researched the non-financial effects of VC in comparing VC backed firms to non-VC backed firms. They found a significant effect for firms who did not have a clear structure and strategy however no clear effect for firms where an effective manager was already in place. This may indicate that the non-financial support of VC is most relevant for the firms that require this aid to grow as well.

Overall, previous literature has indicated that there are significant effects of VC non-financial support on EVs however it has not yet been evaluated which types of non-financial support have the most significant effects. The classifications provided by Large and Muegge (2008) provide a metric to measure the different types of non-financial aid. Hence, based on the previous findings it is hypothesized:

*Hypothesis 5: There exists a significant positive effect of different types of non-financial aid provided by VC on the returns of an EV.*

### 2.5 Conceptual Research Model:

Previous literature has identified many relevant elements and factors through which VC firms influence an EV's returns. The research findings are combined to form the hypotheses and a conceptual research model that is summarized below in Figure 1.

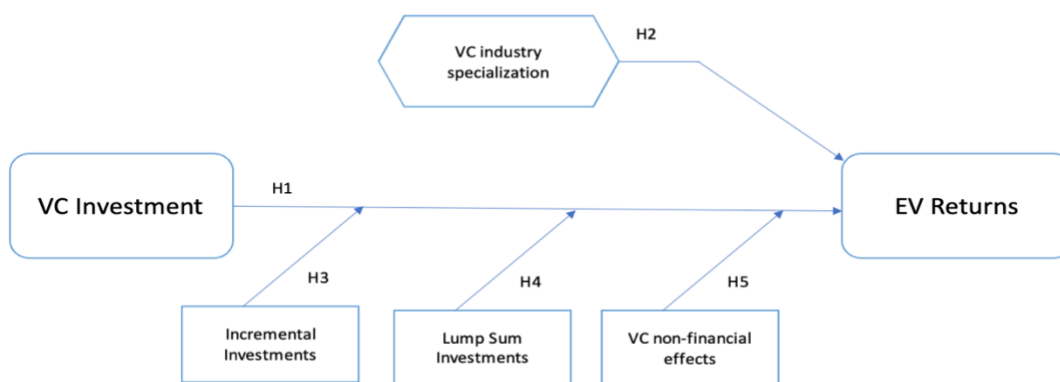


Figure 1: Conceptual research model illustrating the effects described by hypothesis 1 - 4.

## Chapter 3: Data and Methodology

### 3.1 Qualitative and Quantitative Data:

To assess the non-financial effects of Venture Capital, both qualitative and quantitative data was collected. Quantitative data describes numerical observations that are often gathered in large data sets/streams. The straightforward nature of quantitative data allows for a lot of data observations as well. Qualitative data are often textual data points that provide more detail regarding a specific topic. This type of data often has smaller data sets and can be more difficult to gather and analyse.

Regarding the analysis, quantitative data was collected on the exit value of the EV (€), the amount invested into the EV by the VC firm (€) and the dates on which each deal occurred. The qualitative data was matched to each specific point to provide more information on the fund manager and their non-financial investments. The qualitative information included the different types of non-financial support provided by the fund manager, the industry specializations of the VC, the main industries in which the EV operated, the respective names of the VC and EV, and descriptions of the EV. These data points allow for an effective analysis of the non-financial effects of VC.

### 3.2 Data Collection Methods:

The final data sample used in the analysis was constructed by combining multiple data sets from the Preqin database. Preqin is a data provider that is centred around the deals and performance of private equity, private debt, and venture capital. It has access to detailed information on 12,000 fund managers and over 10,000 funds which it gathers through close cooperation with the funds. The data provider also makes use of the Freedom of Information Act to access multiple deals for VC funds. The Erasmus University of Rotterdam has recently acquired their data sets specifically on the roles and performance of VC funds and therefore these data sets were used to construct the final data sample.

Firstly, Preqin's dataset describing the different fund managers and their funds industry specializations, number of employees, main expertise, etc. was collected. This data set provided the information on the non-financial support that each venture capital firm provided through the variable: Main Expertise Provided. This is described by Preqin as the fund manager's specialization in portfolio management and includes the options: Operational Advice, Recruiting, Network, Strategic Advice, Industry Knowledge, Management Advice, Marketing Advice, Technical Expertise, and Financial Expertise. Although these variables provide a relevant overview of the types of non-financial support, Large and Muegge (2008)

designed in their paper a classification for the types of non-financial aid as described in Section 2.4. According to this classification, the Preqin variables were organized as follows:

<b>Preqin Variables</b>	<b>Large and Muegge (2008) Classification</b>
Operational Advice	Operating Activities
Recruiting	Recruiting
Network	Outreach
Strategic Advice	Strategizing
Industry Knowledge	Mentoring Activities
Management Advice & Marketing Advice	Mandating Activities
Technical Expertise & Financial Expertise	Consulting Activities

The first four string variables were defined very similarly in both Preqin and the Large and Muegge (2008) classification and therefore these variables were renamed accordingly. According to Large and Muegge (2008) Mentoring Activities described the informal coaching and development of the EV to the market. The industry knowledge provided to the EV plays a large role in this effect and it was therefore used as a proxy for mentoring activities. Mandating Activities describes the development of performance and structure which is proxied by the management and marketing advice expertise. If a VC firm provided either management or marketing advice (or both) it was classified as also having a mandating activities non-financial effect. Finally, Consulting Activities describe the formal planning and knowledge which was proxied by a combination of technical and financial expertise. Like the Mandating Activities, if a VC provided either technical or financial expertise (or both) it was described as also having Consulting Activities non-financial aid. Although the Preqin database provides detailed information on the different types of non-financial aid it did not provide information or a proxy for Legitimation non-financial aid and therefore it was not included in this analysis (Large and Muegge, 2008). It may be an area for future research to identify techniques to measure this type of non-financial aid. Each type of non-financial aid as classified by Large and Muegge (2008) was structured as a dummy variable with a value of 1 when the VC firm provided this expertise and 0 when not.



Once the data set of the fund managers was transformed, the information of the fund managers was matched to another data set describing multiple European VC deals occurring between 01/01/2000 – 01/05-2022. The deals were also filtered to include only Seed, Series A, Series B and Series C transactions as other transaction types are not invested in by VC (Bains & Wooder, 2014). The information of the non-financial specialization of the VC firm was matched to each deal through the name of the VC firm. The deals included information on the names of the EV and VC firm, their industry specializations, and the size of the deal (€). As most VC firms invested into multiple EVs there were multiple observations on the effects of each firm's specialization. It was decided to link the non-financial information to deals rather than individual EVs as an EV can also receive investments from multiple VC firms and deal data indicates precisely how much was invested by each VC firm. It can then also be determined which VC firm provided which type of non-financial expertise.

After these two datasets were combined, a dummy variable was constructed namely: *IndustryMatching*. This variable had a value of 1 when one of the industry specializations of the VC firm matched the primary industry of the EV and 0 when this was not the case. This data was used in the regression to evaluate hypothesis 2. Following, to evaluate hypotheses 3 and 4, two more dummy variables were created, representing if an investment was an incremental investment or a lump sum amount, named: *IncInvestment* and *LumpSum* respectively. When a VC firm had invested in the same EV on two different dates it was defined as an incremental investment and when two VC firms had invested in the same EV on the same date, it was defined as a lump sum investment.

Finally, the dependent variable *Exit Value* (€) of the portfolio firm was added through the *Exit* data set of *Preqin*. The *Exit Value* variable is defined according to *Preqin* as the value of the stake of the VC firm in the EV when they realize their investment. Using the exit value of the stake of the VC firm relative to the size of the deal removes the possibility that the financial effects are attributed to the size of the VC firm's share in the EV. Schwienbacher (2008) and Large and Muegge (2008) argue that as VC aims to have a profitable exit, the exit value of their share will reflect the results of their financial and non-financial support to an EV. This value was matched to the different deals through the name of the VC firm to complete the data sample used for the final analysis. After including this dependent variable, three observations were removed as they were significant outliers that skewed the results of the analysis which would have made it less reliable.

### 3.3 Data Sample Details:

After the data from the different data sets was collected, merged, and transformed, the final data sample consisted of 150 deals encompassing 27 VC firms and 87 EVs. Although 150 observations may not seem to be many data points to measure the non-financial effects, this is largely due to the availability of EV and VC non-financial data. Bottazzi and Da Rin (2002) describe that due to VC being small in Europe relative to the US, there is not a lot of public data available on EV returns when receiving VC investment. Similarly, as an extension of their own research on the non-financial effects of VC, Quas, Marti and Reverte (2021) realize that these effects should be measured for Europe however that there is limited availability of this data. As the different data sets, for which there is already limited information, were combined, the final data sample consisted of 150 deals. However, for each hypothesis there are at least 30 data points which, according to the central limit theorem, is enough to approximate a normal distribution. Therefore, although the results may not be sufficient to infer high significance and causality, the data sample does provide enough information to draw conclusions about correlations related to the hypotheses.

66.7% of the sample deals are deals where the industry specialization of the VC firm matches that of the EV. This is also in line with the paper by Jeng and Wells (2000) who argue that VC firms will try to match their specializations to the EV as this allows them to have a greater influence on the exit value. The sample deals are from a variety of industries however the primary EV industries include Biotechnology, Electronics, Healthcare, Logistics & Distribution, Medical Devices & Equipment, Pharmaceuticals, and Software. The 150 deals are also spread over 12 countries namely: Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Spain, Sweden, Switzerland, and the UK.

Regarding the Incremental Investments and the Lump Sum investments there are respectively 60 and 35 observations for each. The dependent variable ExitValue is measured in millions of euros and has a mean value of 145€ million. Similarly, the financial effects measured through DealSize is measured in millions of euros and has a mean value of 19.8€ million. These deal sizes are also similar to the findings and growth analyses of Bain and Wooder (2014).

The descriptive statistics regarding the data sample and the counts for the dummy variables can be found in Table 1 below.

Table 1: Descriptive Statistics Regression Variables

Variable	Observations	Dummy Count	Mean	Std. dev.	Min	Max
ExitValue (€)	150	-	145.037	248.3183	.12	1862.96
DealSize (€)	150	-	19.7896	26.75532	.12	224.25
IncInvestment	150	60	.4	.4915392	0	1
LumpSum	150	35	.2333333	.4243695	0	1
IndustryMatching	150	100	.6666667	.4729838	0	1
Consulting	150	132	.88	.3260502	0	1
Mandating	150	105	.7	.4597928	0	1
Mentoring	150	133	.8866667	.3180618	0	1
Operating	150	101	.6733333	.4705654	0	1
Outreach	150	138	.92	.2722021	0	1
Recruiting	150	81	.54	.5000671	0	1
Strategizing	150	134	.8933333	.3097231	0	1

### 3.4 Data Analysis Method:

To analyse the non-financial effects of venture capital on the exit value of the EV, the variables described in Table 1 were regressed on ExitValue. A regression analysis measures the size of the financial or non-financial effect and their respective significance based on the data sample whilst controlling for other variables such as incremental investments.

Firstly, to provide an indication for hypothesis 1, only DealSize was regressed on ExitValue to measure the initial size effects. Previous literature has already shown that VC has a significant positive effect on the exit value in an EV (Saetre 2003, Davila, Forster and Gupta 2005, Croce, Marti and Murtinu 2013, Bertoni, Colombo and Grilli 2011, Quas, Marti and Reverte 2021, St-Pierre, Nomo, and Pilaeva 2011) and therefore the analysis evaluated the effect of the size of the investment rather than if the investment had a significant impact. By first only measuring the effect of DealSize and not including the other variables, the total impact of the venture capital investment relative to the size of the investment can be evaluated on EVs using a two-sided 5% significance t-test. This was then extended by adding in the other variables in new models. The first model is then described by equation 1 below.

$$(1) \text{ExitValue} = \alpha + \beta \text{DealSize} + \epsilon$$

After the significance of the financial effects was initially evaluated, the variables: IndustryMatching, LumpSum and IncInvestment were included in the regression to analyse hypothesis 2, 3 and 4. The inclusion of these variables removes their omitted variable bias that was encompassed in the effect of DealSize in model 1. This is then also used to re-evaluate the financial effects of the coefficient of DealSize. The sign, size, and significance of each variable is tested based on two-sided 5% significance t-tests and their relative values were evaluated. The significance of the variables was used to determine whether a significant effect on the exit value of the EV exists. The second model is described by equation 2.

$$(2) \text{ExitValue} = \alpha + \beta_1 \text{DealSize} + \beta_2 \text{IndustryMatching} + \beta_3 \text{LumpSum} + \beta_4 \text{IncInvestment} + \epsilon$$

Building on this model, the 7 non-financial effects of venture capital were included in the regression. It was observed how relative size and sign of the DealSize variable changed based on these variables to evaluate any implicit effects previously not recorded. Once each variable was included, their sign and size were observed and the significance measured using a two-sided 5% significance t-test. This provided an indication for which non-financial effect may have the largest and most significant effect on exit value and therefore which effect may be most relevant for EVs. The model for this test is shown in equation 3.

The completed model 3 with the non-financial effects also reflects careful consideration of the assumptions of OLS for an accurate analysis. The model was tested for heteroskedasticity of the errors to ensure that it is consistent. A Breusch-Pagan test was conducted on model 3, and to remove the effects of heteroskedasticity, generalized least squared (GLS) errors were applied. The respective weights measured through GLS were applied which allowed for a more accurate evaluation of the non-financial effects. Next, the assumption of no endogeneity needs to be met to ensure that the model is unbiased. As indicated previously, the omitted variable bias was limited by including the dummy variables for incremental investments, lump sum investments and industry matching effects. Previous literature has highlighted that these variables have a significant effect on the exit value of the EV and therefore their endogenous effects are removed by including them in the model. Similarly, the data collection method ensured limited attenuation bias that could cause endogeneity. Therefore, although endogeneity cannot be effectively tested, the construction of the model ensures that this is limited as well. The assumptions of non-zero mean errors and uncorrelated errors are not required to ensure that the final model is unbiased and do therefore not have a significant effect on the results of the hypotheses. Finally, the

assumption of normally distributed errors is needed to also improve the consistency of model 3. This assumption was also accounted for when the GLS errors were applied.

Testing each individual type of non-financial support provides information on their relative importance however it is likely that there are multiple interaction effects between the variables. From Table 1 it is evident that VC firms make use of multiple types of non-financial expertise, often in unison. Large and Muegge (2008) also describe that multiple elements in their classification are likely provided together to stimulate exit value. The variables they discussed that may influence each other are: Operating Activities and Strategizing Activities, Recruiting and Outreach, Mentoring Activities and Mandating Activities, and Consulting Activities and Operating Activities. Therefore, rather than only testing for the individual effects of each type of non-financial expertise, the interaction effects may have a significant impact on the exit value. However, because of multicollinearity between the interaction variables and the main variables, these were not included in model 3. Hence, to evaluate whether these interaction variables may have a more significant effect on the exit value of the EV, it was tested whether these interaction effects describe the exit value better than their main effects. This was done by only including these interaction effects in a model and testing them using a two-sided 5% significance level t-test. The model, shown in equation 4, included GLS errors to ensure the effects of heteroskedasticity were removed.

$$(3) \text{ExitValue} = \alpha + \beta_1 \text{DealSize} + \beta_2 \text{IndustryMatching} + \beta_3 \text{LumpSum} + \beta_4 \text{IncInvestment} \\ + \beta_5 \text{Consulting} + \beta_6 \text{Mandating} + \beta_7 \text{Mentoring} + \beta_8 \text{Strategizing} \\ + \beta_9 \text{Operating} + \beta_{10} \text{Outreach} + \beta_{11} \text{Recruiting} + \epsilon$$

$$(4) \text{ExitValue} = \alpha + \beta_1 \text{DealSize} + \beta_2 \text{IndustryMatching} + \beta_3 \text{LumpSum} + \beta_4 \text{IncInvestment} \\ + \beta_5 \text{Recruiting} * \text{Outreach} + \beta_6 \text{Mandating} * \text{Mentoring} + \beta_7 \text{Strategizing} \\ * \text{Operating} + \beta_8 \text{Consulting} * \text{Operating} + \epsilon$$

Models 3 and 4 evaluate the individual effects of each main variable and their interaction effects on the exit value. However, this paper also realises that there is likely to be a total effect of the combination of the different types of non-financial expertise. Therefore, to test whether the types of non-financial expertise have a significant effect on the exit value, two F-tests were conducted. The first F-test measured the overall effect on all the non-financial effects on model 3. Then a similar test was conducted on the interaction effects in model 4. This provided an indication of the total effect of all the non-financial support.

### 3.5 Research Bias:

In order to conduct an effective and relevant analysis the method of data collection aimed to limit research bias in the sample. Firstly, Preqin sets specific guidelines for their contributors that need to be met before their data is selected. Through these guidelines they aim to ensure accurate and correct data. Their performance team then re-evaluates and benchmarks the data to similar funds to assess whether the observation can be included in their data set. Only after the data passes through this process, it is included in the set.

Regarding the matching of data sets, the data was combined based on several specifications. Firstly, each deal was only included if both the name and description of the EV and the VC firm were available to ensure that there were no incomplete data points in the final sample. Secondly, each deal that included estimates of the deal value rather than the exact recorded value was excluded to limit the research bias. Thirdly, using the program Excel, the data was only included if there was an exact match between the VC firm for which there was non-financial expertise data available, and the VC firm included in each deal. Finally, only EV exit values were included if they exactly matched the exact name of the EV in the deal. This also removed the bias effects of estimates and branches of different entities. Therefore, data points were only included in the sample if there was exact accurate data.

Although the method of data collection limited bias in the sample, there is a chance that some bias remains. The data from Preqin is only collected from public deals and information that people were willing to contribute to the dataset. As the sample only includes the deals that people were motivated to contribute, it may not reflect the entire population of EV and VC deals in Europe. Similarly, although the dependent variable Exit Value provides a good measure of the effects of VC according to Large and Muegge (2008), it cannot describe EVs that failed. Therefore, it does not include values for failed ventures and may once again not describe the entire population of VC deals in Europe.

## Chapter 4: Results

### 4.1 Results:

The results of the regression analyses of models 1, 2, and 3 described in Section 3.4 are presented in Table 2 below. The table includes the values of each of the coefficients, their standard deviations, and their significance at the 10%, 5%, or 1% significance level. These were analysed to evaluate their effects on the dependent variable: Exit Value.

Table 2: Data Table illustrating the financial (€) and non-financial effects of VC investment on the Exit Value of EVs in Europe from the period 01/01/2000-01/05/2022

<i>Variable</i>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3 (without GLS Errors)</b>	<b>Model 3 (GLS Errors)</b>
DealSize (€)	1.156 (0.757)	1.300* (0.748)	1.310* (0.731)	1.359* (0.703)
IncInvestment		37.562 (42.209)	43.149 (42.210)	65.367 (42.750)
LumpSum		-107.741** (51.399)	-101.081** (49.512)	-111.868** (43.665)
IndustryMatching		-5.879 (44.094)	-23.510 (45.758)	-28.576 (45.040)
Consulting			142.847 (89.505)	91.310 (104.227)
Mandating			-208.430*** (63.920)	-152.96 (94.607)
Mentoring			91.686 (126.588)	-32.039 (152.201)
Operating			154.170*** (56.787)	149.331*** (54.946)
Outreach			110.540 (128.140)	133.236 (127.912)
Recruiting			-41.481 (55.108)	-18.413 (40.975)
Strategizing			94.735 (74.801)	10.380 (94.462)
Constant	122.158*** (25.136)	133.335*** (42.209)	-187.729 (136.592)	-23.691 (40.975)
<i>N</i>	150	150	150	126
<i>R</i> <sup>2</sup>	0.0155	0.0641	0.1979	0.2472

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

When evaluating the results presented in Table 2, model 1 shows that initially DealSize does not significantly affect the exit value of the EV at the 10% significance level. However, in model 2 when the other variables are included, the effect of DealSize becomes significant at the 10% significance level (*p-value*: 0.084). The positive coefficient of 1.3 indicates that when the size of the deal increases by 1€, the exit value of the VC share increases by 1.3€. Model 2 indicates that there are insignificant effects of IncInvestment (*p*-

*value: 0.377*) and *IndustryMatching* (*p-value: 0.894*). *LumpSum* is found to have a significant negative effect (*p-value: 0.034*) at the 5% significance level in this model in contrast to hypothesis 3 which predicted a positive effect of a lump sum investment. The negative coefficient of -107.74 indicates that EVs which have received VC investment in the form of a lump sum investment on average have an exit value of the VC share that is 107.74€ million less compared to firms that have not received a lump sum investment.

Columns 4 and 5 describe Model 3 which includes the dummy variables of the types of non-financial aid without and with the GLS errors respectively. Model 3 with the GLS standard errors is shown to explain more of the effect of VC on exit value compared to model 3 without GLS errors as it has a larger  $R^2$  value, namely: 0.2472. Although this only describes a small part of the exit value result, it provides an insight of the significance of the non-financial effects. The effects of *Mandating Activities non-financial aid* which was significant at the 1% significance level without GLS errors is no longer significant when the GLS error weights are applied as well.

In model 3 (with GLS errors), the effect of *DealSize* is found to only be significant at the 10% significance level (*p-value: 0.056*). The coefficient of 1.359 indicates that an increase in the financial investment of 1€ would increase the exit value of the share of the VC in the EV by 1.359€. However, as this effect is not significant at the 5% significance level it may indicate that the financial effects of VC do not significantly influence exit value. Similar to the results of model 2, the coefficients for *IncInvestment* (*p-value: 0.129*) and *IndustryMatching* (*p-value: 0.527*) are both found to not significantly describe the different exit values of the EVs. This is also in contrast to hypotheses 2 and 4. Surprisingly, the effects of a lump sum investment were found to be negative and significant at the 5% significance level (*p-value: 0.012*). The negative coefficient of -111.87 indicates that EVs receiving a lump sum investment on average have an exit value share of 111.87€ million lower compared to EVs that have not received this. Finally, analysing the individual effects of each type of non-financial aid, it is seen that only *Operating Activities non-financial aid* has a significant positive effect on the exit value of the share of the VC (*p-value: 0.008*). *Operating Activities* was described by Large and Muegge (2008) as the support and optimization of the daily operations of an EV. In this case the significant positive coefficient of 149.33 indicates that EVs that received this type of non-financial support on average had a VC firms share exit value that was 149.33€ million larger as compared to EVs that did not receive this type of non-financial aid. The descriptive statistics in Table 1 also showed that 101 VC firms in the sample provided this expertise possibly because of its effectiveness.



Although the results in model 3 (with GLS errors) as presented in Table 2 indicate that only Operating Activities significantly influence the exit value share of the VC, there may be a total non-financial effect of all the types of non-financial aid. This was tested through an F-test for all the seven types of non-financial aid in model 3 with GLS errors. The results of the F-test indicate whether one or more independent variables provide a better fit to the data as compared to not including them in the model. The F-test had a resulting F-score of 2.07 which indicated a p-value of 0.052. Although this is not significant at the 5% significance level, the value is very close to this significance level. The result of the F-test could indicate that rather than having individual effects, the types of non-financial aid may complement each other to have a significant effect on the exit value of the VC share.

To further test this, the impact of only the interaction effects described in Section 3.4 were also tested. Model 4, presented in Table 3 below, provides more insights into the complementary effects of the types of non-financial aid. The table includes the values of the coefficients, their standard deviations, and their significance at the 10%, 5% and 1% levels.

*Table 3: Data Table illustrating the financial effects (€) and non-financial interaction effects of VC on the Exit Value of EVs in Europe from the period 01/01/2000-01/05/2022*

<i>Variable</i>	<b>Model 4 (GLS standard errors)</b>
DealSize (€)	1.776** (0.736)
IncInvestment	63.127 (13.240)
LumpSum	-81.052* (45.877)
IndustryMatching	-4.378 (47.947)
Recruiting*Outreach	-100.572* (54.978)
Mandating*Mentoring	-259.226 (106.773)
Strategizing*Operating	344.825*** (130.388)
Consulting*Operating	88.140 (86.968)
Constant	31.111 (57.823)
<i>N</i>	125
<i>R</i> <sup>2</sup>	0.2307

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01

Regarding the hypotheses, DealSize has a significant positive effect on the exit value of the VC share at the 5% significance level ( $p$ -value: 0.014). The coefficient also has a value of 1.78 indicating that when the amount invested increases by 1€, the exit value of the VC firm share increases by 1.78€ on average. The model shows that the variables IncInvestment ( $p$ -value: 0.129) and IndustryMatching ( $p$ -value: 0.927) are once again both not significant. This may indicate that the use of incremental investment and matching industry expertise does not necessarily have a significant impact on the exit value of the VC share of the EV. Regarding the effects of a lump sum investment, the effect was observed to be negative and significant at the 10% significance level ( $p$ -value: 0.080). Compared to model 3 (with GLS errors) in Table 2, the significance of the negative effect has decreased when the interaction effects were used rather than the individual effects. This effect is still however negative in contrast to the predictions made by hypothesis 3. The coefficient of -81.05 indicates that firms receiving a lump sum investment on average have an exit value of the VC share that is 81.05€ million lower compared to firms that do not receive a lump sum investment.

Observing the impact of the interaction effects, only the interaction effect between the Strategizing Activities and the Operating Activities is found to have a significant positive effect on the exit value of the VC share in the EV at the 1% significance level ( $p$ -value: 0.009). The definitions of the different activities can be found in Appendix 1.1. The coefficient of 344.83 indicates that if a VC applies both Strategizing Activities and Operating Activities financial aid to an EV, the exit value of the VC share is found to be 344.83€ million larger compared to VC firms that apply neither. It is observed that this effect is larger than the individual significant effect of Operating Activities in model 3 (with GLS errors) presented in Table 2 indicating possible combination effects of the types of non-financial support. The interaction effect between Recruiting and Outreach was observed to have a negative effect however this was only significant at the 10% significance level rather than the 5% significance level ( $p$ -value: 0.070).

Although not all the interaction effects were found to be significant, the relative impact of the effects indicates that the impact of non-financial aid may not be the result of interaction effects between two types of non-financial aid however a total complementary effect of all types. This effect refers to the total non-financial impact of the VC firm which is channelled through the different types of non-financial support. Similar to the analysis of Table 2, a F-test was conducted for all the interaction effects in Table 3. The resulting F-value was 3.78 with a  $p$ -value of 0.0063, which is significant at the 1% significance level. This indicates that all the interaction effects included in the model significantly explained the

variance in the exit value of the VC share of the EV. Similar to the previous F-test results this could imply that the non-financial effects of VC are significant when used in unison rather than individually. It is also observed in the analysis that VC firms often offer between 3-7 types of non-financial support, highlighting this total effect.

#### 4.2 Summary of Key Analyses:

Regarding the financial size effects of the VC investment encompassed in the DealSize variable, its coefficient was large and positive in both model 3 and 4 with the GLS errors. In model 3 (with GLS errors) the coefficient was significant at the 10% significance level (*p-value: 0.056*) and in model 4 the coefficient was significant at the 5% significance level (*p-value: 0.014*). In both cases the p-value was relatively low and based on this comparison, it is observed to be in line with hypothesis 1.

In both models, the coefficients of the effects of industry matching and incremental investments were not significant. This result does not coincide with the predictions of hypothesis 2 and 4 respectively.

Similarly, it was observed that the effect of a lump sum investment was negative in contrast to prediction of hypothesis 3. The coefficient of the LumpSum variable was significant at the 5% significance level in model 3 (*p-value: 0.034*) and at the 10% significance level in model 4 (*p-value: 0.070*).

Regarding the impact of the types of non-financial aid, Operating Activities was the only type of financial aid that was positive and significant at the 1% significance level (*p-value: 0.008*). In model 4, the interaction effect between Strategizing Activities and Operating Activities was also found to be positive and significant at the 1% significance level (*p-value: 0.009*). Finally, the total effect of all the types of non-financial aid tested on the main effects in model 3 and the interaction effects in model 4 resulted in p-values of 0.052 and 0.0063 respectively.

## Chapter 5: Discussion and Conclusion

### 5.1 Key Findings from the Literature:

The literature study highlighted some key EV/VC characteristics, elements that influence the effectiveness of a VC investment, and the role of VC non-financial aid. Soininen et al. (2012) specified the importance of an entrepreneurial orientation to drive the success of an EV. They argued that the propensity to take risks, be innovative and to be proactive also lead many entrepreneurs to be individualistic. Ragozzino and Reuer (2007)

then argued that due to this entrepreneurial orientation and individualistic behaviour, EVs would only accept VC investing if it is large enough to overcome their adverse selection problem. Therefore, it was highlighted that the size of the VC investment relative to the value of the EV had a significant effect on the exit value of the VC investment.

When evaluating how VC firms choose to invest in EVs, Botazzi and Da Rin (2002) showed that VC firms can improve the returns of an EV through a two-part scheme: a financial investment and non-financial support. As this non-financial support often depends on the industry in which the EV emerged, it plays a key role in its development. Jeng and Wells (2000) also argue that as VC firms only operate in a few specialized industries, they have benefits for firms within these industries over other forms of investing. Hence when the industry specialization of the VC firm matches the industry in which the EV operates, the VC investment would lead to larger returns as well.

Next, Smolarski and Kut (2011) showed that the form of the VC financial investment can also significantly affect the returns of the EV. Specifically, they explained that the use of incremental investments and a lump sum investment with another VC would improve the effectiveness of an investment. Both incremental investments and a lump sum investment were shown to hedge more risk for the VC and provide a stronger signal to outside investors. Croce, Marti, and Murtinu (2013) measured this effect and showed that the total factor productivity growth in an EV is already higher after the first round of investing as well. Therefore, it was found that both incremental investments and a lump sum investment have significant positive effects on the returns of EVs.

Finally, the role of non-financial aid on the exit value of an EV was evaluated. Large and Muegge (2008) designed a classification for what they defined as the different types of non-financial aid. This classification can be found in Appendix 1.1. With this classification they stated that the different types of non-financial aid may have different effects, depending on the type of industry in which the EV operated. Measuring the effects of the VC non-financial investment, Quas, Marti, and Reverte (2021) used the difference-in-difference method between a VC investment and a participative loan in Spain and found significantly higher effects of VC investment. Applying this method, Quas, Marti, and Reverte (2021) were able to remove the financial effects and illustrate the total non-financial effect. Therefore, the literature study also highlighted the significance of VC non-financial aid on the returns of EVs.

## 5.2 Key Findings of the Results:

The results outlined in Chapter 4 highlighted several interesting findings regarding the role and effectiveness of VC investments. Regarding the effects of the size of the financial investment, model 3 (with GLS errors) shows that the DealSize variable significantly influenced the exit value of the VC share at the 10% significance level with a p-value of 0.056. In model 4 with the interaction effects this variable is significant at the 5% significance level with a p-value of 0.014. In both cases the measured p-value is just above the next significance level. Therefore, when looking at the significance levels and their relative p-values in Chapter 4, hypothesis 1 cannot be rejected.

The IndustryMatching variable measured whether the industry specialization of the VC matched the industry in which the EV operated. In both model 3 (with GLS errors) and 4 this effect was not significant at the 10% significance level. Therefore, hypotheses 2 is rejected.

It was observed that the effect of a lump sum investment had a significant negative effect at the 5% significance level in model 3 (with GLS errors) and at the 10% significance level in model 4. This contrasted with the predictions made by hypothesis 3 and therefore this hypothesis is also rejected.

The effects of an incremental investment were found to also not be significant at the 10% significance level in both models. Hence hypothesis 4 is also rejected.

Finally, looking at the non-financial effects of VC investments, model 3 (with GLS errors) highlighted that Operating Activities has a positive significant effect at the 1% significance level. The other individual effects were not significant at the 10% significance level. Similarly, in model 4, the interaction effect between the Operating Activities and the Strategizing Activities were found to be significant at the 1% significance level. To further investigate the total effects of the non-financial aid, the conducted F-test on all the types of non-financial aid was significant at the 10% significance level in model 3 (with GLS errors) and at the 1% significance level in model 4. This indicates that VC non-financial investments have a large combined effect and not only an individual effect. Therefore, due to the significance of the individual operating effects and the F-tests, hypothesis 5 cannot be rejected.

## 5.3 Comparing the Results to the Literature Study:

Regarding the comparison between the results of this study and the literature reviewed, there was some overlap but also interesting contradictions that may have

significant impact on future research. Firstly, the significance of the size of the financial effects was highlighted by Ragozzino and Reuer (2007) in the literature study. The results supported their argumentation that as the size of the financial investment increases, the exit value of the VC firm's share in an EV will increase as well.

Secondly, looking at the effects of the matching of industry specialization of the VC firm to EV industries, the result that this effect was not significant at the lowest significance level contrasted the findings of the literature study that this effect should have a significant positive effect. Although a VC firm whose specialization matches the EV industry should provide an advantage, Hellmann and Puri (2000) indicated that VC firms have the propensity to invest in innovators rather than imitators. These innovators likely target a new industry segment or market with new products and services. When this is the case, expertise of the overall industry may not always be required as every new segment or market is not necessarily representative of the total industry population. This was also highlighted in the results of this study because Mentoring Activities was proxied by industry knowledge which was not significant at the 10% significance level. Expertise in specific industries may however provide some skills and knowledge to VC that can be applied to similar markets. Therefore, the industry specialization of VC does not necessarily need to match the operating industry of the EV however knowledge acquired from other industries may benefit EV development.

Thirdly, also in contrast to the literature study, the results measured a significant negative effect on the exit value of the VC firm's share in a lump sum investment. Smolarski and Kut (2011) describe that a lump sum investment hedges risk for the VC investors and should improve the efficiency of the investment. Although VC firms benefit from this, a lump sum investment may limit the incentive for each venture capitalist to invest their non-financial resources because their share is lower compared to when investing alone. This causes a moral hazard problem where neither party wishes to invest more resources than the other. Therefore, the lump sum investment may have a negative effect on the exit value of the EV. With this in mind, the interaction and relationship between different VC firms that decide to enter in a lump sum investment should further be analysed.

Fourthly, similar to the effects of lump sum investments, Smolarski and Kut (2011) highlighted that incremental investments also hedge risk and provide a stronger signal to outside investors. The results of the study presented in this paper indicated however that the effect of an incremental investment is not significant at the lowest significance level. This finding hints that an incremental investment may once again be beneficial for the venture

capitalist however not necessarily have a significant effect on the exit value of the VC share of the EV. Croce, Marti, and Murtinu (2013) also indicate in their research that VC investment in the first round already had a significant effect on the returns of the EV. Therefore, the presence of the initial investment may already have a large enough effect and be a strong enough signal to outside investors. This implies that incremental investments would not have a significant positive effect on the EV however just be beneficial to the VC firm.

Finally, looking at the non-financial effects, Large's and Muegge's (2008) classification of the types of non-financial aid hinted towards the effectiveness of the individual effects of each type. The results of this study showed however that these individual effects were only positive and significant for the Operating Activities and its interaction effect with Strategizing Activities. The analysis by Quas, Marti, and Reverte (2021) showed significant total effects for the non-financial effects of VC. The conducted F-tests support this finding and indicate the presence of a total effect rather than individual effects. This reasoning is further elaborated on when answering the research question in Section 5.4.

#### 5.4 Central Research Question:

*How does the non-financial support of Venture Capital firms influence the exit value of entrepreneurial ventures in Europe?*

Based on the literature study and the results, a framework was constructed to explain the impact of VC non-financial effects on European EVs.

In their paper, Large and Muegge (2008) designed a classification to categorize the different types of non-financial aid. This classification was also applied to the data of this paper and can be applied to future studies analysing the different effects of non-financial aid in general. Large and Muegge (2008) use this typology to compare the effectiveness of the non-financial aid types however the results of this paper highlight that the role of non-financial aid is not the result of individual effects but rather combined and complementary effects.

When initially measuring the individual effects, Operating Activities was measured to have a significant positive effect at the 1% significance level similar to the findings of Large and Muegge (2008). Their conducted literature review showed that Operating Activities non-financial aid was mentioned most in other papers as having a predicted positive effect. However, in contrast to Large and Muegge (2008), the results in this study showed that the

other variables do not have a significant effect on the exit value of the VC firm's share. Rather the conducted F-tests showed a significant total effect of the types of non-financial aid. The analysis of Quas, Marti, and Reverte (2021) and St-Pierre, Nomo, and Pilaeva (2011) also showed that the total non-financial effects of VC investments have a significant positive effect on the returns of different EVs.

Therefore, this paper proposes a new framework for understanding effects of VC non-financial investments on EV exit value. Previous literature has theorized that the total value of non-financial VC aid is comprised of different individual types of expertise and actions. This would imply that the total effect is the sum of the value added from each individual type. However, the results presented in Chapter 4 show that not every individual non-financial investment has a significant effect. Consequently, the total value added is not comprised of each individual effect but rather the interaction between these variables when the types of expertise are applied in unison to an EV. This is also in line with the observation in the data that each VC firm specialises in at least 3 different types of non-financial aid.

This framework also significantly influences how VC non-financial aid is measured and applied. The classification designed by Large and Muegge (2008) can still be used to measure the types of non-financial aid but rather than testing each individual effect, the combinations between the types of non-financial aid and how they influence EV exit value need to be measured. This will provide a better understanding of interaction effects and possible complementary effects that each type of expertise has in combination with the other seven types. This is also seen in the results in model 4 when finding that the operating effects and strategizing effect complement each other and have a significant positive effect on EV exit value. It is therefore also theorized that there may be combination and complementary effects between more than only two types of expertise and that these effects comprise the total value added of VC non-financial aid.

In summary, the value of a VC firm's non-financial investments should not be viewed as the sum of the individual elements but as the complementary effects of all eight types highlighted by Large and Muegge (2008). This implies that VC non-financial aid has a larger effect than initially theorized because the complementary effects of each type of non-financial aid is larger than each individual effect.

### 5.5 Future Research:

Building on the framework proposed in Section 5.4, future research should measure the complementary effects that each of the eight types of non-financial aid have on each



other. Measuring the effects of combinations of the different non-financial aid types will provide an indication of which combinations have the largest impact on the total added value of non-financial investments. Similarly, qualitative interviews with multiple venture capitalists about their choices for different types of expertise can also provide more insights on the complementary effects that each type has.

To effectively understand all forms of non-financial investments, and their value added, Legitimation as a form of non-financial aid needs to be measured as well. Legitimation refers to an improved reputation with respect to other EVs due to VC investment as specified in Appendix 1.1. It is proposed that this effect is measured through the amount of contact an EV has with potential investors after a VC investment has occurred compared to EVs without a VC investment. If a VC investment leads to an improved reputation, the EV would have more interest from other investors who are interested in them as well. It is proposed to use contact with other investors rather than actual investment from other investors as there is often a limited amount of investment accepted by EVs because entrepreneurs do not want to relinquish a large percent of their venture (Florin, 2005). This would also suggest that a larger data sample should be gathered representing the EV market in Europe to gather more accurate data on the population.

Next this study suggested that in order to analyse the effects of industry specialization, the skills and knowledge gained on operations across different industries should be measured rather than comparing industries. Hellmann and Puri (2000) highlighted that VC firms invest in innovators that may enter new markets or segments rather than existing industries and therefore the VC industry specialization benefit comes from the skills acquired across industries rather than in specific industries. Therefore, this effect should be measured through their skills acquired from these specific industries and how these are applied to the EV.

Finally, the results showed a significant negative effect of a lump sum investment on the exit value of the VC firm's share in the EV rather than the positive effect proposed by Smolarski and Kut (2011). To further analyse this effect, the relationship between two VC firms that enter a lump sum investment should be measured. By analysing the amount of resources they use in their investment relative to their relationship, it can be measured how the different relationships between VC firms may influence a lump sum investment.

## 5.6 Limitations to the Research:

Although many measures were taken when gathering and analysing the data to limit any bias in the results, there are still some limitations to the research. Firstly, the smaller size of the data sample could imply that it is not necessarily representative of the VC deal population in Europe. Due to the limited availability of VC deal data, it is difficult to gather a representative sample. Therefore, as stated in Section 5.5, a larger sample should be gathered to analyse the effects of different VC deals and their types of expertise.

Building on this, the current data sample only consists of positive EV exits and therefore does not include data on VC deals that failed. This may also create a bias in the results and therefore data points for this population set should be gathered as well. Similarly, Preqin is only able to access data from public deals and does not have access to many private deals. The deals for which they do have access to are deals with VC firms who were willing to share their data however they do not have this measure for VC firms who were not willing to share their deal data. A measure for the results of these deals also improves the accuracy of the sample.

A final limitation is the time frame of the research. The paper was constructed in 3 months, which allowed for a comprehensive analysis of the data however there was limited opportunity to conduct detailed qualitative interviews with multiple VC firms. These interviews may have provided some more insights into the choices for specific types of expertise and how these types complement each other.

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## Appendix B:

### Appendix 1.1:

<b>Types of Non-Financial Aid</b>		<b>Descriptions</b>
Externally Oriented	Legitimation	An improved reputation with respect to other EVs due to the presence of a VC investment
	Outreach	An improved connection with other investors due to the presence of a VC investment
Internally Oriented	Recruiting	The acquisition and implementation of professional and capable manager
	Mandating Activities	The development of the performance, structure, and measures of the team in combination with incentive schemes
	Strategizing	The emphasis on the long-term growth of the firm and its success
	Mentoring Activities	The informal coaching and development of the EV that is conducted by the general partner
	Consulting Activities	The formal planning and knowledge that is applied to the firm through the general partner
	Operating Activities	The VC's support in the daily operations of the venture and optimizing its daily performance