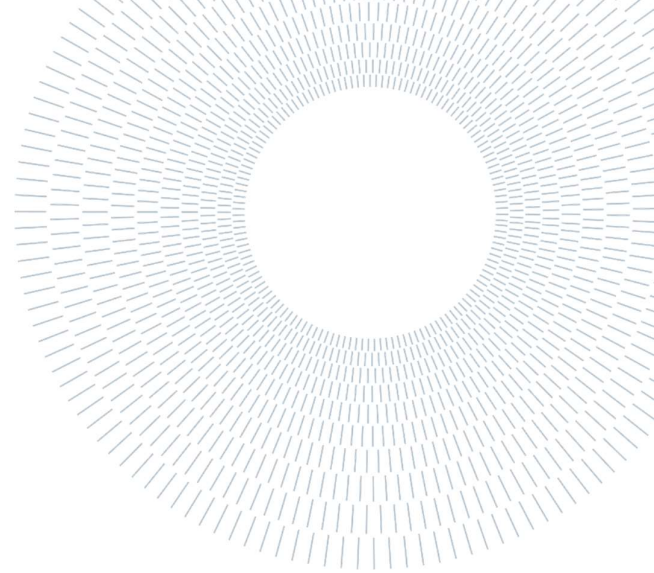




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EXECUTIVE SUMMARY OF THE THESIS

## An Exploratory Analysis of the Impact of Macroeconomic Variables on Corporate Venture Capital Activities

TESI MAGISTRALE IN MANAGEMENT ENGINEERING – INGEGNERIA GESTIONALE

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### 1. Introduction

The present study focuses on the Corporate Venture Capital, an investing phenomenon that acquired huge interest between corporations in the last decades. Corporate Venture Capital, briefly said CVC, consists in minority equity investments done by one or more corporations into small companies, usually start-up.

CVC is not a completely new phenomenon among corporations. According to the literature [1], the earliest traces of CVC activity date back to the early 1900s, when Pierre S. Dupont, president of the chemical company, invested in the new-born General Motors (“GM”). The DuPont investment in GM is regarded as the first CVC investment, blended with mixed financial and strategic objectives [1]. Such a phenomenon has grown during the years, always acquiring more and more space among corporations. However, it is in recent decades that this phenomenon has gained momentum in terms of business volumes. In fact, in recent years, CVC activities have grown rapidly

and increased their role in the overall venture capital industry.

The present work has therefore started from a broad literature analysis of the overall CVC field, with an initial focus on the concept of Open Innovation that it is core to understand the idea of the CVC [2]. The CVC phenomenon has been extensively studied over the years by various researchers and practitioners, who have often highlighted its strategic role for investing firms and its importance in terms of innovation. However, our review of the literature pointed out that there are still no specific studies that relate Corporate Venture Capital to certain macroeconomic or national factors. Therefore, in the second part of the work, an **exploratory analysis** taking the energy industry has been performed with a statistical analysis of 156 deals in the time span 2018-2020.

### 2. Literature Review

The following literature review provides a comprehensive overview of Corporate Venture Capital, including its key traits and objectives. To this end, our analysis begins by focusing on the

concept of innovation as the central concept of Corporate Venture Capital. We therefore analysed the Open Innovation model as a corporate strategy for innovation. Specifically, we contrasted the Closed Innovation model and the Open Innovation model. After identifying and analysing the main characteristics that these two models possess, we delved into how one can move from one model to the other to concretely implement the concept of innovation. Building on these initial concepts, we then delved into the study of Corporate Venturing as a phenomenon strongly aligned with the concept of Open Innovation. In particular, we analysed the phenomenon of Corporate Venture Capital as a key component of Corporate Venturing. Exploring the studies conducted so far on Corporate Venture Capital, several interesting points emerged, and this analysis allowed us to understand how, globally, studies have evolved over time. To understand this phenomenon even better, we compared and analysed Corporate Venture Capital with Corporate Venturing to understand its objectives and strategies.

Our analysis then explored which factors are relevant in the analysis of a corporate venture capital operation. Thus, we found out which factors carry the most weight in the analysis of a CVC operation: the company, the industry, and geography.

Next, to further explore the concept of a CVC operation, we delved into the different perspectives from which a CVC operation can be analysed. It turned out that these are mainly: individual level, organizational level, and market level. However, we found that each of these three perspectives can be further deepened to get an even more accurate and timely version of the phenomenon in its entirety.

Next, we wanted to lay the groundwork for understanding how CVC operations behave and the trend they have in Europe and America, as we knew that these would be two geographic areas from which it would be easy to extract CVC data for our future analyses. From here we were able to understand the main trends and characteristics typical of these two continents. Next, the literature review considered the aspect of technological discontinuities and linked it to the concept of Corporate Venture Capital.

Reading several articles, however, we realized that we had not considered an aspect that may be of interest when considering a CVC transaction,

namely the organizational structure of the companies involved. For this reason, we decided to take a closer look at this concept and its impact. Therefore, we added a section explaining and analysing the operational models of CVC transactions. This section allowed us to understand the three main types of operating models that can be identified, namely the "Balance Sheet," the "GP Model," and the "LP Model." Each of these three models was then explored in more depth, with the goal of providing a complete picture, from an intentional strategic perspective, of what it means to choose one model or another. To support the analysis of the operational models, we delved into the topics of purpose, structure, talent, measures of success, and examples, to have a complete overview of the phenomenon.

Finally, we decided to study the energy sector, as it is highly active in Corporate Venture Capital. Therefore, we first analysed the sector in general, investigated CVC operations in that sector, and hypothesized a possible future development of that sector.

The literature analysis has pointed out the main characteristics and objectives of the CVC, highlighting the key concept behind such a phenomenon. However, it also pointed out the lack of studies that relates macroeconomics concept (as the Level of Country Development and Education) to CVC.

### 3. Hypotheses & Methodology

Therefore, the second part of the thesis has focused on setting up the hypotheses and a methodology framework for studying the link between macroeconomics variable and the Corporate Venture Capital.

We first developed our hypotheses from a fundamental concept for Corporate Venture Capital, namely the concept of innovation. From several studies, we have seen how the concept of innovation is strongly related to a country's level of development and education. For this reason, we then decided to investigate a possible link between these two elements and Corporate Venture Capital, trying to understand whether the value of a certain CVC deal is affected. Therefore, we ended up developing two hypotheses according to which we positively associate the Deal Size to the Country Development and Educational Level.

The next step has been the selection of the industry into which run our analyses, such as the Energy Industry. This sector is going into radical innovation, and it has therefore been considered as significant examples for carrying out an exploratory analysis. In addition, it is one of the industries more active as regarding CVC activities. A subset of 156 deals has therefore been selected in the time span 2018-2020. Per each deal a set of variables has been selected. In particular, we collected the size of each deal in terms of Money Raised and we used it as Dependent Variable in our model. Moreover, the Funding Round, the Strategy pursued, and other variables have been selected with the perspective of using them as Control Variable. Then, we collected the data about the Gross Domestic Product (GDP) and the Educational Attainment Rate (EAR) per each country, respectively as numeric variables for the Country Development and Educational Level. Therefore, using all the data collected, we built up our database to run a statistical analysis.

To test our hypotheses and thus test for a possible link between our dependent and independent variables, we considered **Ordinary Least Square (OLS) Regression** to be the most appropriate model. We also tested our variables so that those were aligned to the OLS model assumptions.

## 4. Main Findings

Our statistical analysis did neither verify nor disprove our hypotheses. Indeed, the OLS model did not show a significant relation between our independent variables and the dependent one. However, ours is just an exploratory analysis, with the aim of setting some ideas for future research. In addition, our model presents some limitations that could affect strongly the results obtained.

Despite these limitations and despite the fact the model did not verify our hypotheses, the analysis gave some interesting insight that left the doors opened for future research.

Indeed, our analysis showed some significant correlation that links our country variables to some variables related to the CVC deals.

In particular, we found that there is a positive and quite strong correlation between the GDP and the number of investors in a deal, that seems to indicate that CVC companies preferer to move their capital in more developed countries. Another interesting correlation is the positive one between

the GDP and the Funding Round, that seems to indicate that the start-up based in developed countries are more alike to reach later stages and therefore raise up more funds.

## 5. Limitations

The outcomes of the application of our econometric model and the methodologies used provided intriguing new information about the relationships between CVC investments and macroeconomic factors. The present dissertation does, however, have some limitations, just like any other research paper. These limitations can be broadly divided into two categories: limitations related to the data and methodology used, as well as the industry chosen.

Starting with the selection of industry to which the CVC deals belong, there are two main typologies of sectors: defensive and cyclical. A sector is defined as cyclical when it is strongly influenced by trends in the business cycle (such as movements in GDP or industrial production). In contrast, defensive sectors are little correlated with the business cycle and are less affected by any growth slowdowns or recessions. From the information just provided, it is possible to infer that the decision to focus our analysis on the Energy sector, which is a part of the Defensive Sector category, has some implications and might even constrain it. The selection of a defensive sector, which has little correlation with the economic cycle and is thus less affected by slowdowns or recessions and macroeconomic variables, may actually be controversial given the purpose of the current study, which refers to understanding the impacts of macro-economic variables on CVC deals.

On the other hand, it should be noted that our database does not include all potential CVC deals that might have taken place in the three-year period between 2018 and 2020, which is one of the limitations related to the variables used and the methodology used. In fact, it would have been appropriate to use multiple sources and make use of multiple databases in order to have a broader perspective of all the CVC deals that took place.

The variables we thought about and used for the analysis were selected based on the data from the CrunchBase and OECD databases. Undoubtedly, additional variables could have been retrieved with the aid of other databases, enhancing the analyses that were conducted. Additionally, our

dependent variable, the deal size, only takes into account the money collected in the CVC Deal under consideration and ignores all other factors. In fact, a more thorough approach might have taken into account additional variables that are part of the dependent variable (e.g., minority stake acquired).

Moreover, political and economic factors also play a role in the chosen time horizon, which is the three-year period from 2018 to 2020. These factors undoubtedly affected the quantity and variety of CVC deals. The layout of the search engines on the websites also imposed some limitations. We weren't aware of how the sites were constructed, so we only selected the categories we felt were most appropriate. The main challenge should be to comprehend how the categories were defined in order to choose all of those that contain CVCs. In fact, one has the choice to choose and filter the data using a few predefined categories during the filtering stage. This unquestionably weakens our work because we are more likely to have missed some aspects that might have been relevant to our search.

Therefore, additional directions for improving the current dissertation might include broadening the dataset to include other industries and assessing the use of additional databases, which would allow for the consideration of more variables, as well as more CVC deals.

To sum up, we believe that this paper demonstrates that understanding CVCs requires much more than simply examining the amount of invested capital and a few macroeconomic variables. When analyzing a CVC deal, it is important to take into account the investing company's larger innovation context. Any assessments of the effectiveness of CVCs should look beyond the financial returns on the investments in the venture portfolio and consider the extent to which these investments have aided the expansion of the investing company.

We hope that this paper will spark new and intriguing directions for further study in this field.

## 6. Conclusions & Implications

Several implications emerged from our analysis, mainly involving investors and practitioners.

Starting from our first hypothesis, it turned out that it is not statistically verified, but a positive correlation was noted between the variable Deal

Size and the GDP of the target company's country. This result, albeit partial, could be the starting point for further and more in-depth analyses, which could also use a more structured database, a larger number of deals and a longer time horizon.

As for the second hypothesis, it has been neither disproved nor confirmed by our econometric model. Therefore, again, expanding the boundaries of our analysis, i.e., increasing the number and type of data available (including both the number of CVC deals and additional macroeconomic variables), could lead us to identify new correlations, which would enrich our analysis.

It is now possible to explore implications for potential investors of corporate venture capital deals. In particular, investing companies must quickly adapt their operating models and mindsets to realize the value of early-stage and middle-stage CVC investments. Indeed, CVC deals demand a higher risk tolerance, quicker decision-making, and a longer investment horizon than what most corporate acquirers are used to. A committed investment team with proven expertise is the first crucial component for companies interested in CVC. The company's reputation in the venture capital community will increase as a result of the hiring of individuals with extensive experience in corporate venture capital. Hence, it is possible to say that two crucial aspects of venture capital are network and reputation as a trustworthy investor.

## 7. Bibliography

- [1] "CB Insights," 2017. [Online].
- [2] H. Chesbrough, "The Era of Open Innovation," *MIT Sloan Management Review*, pp. 44(3), 35–41, 2003.

## 8. Acknowledgements

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