LUISS

Dipartimento di

Impresa e Management

Cattedra di Advanced Corporate Finance

Startups and Corporate Venture Capital (CVC) in Italy: An Empirical Analysis

Prof. Rosella Santella

RELATORE

Prof. Luigi Gubitosi

CORRELATORE

Matr. 737951

CANDIDATO

Anno Accademico 2021/2022

TABLE OF CONTENTS

INTRODUCTION

The purpose of this paper is to investigate corporate venture capital (CVC) in Italy and its impact on the Italian economy and startups.

CVC has been identified in the relevant literature as one of the ways of corporate venturing, Among the various ways of corporate venturing, this can be divided into internal and external depending on whether the investment is made for the development and exploration of new technologies or externally through the acquisition of the capital of third-party companies (Reinabsch & Hauschild, 2012; Keil, 2000)

Corporate venturing capital has thus been defined as one of the modes of external corporate venturing. Corporate venture capital activities comprehend both regular management of corporate investments (direct external VC) and investment decisions made by a venture capital fund in which the corporation participates with a certain stock of capital (indirect external VC (Miles & Covin, 2002). This can be either self-managed, and thus exists within the firm, or exists as a dedicated fund outside the company that is a separate entity with well-defined strategic objectives (Gompers 2002; Keil, 2000; Markham et al, 2005; Reinbasch & Hauschild, 2012).

Furthermore, established companies can invest in the stock capital of third party dedicated funds, becoming a passive limited partner of them (Reinbasch & Hauschild, 2012). However, the consideration previously made about strategic objectives with this form of CVC doesn't have that much value as becoming passive limited partners respond to the purpose of gaining mainly financial returns.

Throughout the analysis of the relevant literature, the thesis is argued that corporate venture capital responds not only to financial strategies but primarily to strategic ones. Although, firms have historically struggled with the successful use of corporate venturing for long-term growth as there has been uncertainty over how CV might be operationally linked to a firm's scope and strategy (Covin & Miles, 2007). Indeed, corporate venture capital has grown in recent decades, and it had become an important tool in the open innovation strategies of many leading companies (Zhang, 2021). Specifically, it is argued that corporate venture capital strategies address the following objectives: a) learning; b) option building – to acquire new companies or to enter new markets; c) leveraging own technologies and complementary resources (Maula, 2001).

From the startup perspective, corporate venture capital is seen as an alternative source of funding for traditional venture capital (Maula, 2001). The main difference between CVC and venture capital is the direct link between the parent company and the portfolio companies. This relationship is the key concept on which it is based the argument that corporate venture capital might create (add) value to young and innovative companies.

Thus, in the course of the analysis, the model proposed by Maula (2001) about the value-added mechanism is highlighted, which underlines three ways in which startups receive value through the parent company – knowledge acquisition, resource acquisition, and endorsement.

In the second chapter, the Italian context of innovative startups and SMEs and corporate venture capital is analyzed. The Italian legal framework for innovative startups and SMEs is then analyzed. The interventions of the legislature in recent years to foster the growth of young and innovative companies are specifically discussed. These, starting with the "Decreto Crescita 2.0", concern a process of un-bureaucratization of certain stages in the establishment and dissolution of startups and innovative SMEs, as well as incentives for investment in them by individuals and legal person. In addition, the interventions of the legislature in the period related to the pandemic from Covid 19 are highlighted and analyzed. It is therefore emphasized the work by the Italian government in creating favorable environments for the growth of innovative startups and SMEs about programs to facilitate access to credit and provision of loans (Smart & Start), as well as programs for their internationalization (SPIN program).

The second chapter analyzes and discusses the spatial and sectoral distribution of innovative startups and SMEs in Italy. Two main sources are referenced throughout this analysis: the Annual Report to the Parliament 2021 (MiSE, 2021) and the Sixth Observatory on Open Innovation (Assolombarda & InnovUp, 2021).

In addition, the territorial and sectoral distribution of CVC members registering in the area is discussed. Thus, the number of CVC members themselves in Italy, the geographical area in which they are most dispersed, and the sectors in which the largest investments have been made are analyzed. Finally, of relevance to the purposes of this study, the weight of startups and innovative SMEs participated by CVC members in the total volume of Italian production is analyzed.

Finally, the empirical analysis conducted on Italian startups is discussed. This analysis aims to answer two research questions:

a) Is there a relation between CVC and startups' performance? – Model A

b) What are the startup characteristics that lead to a CVC relationship? – Model B

The analysis was conducted on a sample of 200 Italian startups operating in Italy and founded between 2010 and 2020. The main problem encountered throughout the empirical analysis is the lack and fragmentation of data. This problem particularly pertains to financial data. The data collected were therefore hand-collected from multiple sources.

As highlighted above, Model A investigates the relationship between startup performance and the presence or absence of CVC partners. The model is then set up as a linear regression taking Compounded Annual Growth

Rate (CAGR) as the dependent variable and CVC as the independent variable – set up as a dichotomous variable (1, presence of CVC; 0, otherwise).

Model B, on the other hand, was set up as a logit, having CVC (dichotomous) as the dependent variable and qualitative and quantitative characteristics of startups as the independent variable.

The results of the analyses will be exhibited and discussed in the Empirical Analysis section and the conclusions.

Chapter 1:

LITERATURE REVIEW

In this section, the relevant literature on corporate venturing and corporate venture capital is examined in relation to the extent of this work. Hence, it was important to resolve and specifically determine the right taxonomy for corporate venturing and corporate venture capital activities and then explain what the benefits and objectives are that the established company and the venture would gain in such an investment relationship.

Before moving on to the explanation of the notion of Corporate Venturing (CV) and its different meanings, it is necessary to first introduce the related concept of Venture Capital (VC) briefly. Then, the definition of corporate venturing and its different modes are agued by taking into consideration the framework developed by Keil (200) and the different characteristics on what is based the distinction made by Reinabsch & Hauschild (2012). Finally, based on the definition of corporate venture capital, the benefits and strategy pursued with such an investment tool are argued both from the perspective of the established firm and from the startup.

1.1 Venture Capital (VC)

Venture capital activity can be defined as the investment activity with the capital of risk in companies that have the potential to develop into significant economic contributors (NVCA, 2001). Therefore, VC is a long-term equity-based finance where the capital gain is the primary reward for the investor (Lorenz 1989) when the exit is completed. As Bygrave and Timmons (1992), it has a significant role in the entrepreneurial process as it sustains its economic growth and revival.

Although many authors have focused on the definition of Venture capital as an investment, it is important to notice, also in relevance to the scope of this study, that it has an important role in the business development of a startup. In this sense, Gompers and Lerner (2004) have argued that venture capital can be viewed as a cycle that starts firstly with the raising of a venture fund, then proceeding through investing in a business, monitoring and adding value to the firm. Then the cycle ends with the exit deal and the capital gain, and it starts over with another investment opportunity.

This metaphorically coaching activity by Venture capitalists (Hellmann, 2002) and its production of value-added for the startup is one of the most important considerations for entrepreneurs when selecting investors (Smith, 2001) along with the investment offers in connection with the share and types of stocks the founders would concede. Corporate venture capital represents another important complementary alternative source of

financing, especially for technology-based new firms (Christopher, 2000; Hellmann, 2001; Maula & Murray, 2017).

This definition of venture capital as a value-adding process (Hellmann & Puri 2000, 2002, Sapienza 1992) is relevant to the scope of this study since it is argued that corporate venturing provides important helps in supporting and creating value for the invested company.

1.2 Corporate Venturing (CV)

Moving from a brief description of Venture Capital (VC), the concept of Corporate Venture Capital can be expressed in several ways. Firstly, there are two main alternative perspectives: (1) corporate venturing as a mode of external venturing from the perspective of the corporation (Henderson & Leleux, 2001; Kann, 2001; Keil, 2000) or (2) as an alternative source of funding from the perspective of an entrepreneurial company (Gompers & Lerner, 2000; Maula & Murray, 2000a). This study is focused mostly on the latter as the extent is to empirically analyze the relationship between corporate venturing and a startup's growth and the qualitative and quantitative factor that makes the venture more attractive for a corporate venturing investment. Secondly, as it is argued in this section of the study, it is important to define the taxonomy of corporate venturing as the expression Corporate Venture Capital (CVC), which is critical for the analysis, has been utilized in the literature in different ways (Nathusius, 1979). Besides the differences in classifying this tool and the problem of fragmentation within the relevant literature, corporate venturing is defined as equity or equity-linked investment in young, privately-held companies (Maula, 2001), where the investor is a well-established corporation pursuing financial and strategic objectives.

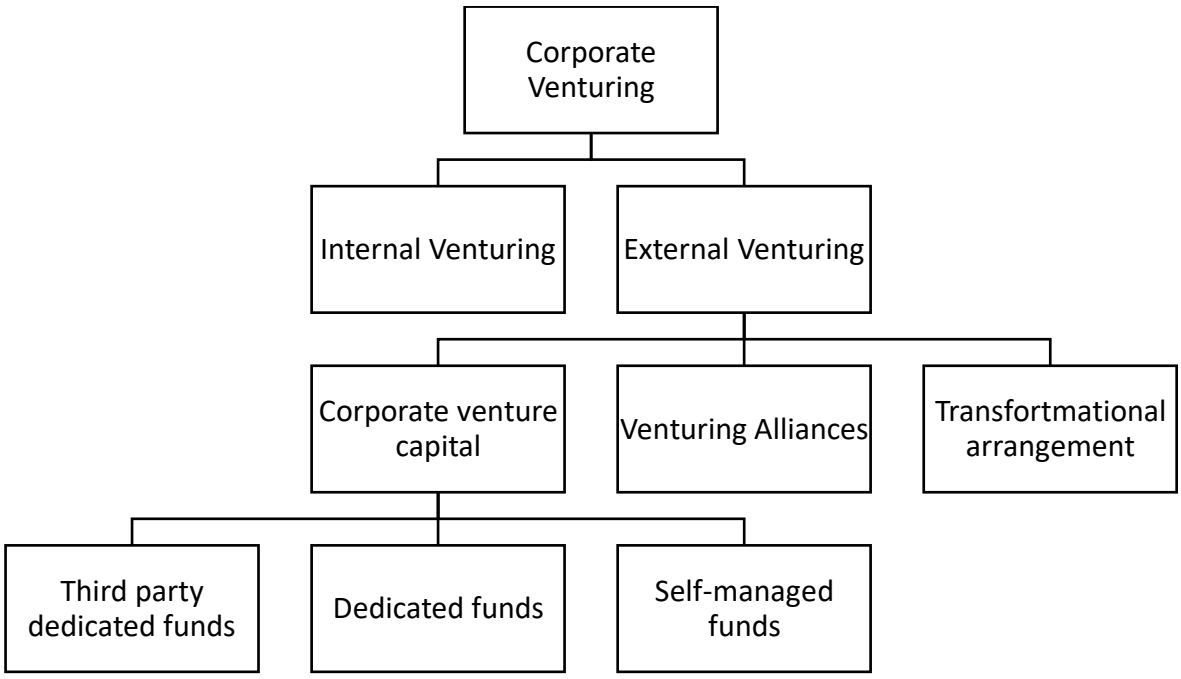
Therefore, the main difference between venture capital and corporate venturing is the fund sponsor (Maula, 2001) as in corporate venturing the limited partner for the start-up is a corporation that can operate as an investor directly or via a subsidiary corporation. This difference based basically on the investor leads to important considerations regarding the value-added for the startup, hence the non-financial benefits received from the corporate venturing investment investor (Maula, 2001). As the investor is, directly or indirectly, a major industrial corporation, this form of investment can guarantee access to the resources of the parent corporation, such as distribution channels, production facilities, research and development, technology, or pricing benefits on the products and services of the corporation (Alter & Buchsbaum, 2000; Barry, 200; Christopher, 2000; Kelley & Spinelli, 2001; Maula & Murray, 2017). Furthermore, "an investor relationship with a major corporation may provide valuable endorsement for a new technology-based firm" (Maula, 2001: p. 15).

In the next paragraphs, corporate venturing and corporate venture capital are analyzed firstly from the point of view of the established corporation (Henderson & Leleux, 2001; Kann, 2001; Keil, 2000) and then from the startups' (Gompers & Lerner, 2000; Maula & Murray, 2017).

1.3 Modes of Corporate venturing

Corporate venturing, as described and analyzed in the previous paragraph, can be discerned and classified in different modes. In this work, the hierarchy defined by Keil (2000) is considered as a key theoretical underpinning.

Fig. 1: Corporate venturing modes



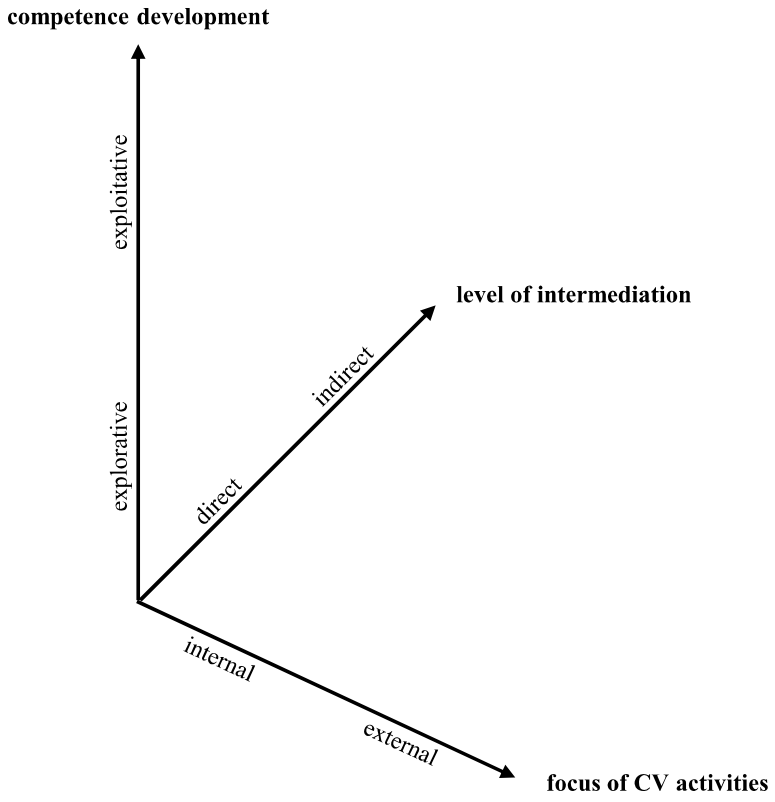
Source: Keil (2000)

The different modes and their explanation are crucial for this study as only the concept of Corporate Venture Capital (CVC) will be taken into consideration when analyzing a sample of 200 Italian startups.

In this section will be briefly discussed the definitions of both internal and external venturing before introducing and explaining the concept of corporate venture capital and its objectives and benefits from the established company and the startup points of view. The differences between internal and external corporate venturing are discussed taking into consideration the framework proposed by Reinabsch & Hauschild (2012),

in which they bring together many theories of the relevant literature: (1) distinction between internal and external corporate venturing; (2) the degree of intermediation within the corporate venturing process; (3) the explorative and exploitative orientation of corporate venturing.

Chart 1: Dimension of the CV typology



Source: Reinbasch & Hauschild (2012)

1.3.1 *Internal Corporate Venturing*

Internal CV comprises the development and exploitation of business models within the established company that focuses on new technologies, processes, or product markets and differ substantially from the inherent risk characteristics of the core business (Starr, 1993).

Internal corporate venturing strategies concern the formation, development, and exploitation of a business model within an established company that focuses on new technologies, processes, or products, and differ substantially from the core characteristics of the core business (Starr, 1993). These business models receive funds directly from the parent company or alternatively, companies might create a specific Venture Capital

fund that works as an intermediary for the parent company and invest the funds supporting the ventures – indirect internal corporate venturing.

Internal CV is an important tool that can be used to directly increase a firm's competitive ability by exploiting the internal innovation potential within an organization (McGrath et al, 1994; Zahra et al, 1999). The exploitation dimension is the main characteristic of internal corporate venturing, and it assumes significance in relation to organizational learning, and therefore the creation and combination of core competencies and resources (Miles & Covin, 2002) that can be transferred among the existing business units and new ventures (Burgelman & Välikangas, 2005; Keil et al, 2009).

However, since internal corporate venturing draws on financial management resources, it can cause high transaction costs (Reinbasch & Hauschild, 2012) and there is a risk that exploiting core competencies too different from the existing ones might have a negative impact on the company's daily business operations (Burgelman, 1985). Thus, an alternative is to access innovative technologies and core competencies through external corporate venturing strategies.

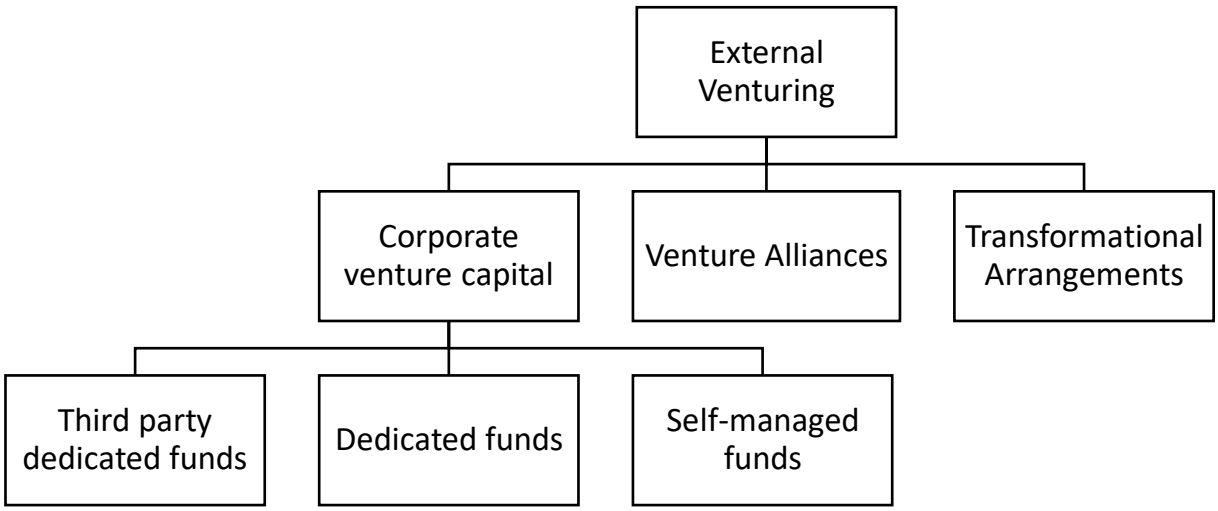
1.3.2 *External Corporate Venturing*

Several studies have shown that external corporate venturing has the important objective of proving a "window on technology" (Witt & Brachtendorf, 2002; Benson and Ziedonis, 2009; Anokhin et al, 2011) which consist of the possibility of accessing new technologies (Teng, 2007) by investing in young and highly innovative startup companies. In this sense, external corporate venturing represents an opportunity for an established company to acquire externally core competencies that could not be produced or generated internally.

This form of investment can also be risk-reducing, in the sense that can be a hedging instrument for the established company from unexpected technological change (Seeliger, 2004). The corporate venture "can anticipate technological trends at a very early stage and thus potentially influence them to the firm's own advantage" (Reinbasch & Hauschild, 2012: p. 75).

By recalling the framework defined by Keil (2000), external venturing can be classified furthermore in (1) Corporate Venture Capital (CVC), (2) Venturing Alliances, and (3) Transformational arrangements, depending on the investment form and objectives.

Fig. 2: Extract of Corporate Venturing Modes I



Source: Keil (2000)

In this paragraph are briefly explained respectively the two groups of venturing alliances and transformational arrangements and then, it is provided a definition and explanation of the central topic of this work – Corporate Venture Capital (CVC).

The group of Venturing Alliances includes non-equity, direct minority investments, and joint ventures (Keil, 2000). The main difference between CVC and Venturing alliances is that the latter's relationships with the venture are built on intense cooperation rather than on investment (Maula, 2001). The reason why proceed with such arrangements are mainly the access to new resources, economies of scale, building brand awareness, to mitigatemitigating risk-specific of an industry, and often produce synergy and technical upgrade of skills to improve the business process (Stead J. G. & Stead W. E, 2014).

If the distinction between Corporate Venture Capital and joint ventures and non-equity investments is clear and absolute in the literature, there have been various arguments regarding the difference between CVC and direct minority investments (Maula, 2001). For example, McNally (1997, p. 37) used the term "corporate venture capital" to describe "instances where an equity stake has been taken by a large corporation in a small, unlisted company, whether it is coupled with further strategic relationship or not". In this matter, Keil (2000),

within the sample of case companies analyzed, found that could be identified three dimensions that distinguishes these two activities. First, corporate venture capital investments are identified more as market monitoring activity whereas in direct minority alliances the focus tended to be more on value creation.

Second, the CVC was made in the strategically less close venture, with andan intent to diversify, than direct minority investments. Third, corporate venture capital investments were driven more by financial objectives than direct minority alliances.

Finally, the last group of external venturing modes in Keil's (2000) framework is transformational arrangements which consist of acquisitions, where external ventures are internalized, and spin-offs, in which internal ventures are externalized (Maula, 2001).

1.4 Corporate Venture Capital (CVC)

The last group that is being analyzed in this paragraph is the Corporate Venture Capital (CVC). In this study, CVC is the sole form of external corporate venturing considered and any other citation of the term 'Corporate Venture Capital' have the meaning intended by Keil (2000).

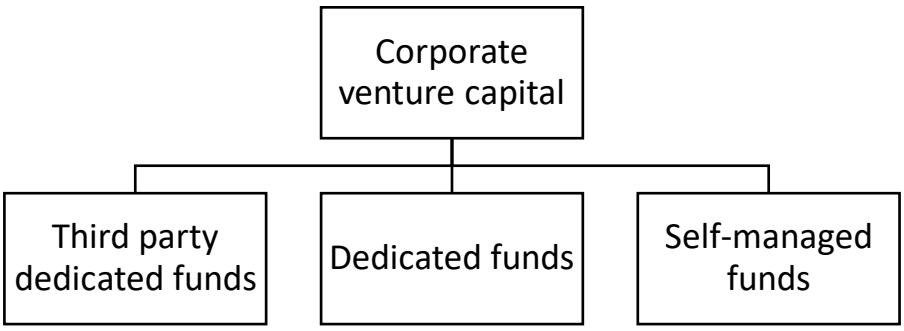
As we saw in the previous paragraph, corporate venturing can take various forms – internal or external, alliances and transformational arrangements – but the most important example is corporate venture capital (CVC) (Maula, 2001). This term is intended for every construct where an established corporation, as the sole investor or via syndicated investments (Anokin et al, 2001), invests in young and innovative startup companies (Dushnitsky & Lenox, 2005 and 2006).

The main difference between venture capital and CVC is that the latter is dominated by strategic objectives and the degree of intermediation is an important aspect that determines underlined this difference (Reinbasch & Hauschild, 2012).

The fact that Venture capital differs from corporate venture capital because of the latter is dominated by strategic objectives is underlined by the degree of intermediation (Reinbasch & Hauschild, 2012).

Corporate venture capital activities comprehend both regular management of corporate investments (direct external CV) and investment decisions made by a venture capital fund in which the corporation participates with a certain stock of capital (indirect external CV (Miles & Covin, 2002). This can be either self-managed, and thus exists within the firm, or exists as a dedicated fund outside the company that is a separate entity with well-defined strategic objectives (Gompers 2002; Keil, 2000; Markham et al, 2005; Reinbasch & Hauschild, 2012).

Fig. 3: Extract of Corporate Venturing modes II



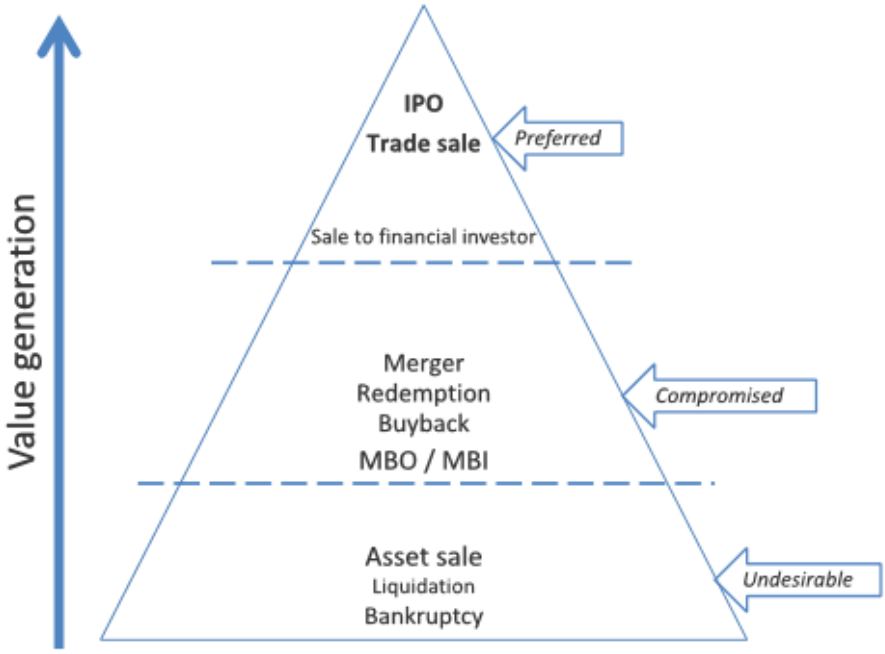
Source: Keil (2000)

Furthermore, established companies can invest in the stock capital of third-party dedicated funds, becoming a passive limited partner of them (Reinbasch & Hauschild, 2012). However, the consideration previously made about strategic objectives with this form of CVC doesn't have that much value as becoming passive limited partners respond to the purpose of gaining mainly financial returns.

In this sense, in this work, the term corporate venture capital has a comprehensive meaning, also considering the investment form of third-party dedicated funds. The sample analyzed for this study is composed of 200 (two hundred) startups. However, in the selection of the case companies, when looking at the presence of a corporate venture capital investment, only the two subgroups of dedicated and self-managed funds were taken under consideration. The reason for this choice is based upon the type of research as this work is focused on both strategic and financial perspectives of this kind of investment tool and it has been argued that using third party dedicated funds as a passive limited partner is not relevant to the strategic scopes of such tool.

Regardless of the structure or form of the CVC investment, there are several exit options for the established corporation which mainly consist of acquiring the portfolio company (Gerpott, 2009) or selling equity stakes, e.g., to other strategic investors or in the process of an Initial Public Offering (IPO) (Reinbasch & Hauschild, 2012). Below, is the representation of the most common exit opportunities identified and classified by Klonowski (2018).

Fig. 4: Exit opportunities and value generation in venture capital



Source: Klonowski (2018: p. 261)

This exit modes of disinvestment for the established company show how through a corporate venture capital investment established companies can participate "in growth opportunities and hedge against unprofitable technology trends at the same time" (Reinbasch & Hauschild, 2012: p. 76).

Several studies have argued and proved that external corporate venturing has positive effects in terms of technological competencies (e.g., Belderbos et al, 2018; Husted & Vintergaard, 2004; Maula, 2001; Wadhwa et al, 2016). It has also been argued that corporate venturing activities can have explorative and exploitative orientations (Keil, 2000; Gaba & Bhattacharya, 2012; Reinbasch & Hauschild, 2012). The difference between those forms of orientation regards their mode of exploration of new competencies and technology. In fact, while explorative external CV activities contribute to faster new market access and gain rapidly competencies in a firm's portfolio (Keil, 2000; Miles & Covin 2002), exploitative strategies focus on accessing radically new technologies (Wadhwa & Kotha, 2006; Teng, 2007). Reinbasch & Hauschild (2012) argued that CVC is more suited for explorative competence acquisitions rather than exploitative strategies. From a risk management perspective, the authors, citing Schildt et al (2005) and Williams & Lee (2009), stated that "CVC

seems also suitable for high-risk explorative investments as the initial capital commitment to each venture is quite low" (p. 76).

1.4.1 *Strategic use of Corporate Venture Capital and corporations' objectives*

Corporate venture capital has grown in recent decades, and it had become an important tool in the open innovation strategies of many leading companies, including tech giants such as Apple, Google, and Microsoft (Zhang, 2021). As in the Schumpeterian view innovation is the key driving force behind the growth and evolution of firms and economies (Zhang, 2021), CVC can be a significant tool for established companies to innovate and broaden their portfolio's technological competencies. In this matter, corporate venturing can be an important tool to enable the firm to gain greater from its core competencies by leveraging those within product-market arenas that are operationally or strategically linked to its business area (Burgelman & Doz, 2001). Corporate venturing can be used also to reach new competencies and resources that were previously outside the firm's operations (Kanter, 1989). However, firms have historically struggled with the successful use of corporate venturing for long-term growth as there has been uncertainty over how CV might be operationally linked to a firm's scope and strategy (Covin & Miles, 2007).

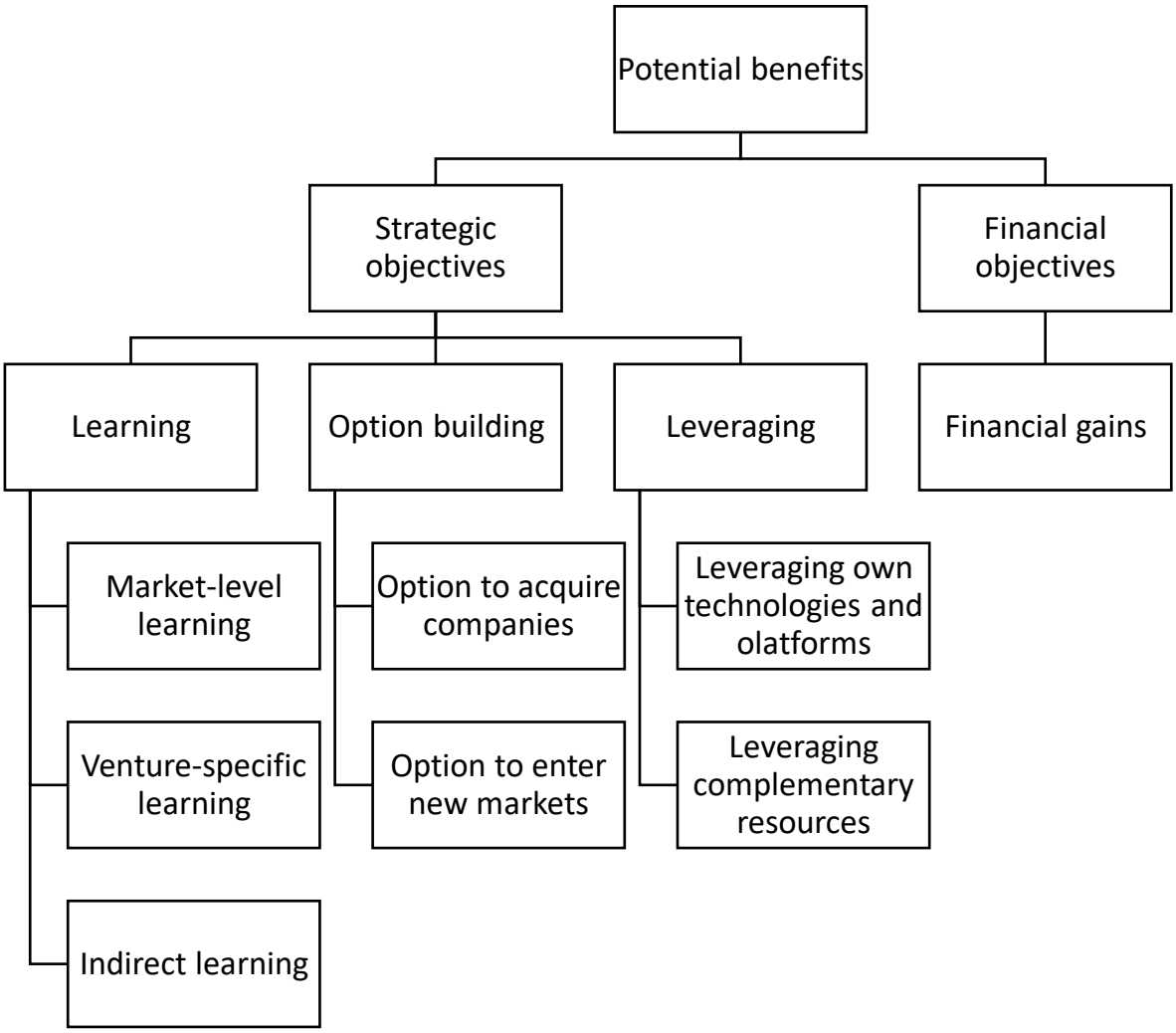
Corporations generally tend to pursue multiple objectives in their corporate venture capital strategies and activities (Maula, 2001), based upon the groups of strategic and financial strategies. For instance, Silver (1993) in his research found that the main objectives for a corporation were finding acquisition targets, getting exposure to new markets, adding new products to existing distribution channels, externalizing R&D, exposing middle management to entrepreneurship, training managers, and utilizing excess plant space, time, and people. Sykes (1990) found that the most important goals were finding new opportunities and developing business relationships. McNally (1997) found that the main objectives pursued were similar to Silver's (1993) and Sykes' (1990) findings, along with exposure to new technologies and financial return. Finally, more generally, authors like Bisesi (1984), Drucker (1985), and Sayles (1986) found that organizations are keen to discover new ways to execute current operations or new operations that represent growth opportunities (Covin & Miles, 2007).

Recent research has shown that both strategic and financial objectives are crucial for corporations when pursuing corporate venture capital activities (Alter & Buchsbaum, 2000; Keil, 2000). Keil (2000) found that while strategic objectives are the drivers for corporate venture capital activities, investments are made based on financial criteria as the financially most promising companies should be the best to learn from (Maula, 2001).

In this paragraph are analyzed both Kann's (2000) and Keil'sil (2000) findings of corporations' objectives to pursue CVC activities as they are both relevant to the extent of this work. Kann (2000) distinguishes three classes of strategic objectives: (1) external R&D, (2) accelerated market entry, and (3) demand enhancement.

Keil (2000), on the other hand, identified the following four objectives: (1) monitoring markets, (2) learning about markets and new technologies, (3) option building, and (4) market enhancement. Maula (2001) has summarized and integrated the objectives found by Kann (2000) and Keil (2000) (Fig. 5).

Fig. 5: Re-elaborated version of Potential benefits for corporations from corporate venture capital



Source: Maula (2001)

The financial objectives, e.g., financial gains, are not relevant for the purpose of this study, at least from the established company's point of view.

The strategic objectives are classified into three groups – learning, options building, and leveraging, which can be divided into different subgroups.

Market-level learning refers to learning by being exposed to the development of markets, technologies, and businesses when monitoring the portfolio companies (Keil, 2000; Maula, 2001; Silver, 1993).
Venture-specific learning refers to learning from the relationship with the portfolio companies (Maula, 2001). Many studies have argued that corporations might use corporate venture capital as a form of external R&D (Kann, 2000; McNally, 1997; Silver, 1993). However, Kann (2000) argued that externalizing R&D might result in higher risk for opportunism by the corporate investor.
Indirect learning refers to learning from the corporate venture capital process (Maula, 2001). Many authors have argued that corporations might and have used CVC to also train managers (Silver, 1993), support the development of corporate venturing processes (McNally, 1997), and build new business relationships (Winters & Murfin, 1988).

Although the option to acquire companies is included in the framework constructed by Maula (2001), many studies have shown that this goal is not that often pursued by established companies as the majority of the acquisitions had been made by outsider companies (Maula, 2001).
Options to enter new markets refers to the possibility of corporations using corporate venture capital to prepare for entering new markets, learning from the portfolio companies the necessary skills, and ensuring the right timing (Kann, 2000; Keil, 2000). In particular, Keil (2000) have argued that corporations strategically use to create alliances and ensure that they have some stakes in innovative and technology company when entering a new market.

Leveraging own technologies and platforms is a relevant strategic use of corporate venture capital for this work. It refers to corporations using CVC to stimulate demand for their technologies and products (Maula, 2001), and to promote the development of "de-facto standards around their technologies" (Maula, 2001: p. 29) by supporting the growth of innovative start-ups through corporate venture capital (Kann, 2000).
Furthermore, leveraging own complementary resources is another relevant subgroup classified by Maula (2001) as it refers to the possible use of corporate venture capital to access new distribution channels and production facilities. This sub-category assumes a value in this work considering the start-up point of view. In fact, as those young and innovative companies might have limited access to distribution networks, the vicinity of large and established is an important tool for their growth (Maula, 2001).

Besides the last group – leveraging – all the categories underlined by Maula (2001) have relevance in this study and they will be discussed further in the next section when talking about the start-up perspectives. In fact, these above-mentioned benefits and objectives for corporations when delivering CVC strategies can be

translated from the startup point of view. For instance, financial objectives align with the objective of fast growth and value creation within the startup. Learning new competencies and leveraging new technologies finally is significant for an innovative company as, especially if the corporate investor is in the same business like it, there are possibilities to access new markets and receive valuable know-how.

1.4.2 *Corporate venture capital from the perspective of the startup*

After having explained the different modes of corporate venturing, with a special eye on corporate venture capital and its benefits for the parent companies, it is time to answer the question: What it is in for startups? In the previous section, it has been argued that the benefits for corporations when adopting the CVC strategy can be translated from the startup's point of view. In fact, in this work, it is argued that aside from financial benefits, the exchange of core competencies and gaining access to resources and relevant know-how is key for a startup's growth. Therefore, rather than financial objectives, the strategic relatedness between the corporate venture and the portfolio companies is considered an important determinant of the benefits for ventures (Gompers & Lerner, 2000).

From the startup perspective, corporate venture capital is seen as an alternative source of funding for traditional venture capital (Maula, 2001). The main difference between CVC and venture capital is the direct link between the parent company and the portfolio companies. This relationship is the key concept on which it is based the argument that corporate venture capital might create (add) value to young and innovative companies. Considering both corporate venture capital and VC, Brav & Gompers (1997) and Jain & Kini (1995) found that the different samples analyzed the venture-backed IPOs outperformed the non-venture-backed. Jain and Kini (2000), considering the long-term performance implications, found that venture-backed companies had a higher survival profile than the non-venture-backed. Contrary to these results, Manigart & Van Hyfte (1999) analyzing a sample of 187 venture and non-venture backed companies argued that the survival profile was lower for the venture-backed companies rather than for the non-venture backed. However, they found that the venture-backed startups had a higher growth rate in total assets and cash flows.

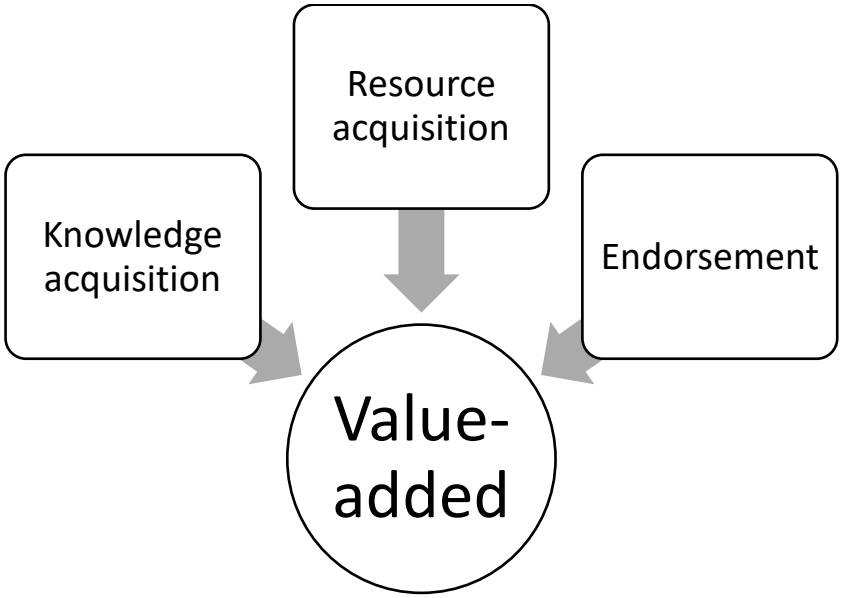
In the extant literature, there are different and conflictive opinions regarding the fact that CVC-backed corporate ventures would outperform independent ventures. For instance, Hines (1957) and Caves & Porter (1977) predicted that CVC-backed would outperform independent ones, whereas Weiss (1981) and Zahra (1996) found that independent ventures outperformed corporate ventures. In the extant literature, it has been acknowledged the important role of resources and knowledge acquisition (e.g., Backholm, 2000; Burgelman & Sayles, 1988; Caves & Porter, 1977; Hines, 1957; Parhankangas, 1999; Shrader & Simon, 1997). However, Shrader & Simon (1997), as well as Block (1982 and 1989) and Kanter (1985), argued that resource benefits

are counterbalanced by problems regarding the startup's lack of autonomy. They asserted that parent companies share resources but "may constrain ventures when translating those resources into strategies" (Maula, 2001: p. 52).

The characteristics of both the parent firm and the venture are linked to each other when analyzing the potential of their relationship (Maula, 2001) as their fit might have a positive role in the value creation. Thornhill & Amit (2001) found that a tight fit was positively associated with the venture performance because of the possibility of accessing its parent's resources. The authors also distinguished two dimensions of the fit between parent firms and portfolio companies: relational and economic. The relational fit is based upon the organization's culture and structure, while the economic fit depends on the alignment of the needs of the venture and the resources of the parent company.

Maula's (2001) work has a relevant role in this discussion as the author defined various models for the analysis of the value creation in the corporate venture capital process. The most crucial for this thesis is the model on value-added mechanisms (Fig. 6).

Fig. 6: Model of the value-added mechanism



Source: Maula (2001)

The above-illustrated model classifies three main mechanisms through which the portfolio companies receive value-added from the parent company: knowledge acquisition, resources acquisition, and endorsement.

Knowledge acquisition refers to the organizational learning by the startup through the interaction with the corporate venture capital investor and access to their knowledge base.

Resource acquisition refers to the distribution channels and production facilities that the venture can access through the relationship with the parent firm. Finally, endorsement refers to the reputational benefits that the startup receives by being associated with the corporate venture capital investor.

Maula (2001) found that those variables are positively related to the value-added for the technology-based new firm and identified social interaction and complementarities within the portfolio company and the parent company as key factors in value-creating corporate venture capital operations.

Chapter 2:

STARTUPS AND CORPORATE VENTURE CAPITAL (CVC) IN ITALY

The previous section reviewed the relevant literature on corporate venture capital. Specifically, for this study literature review was focused primarily on analyzing the benefits that both the established company and the young venture would gain from a CVC relationship. The objectives of acquiring and developing new technologies and transferring know-how are certainly some of the most relevant and significant factors illustrated. One of the purposes of this study, as will be argued in the last chapter on the empirical analysis, is to investigate (Model A) whether, in addition to the aforementioned "technological" benefits, corporate venture capital is a relevant factor in the economic and financial growth of the invested company. The second research question pertains to the investigation of the characteristics are, quantitative and qualitative, of innovative startups and SMEs that lead to the realization of this type of investment (Model B). The analyses are carried out on a sample of 200 startups operating in Italy.

It is therefore important in this section to analyze and problematize corporate venture capital in Italy. First, a formal definition of innovative startups and SMEs will be provided, referring to Italian regulations. The quantitative parameters and main qualitative characteristics that companies must possess to be classified as such will then be introduced.

Second, the regulatory framework for startups and innovative SMEs that the legislature has enacted and put in place in the past years to incentivize and foster the growth of such companies will be analyzed. Specifically, the analysis will focus on the interventions since the so-called "Growth Decree 2.0" and the new initiatives implemented during and after the Covid-19 pandemic. the objective of this analysis is to provide a clear overview of the Italian situation to understand what the main factors are in incentivizing the growth of innovative startups and SMEs in Italy, as well as Corporate Venture Capital.

Third, taking the 2021 Annual Report to Parliament prepared by the Ministry of Economic Development (MiSE) as the main source, the territorial and sectoral distribution of Italian startups and SMEs will be analyzed.

Finally, Corporate Venture Capital in Italy will be analyzed. The main reference adopted throughout this analysis is the Sixth Observatory on Open Innovation 2021, edited by Assolombarda and InnovUp. The analysis is aimed at representing the territorial and sectoral distribution of innovative startups and SMEs participated by CVC partners.

2.1 Innovative Startups and innovative SMEs: a formal definition

Before going through the explanation of the Italian startup context and the evolution of the CVC industry in Italy, it is important to first introduce a formal definition of innovative startups and innovative SMEs, as defined by the regulator.

The Italian Startup Act has been introduced by the Decree-Law on 18 October 2012, n. 179. The decree aimed to define a holistic strategy to foster the constitutions and development of new innovative enterprises with high technological value. When firstly promulgated, the DL n. 179/2012 represented a new approach for Italy and the other OECD (Organization for Economic Co-operation and Development) States on innovative startups.

The definition of an innovative startup is introduced by article 25 of the DL n. 179/2018. Firstly, the startup must be a limited company whose shares are on a regulated market nor in a multilateral negotiation system. Furthermore, the company must oof the following requisites (article 25, paragraph 2):

a) The majority of the shareholders must be of physical persons at the moment of the foundation of the company and for the following 24 months
b) It has been founded or has been operative for less than 48 months (now 5 years after the promulgation of the "Investment Compact" Decree-Law n. 3/2015)
c) It has its headquarters in Italy or at least one operative branch in the Italian territory
d) Starting from the second year of activity of the innovative startup, the total annual production value, as shown in the last approved financial statements within six months after the end of the fiscal year, is not more than €5 million
e) It does not distribute, and it has not distributed, profits
f) It has, as its corporate purpose (exclusive or predominant), the development, production, and marketing of innovative products or services with high technological value
g) It was not formed by a corporate merger, demerger, or as a result of the sale of a company or business unit
h) It possesses one of the following requisites:

1) R&D expenses are equal to or greater than 20 percent of the greater cost and total al value of the innovative startup's output
2) Employment as employees or collaborators in any capacity, in a percentage equal to or greater than one-third of the total workforce of personnel who hold a Ph.D. degree or who are pursuing a Ph.D. degree at an Italian or foreign university, or who hold a bachelor's degree and who have been engaged, for at least three years, in certified research activities at public or private research institutions, in Italy or abroad
3) It is the owner or depositary or licensee of at least one industrial patent relating to an industrial, biotechnological, semiconductor product topography or new plant variety invention directly related to the corporate purpose and business activity

Moreover, following article 25, paragraph 4, of the DL n. 179/2012, an innovative startup that has the above-mentioned requisites may obtain the qualification of innovative startups with a social vocation (SIAVS). Paragraph 4 refers to the following areas:

a) Valorization of the cultural heritage
b) Protection of the environment
c) Social and health assistance
d) Social enterprises
e) Education (university and post-university)
f) Research

In case of success of the startup, after the time limits imposed by law, it might be classified into the category of innovative Small and Medium Enterprises (SMEs).

To facilitate the transitioning procedure from startup to SME, the regular, with the Decree-Law 25 January 2015, n.3, have implemented an agile system that permits companies to have access to the related and applicable benefits without any interruption.

When a company loses one of the startup requisites explained above, it can directly request the cancellation from the special section of the Commercial Register and simultaneously ask for enrollment in the special section for innovative SMEs.

It is therefore important to the extent of this study to give a formal definition also of innovative SMEs as well as defined by the Decree-Law 25 January 2015, n. 3.

The first requisite to be included in this category is quantitative. Based on the EU Recommendation 2003/361/EC, a SME must have the following characteristics:

a) It employs less than 250 employers or collaborators

b) Its annual revenues are less than €50 million

c) Its total assets on the balance sheet amount to less than €43 million

As well as defined as innovative startups, innovative SMEs, to be comprehended in this category, must have their headquarters in Italy or at least one branch in the Italian territory.

Moreover, a company must possess at least two of the following three requisites of innovativeness:

1) R&D expenses are equal to or greater than 3 percent of the greater cost and the total value of the innovative startup's output

2) It employs highly qualified staff (1/5 PhDs, Ph.D. students or researchers, or 1/3 with a master's degree)

3) It is the owner or depositary or licensee of at least one industrial patent or owner of a registered software

These definitions were essential to proceed in the discussion of the innovative startups and innovative SMEs scenario in Italy. In the next section, it is explained the current regulatory framework for this type of company and the incentive factors promulgated by Governments through the years to foster their development and incentivize investments in them. It has already been explained through the course of the literature review that corporate venturing activities conduct to highly significant results for both the parent company and the young ventures from a technological and innovative point of view (Chesbrough & Tucci, 2002; Maula, 2011). In the next section, besides the brief explanation of the more agile economic, bureaucratic, and legal environment for startups, will also be illustrated the tax benefits that the established company would have if investing in innovative startups and SMEs.

2.2 Innovative startups and Innovative SMEs in Italy

After introducing the formal definition of innovative startups and innovative SMEs – following, respectively, the Law n. 221/2012 and the Decree-Law n. 3/2015 – in this section will be explained its distribution through the Italian territory.

The table below shows the number of innovative startups and SMEs registered in Italy at the end of the year 2020. The table also displays quantitative figures regarding the number of employees occupied, number of business partners, total workforce, and the total value of production of those types of companies.

Table 1: Innovative startups and Innovative SMEs: 31 December 2020 Ecosystem

	Innovative start-ups	Innovative SMEs	Total
N. of companies	**11.893**	**1.789**	**13.682**
Δ n. of companies (2019-2020)	10,00%	31,40%	11,60%
N. of employees	**17.424**	**34.492**	**51.916**
Δ n. of employess (2019-2020)	4,30%	40,80%	26,00%
N. of business partners	**59.728**	**23.253**	**82.981**
Δ n. of business partners (2019-2020)	15,10%	61,70%	51,60%
Total workforce	**77.152**	**54.745**	**131.897**
Δ total workforce (2019-2020)	12,50%	67,60%	40,50%
Value of production 2019	**€1.5 billion**	**€5.5 billion**	**€7 billion**
Δ annual value of production (2019-2020)	25,20%	35,30%	33,00%

Source: Annual Report to the Parliament 2021 (MiSE)

The table above shows some interesting figures regarding the growth of innovative startups and SMEs through the years 2019 and 2020. The number of startups and SMEs enrolled in the special section of the Commerce Register saw an 11,60 percent increase which consequently has resulted in employment growth (26 percent) as well. Furthermore, it is possible to observe a growth in the number of business partners of innovative startups and SMEs which amounts to 51,60 percent. Moreover, the total value of production has significantly increased to €7 billion with a registered growth of 33 percent. These positive trends of the year 2020 are sustained in 2021. Confirming the high resilience and adaptability to the new challenges posed by the Covid-19 pandemic, as of September 30, 2021, the number of innovative startups continued to grow, standing at 13.999 (+16,8 percent compared to the end of 2020). Innovative SMEs also show significant growth, amounting to 2.066 (+15,5 percent compared to the end of 2020). Table 2 provides information about the geographical distribution of innovative startups.

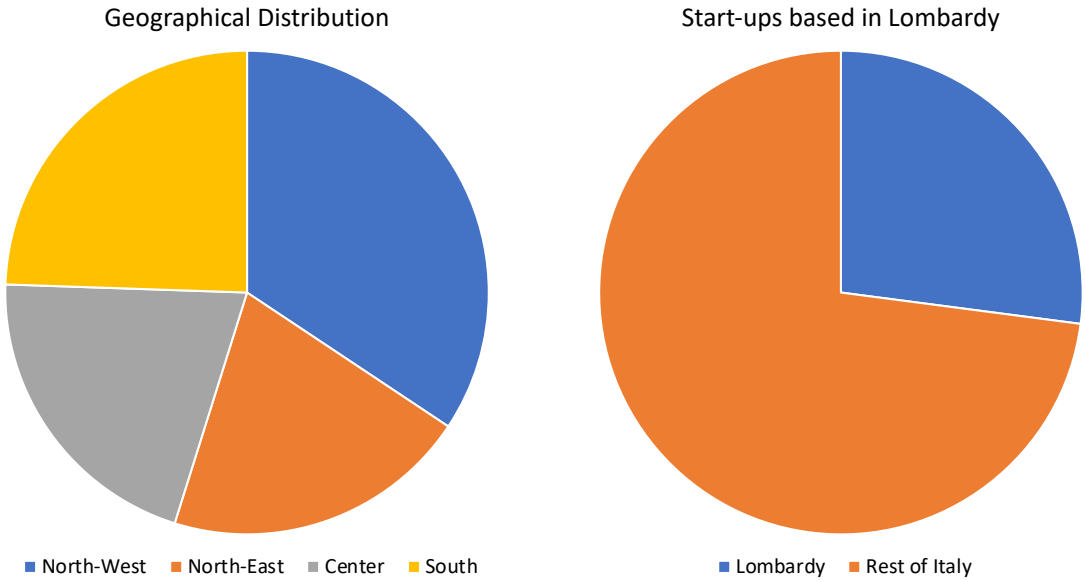
Table 2: Innovative startup's geographical distribution

Geographical distribution	2019		2020		Δ %
	n.	weight %	n.	weigh %	2020/2019
Piedmont	613	5,6%	662	5,5%	8,0%
Aosta Valley	22	0,2%	22	0,2%	0,0%
Lombardy	2.927	26,9%	3.244	27,1%	10,8%
Liguria	190	1,7%	187	1,6%	-1,6%
Total North-West	**3.752**	**34,4%**	**4.115**	**34,3%**	**9,7%**
Trentino-Alto Adige	266	2,4%	290	2,4%	9,0%
Veneto	892	8,2%	973	8,1%	9,1%
Friuli Venice Julia	231	2,1%	251	2,1%	8,7%
Emilia-Romagna	931	8,5%	942	7,9%	1,2%
Total North-East	**2.320**	**21,3%**	**2.456**	**20,5%**	**5,9%**
Tuscany	424	3,9%	544	4,5%	28,3%
Umbria	187	1,7%	196	1,6%	4,8%
Marche	344	3,2%	343	2,9%	-0,3%
Lazio	1.229	11,3%	1.397	11,7%	13,7%
Total Center	**2.184**	**20,0%**	**2.480**	**20,7%**	**13,6%**
Abruzzi	215	2,0%	216	1,8%	0,5%
Molise	80	0,7%	75	0,6%	-6,3%
Campania	899	8,3%	1.060	8,8%	17,9%
Apulia	431	4,0%	606	4,2%	17,4%
Basilicata	104	1,0%	110	0,9%	5,8%
Calabria	265	2,4%	254	2,1%	-4,2%
Sicily	514	4,7%	551	4,6%	7,2%
Sardinia	129	1,2%	160	1,3%	24,0%
Total South	**2.637**	**24,2%**	**2.932**	**24,5%**	**11,2%**
Total Italy	10.893	100%	11.983	100%	10,0%

Source: InfoCamere

As we can observe from the table above, 34,3 percent of innovative startups are located in Northwestern Italy with Lombardy leading the way (27,1 percent of the national total) (Chart 2). The presence of startups in Southern Italy is also significant: in fact, about one in four companies operates in the South. In particular, it is Campania that has the largest number with more than a thousand startups (the only southern region to exceed this threshold).

Chart 2: Geographical distribution of innovative startups



Source: Personal elaboration based on InfoCamere data

In the center of Italy, Lazio is leading the way with 1.397 startups registered, confirming itself as the second-largest Italian region. In general, compared to 2019, 15 out of 20 regions have increased the number of innovative startups; the most important improvement – in absolute terms – was achieved by Lombardy (+317), while, in relative terms, by Campania, which achieved a considerable +17,9 percent. Regarding the provinces, it is Milan that leads the ranking in terms of the number of innovative startups present (19,2 percent of the total), followed by Rome (10,4 percent) and Naples (4,4 percent) (Annual Report to the Parliament, 2021, MiSE).

Relative to sectors of economic activity, just under half of the startups have an activity that falls under the Ateco section (2008) "J – Information and communication services". Within it, 4.375 companies, equivalent

to 36,5 percent of the total, operate in software production, IT consulting, and related activities (Table 3). It is worth highlighting both the approximately 2,800 innovative startups (23,3 percent) in the section "M – Professional, scientific and technical activities", where 60 percent operate in the field of scientific research and development, and the 1,902 manufacturing startups (15.9 percent), driven by the latter by divisions "C 26 – Manufacture of computers and electronic and optical products" and "C 28 – Manufacture of machinery and equipment".

Table 3: Innovative startups divided by sector of economic activity (Ateco 2008)

Section	2019		2020		Δ %
	n.	weight %	n.	weigh %	2020/2019
A - Agriculture, silviculture and fishing	79	0,7%	90	0,8%	13,9%
B - Mining of minerals from quarries and mines	2	0,0%	1	0,0%	-50,0%
C - Manufacturing activities	1.787	16,4%	1.902	15,9%	6,4%
D - Supply of electricity, gas, steam and air conditioning	83	0,8%	120	1,0%	44,6%
E - Water supply; sewerage, waste management and sanitation activities	36	0,3%	33	0,3%	-8,3%
F - Constructions	97	0,9%	118	1,0%	21,6%
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	370	3,4%	366	3,1%	-1,1%
H - Transportation and storage	30	0,3%	26	0,2%	-13,3%
I - Accommodation and food service activities	59	0,5%	64	0,5%	8,5%
J - Information and communication services	5.165	47,4%	5.770	48,2%	11,7%
K - Financial and insurance activities	22	0,2%	28	0,2%	27,3%
L - Real estate	22	0,2%	24	0,2%	9,1%
M - Professional, scientific and technical activities	2.545	23,4%	2.788	23,3%	9,5%
N - Rental, travel agencies, business support services	299	2,7%	328	2,7%	9,7%
P - Education	102	0,9%	108	0,9%	5,9%
Q - Health and social care	74	0,7%	76	0,6%	2,7%
R - Arts, sports, entertainment and recreation activities	56	0,5%	49	0,4%	-12,5%
S - Other service activities	35	0,3%	41	0,3%	17,1%
Not specified	30	0,3%	51	0,4%	70,0%
Total of Italy	**10.893**	**100%**	**11.983**	**100%**	**10,0%**

Source: Personal elaboration based on Annual Report to the Parliament 2021 (MiSE)

Regarding the legal character of innovative startups, it is possible to observe that more than nine out of ten companies are limited liability companies. Compared to 2019, they also grew by 12,8 percent, surpassing the ten-thousand threshold (Table 4). They are followed by simplified limited liability companies, with a 6,8 percent share, and limited companies (0,8 percent).

Table 4: Innovative startups divided by legal character

Legal character	2019		2020		Δ %
	n.	weight %	n.	weigh %	2020/2019
European Economic Interest Group	1	0,0%	1	0,0%	0,0%
Simplified limited liability company	937	8,6%	812	6,8%	-13,3%
Cooperative company	121	1,1%	97	0,8%	-19,8%
European company	1	0,0%	2	0,0%	100,0%
Limited liability consortium	10	0,1%	9	0,1%	-10,0%
Limited company	92	0,8%	100	0,8%	8,7%
Limited liability company	9.705	89,1%	10.944	91,3%	12,8%
Company established under the law of another State	8	0,1%	8	0,1%	0,0%
Limited liability company with sole shareholder	18	0,2%	10	0,1%	-44,4%
Total of Italy	**10.893**	**100%**	**11.983**	**100%**	**10,0%**

Source: Annual Report to the Parliament 2021(MiSE)

Regarding the selected innovativeness requirements – defined by the article 25, paragraph 2, word h), of the Decree-Law n. 179/2012, during the year 2020, 7.809 innovative startups reported having at least the first requirement (15% of the greater total cost and the total value of production relates to research and development activities), 3.116 at least the second (a team consisting of 2/3 of staff with master's degrees or 1/3 of doctoral students, PhDs, or graduates with 3 years of experience in certified research activities), and 2.045 at least the third requirement (the company that is the depositary or licensee of industrial patents or the owner of registered software) (Table 5).

Furthermore, Table 6 also shows a modest youth prevalence, with a relative incidence of 17,5 percent, followed by the share concerning the female prevalence (12,3 percent) – both declining compared to 2019 – while the share concerning the foreign prevalence (3,3 percent) is small.

Table 5: Innovativeness requirements in innovative startups

Requirements	2019		2020	
	n.	weight %	n.	weigh %
Only first requirement	6.401	58,8%	7.080	59,1%
Only second requirement	2.286	21,0%	2.514	21,0%
Only third requirement	1.399	12,8%	1.538	12,8%
First and second requirements	301	2,8%	315	2,6%
First and third requirements	182	1,7%	220	1,8%
Second and third requirement	98	0,9%	93	0,8%
All three requirements	183	1,7%	194	1,6%
None	43	0,4%	29	0,2%

Source: InfoCamere

Table 6: Youth, Female, and Foreign prevalence in innovative startups

Youth prevalence	2019		2020	
	n.	weight %	n.	weigh %
Majority (50%<x<66%)	266	2,4%	274	2,3%
Strong (66%<x<100%)	838	7,7%	849	7,1%
Exclusive (100%)	899	8,3%	973	8,1%
Total	**2.003**	**18,4%**	**2.096**	**17,5%**
Female prevalence	**2019**		**2020**	
	n.	weight %	n.	weigh %
Majority (50%<x<66%)	281	2,6%	306	2,6%
Strong (66%<x<100%)	617	5,7%	664	5,5%
Exclusive (100%)	487	4,5%	508	4,2%
Total	**1.385**	**12,8%**	**1.478**	**12,3%**
Foreign prevalence	**2019**		**2020**	
	n.	weight %	n.	weigh %
Majority (50%<x<66%)	77	0,7%	79	0,7%
Strong (66%<x<100%)	154	1,4%	173	1,4%
Exclusive (100%)	131	1,2%	144	1,2%
Total	**362**	**3,3%**	**396**	**3,3%**

Source: InfoCamere

2.3 Italian economy and regulatory framework on startups and innovative SMEs

Small and Medium Enterprises (SMEs) represent 99,9% of the number of companies operating in Italy, producing more than 70% of the total national industry revenues, and giving a job to more than 81% of workers (Continolo, 2021).

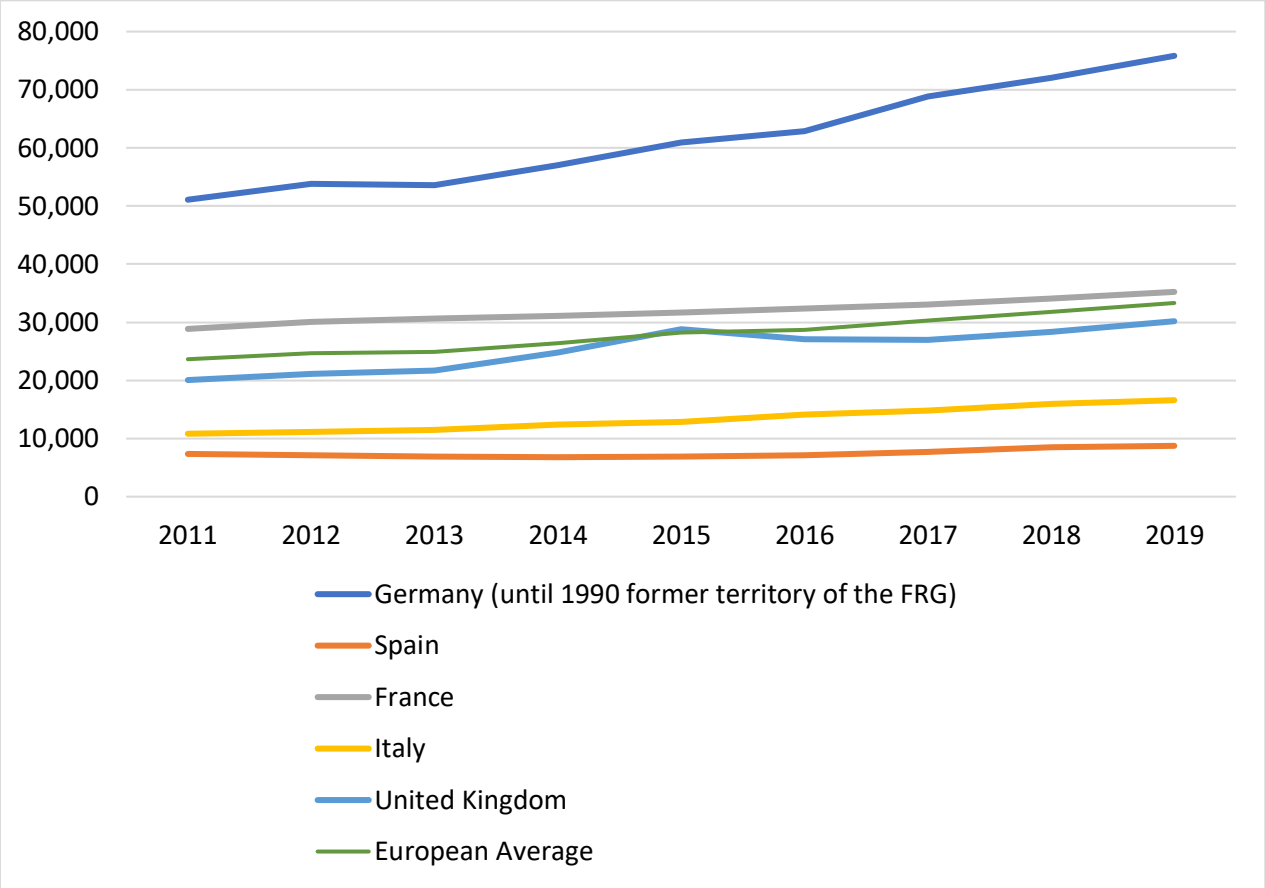
On one hand, the problem of innovation for SMEs has been recognized as crucial for the stagnation of the Italian economy in recent years. On the other hand, recent literature has highlighted the importance of innovation for small ventures. It has been argued that SMEs generally face several challenges compared to large enterprises in implementing innovation in their production context (Überbacher et al, 2020). These challenges consist mostly of the timely recognition of relevant technological trends (Salatino, 2015), their limited investment capacity (Dassisti et al, 2017), the lack of a clear strategic vision, and scarce employee qualifications (Überbacher et al, 2020). Furthermore, family-owned businesses, are typically long-term oriented and driven by financial and non-financial goals (Überbacher et al, 2020). Finally, the firm's survival over generations and the willingness of managers to pass on their knowledge and their experience across generations play a crucial role (Kotlar & De Massis, 2013).

Although scholars have associated SMEs with lower innovation inputs, and therefore lower innovation outputs, their flexibility, and fast decision-making allow them to quickly adapt to changing environments by shaping their innovation (Erdogan et al, 2020). Furthermore, their regional embeddedness and strong local relationships are crucial in fostering innovation activities (Überbacher et al, 2020).

Finally, larger businesses have a significant advantage in accessing resources needed to support innovation. Moreover, their size helps them in enhancing the productivity growth associated with the innovation, while SMEs have shown difficulties in sustaining high fixed costs in R&D programs.

Overall, from the point of view of innovation, the high presence of SMEs has hindered Italy when compared to the other European major economies. This is shown in chart 3, which displays the business enterprises' expenditure on R&D of the major European economies (e.g., Germany, Spain, France, and United Kingdom) as expenditures in R&D can be considered as an indicator of innovativeness.

Chart 3: Business Enterprises Expenditure on R&D (BERD) of the European major economies

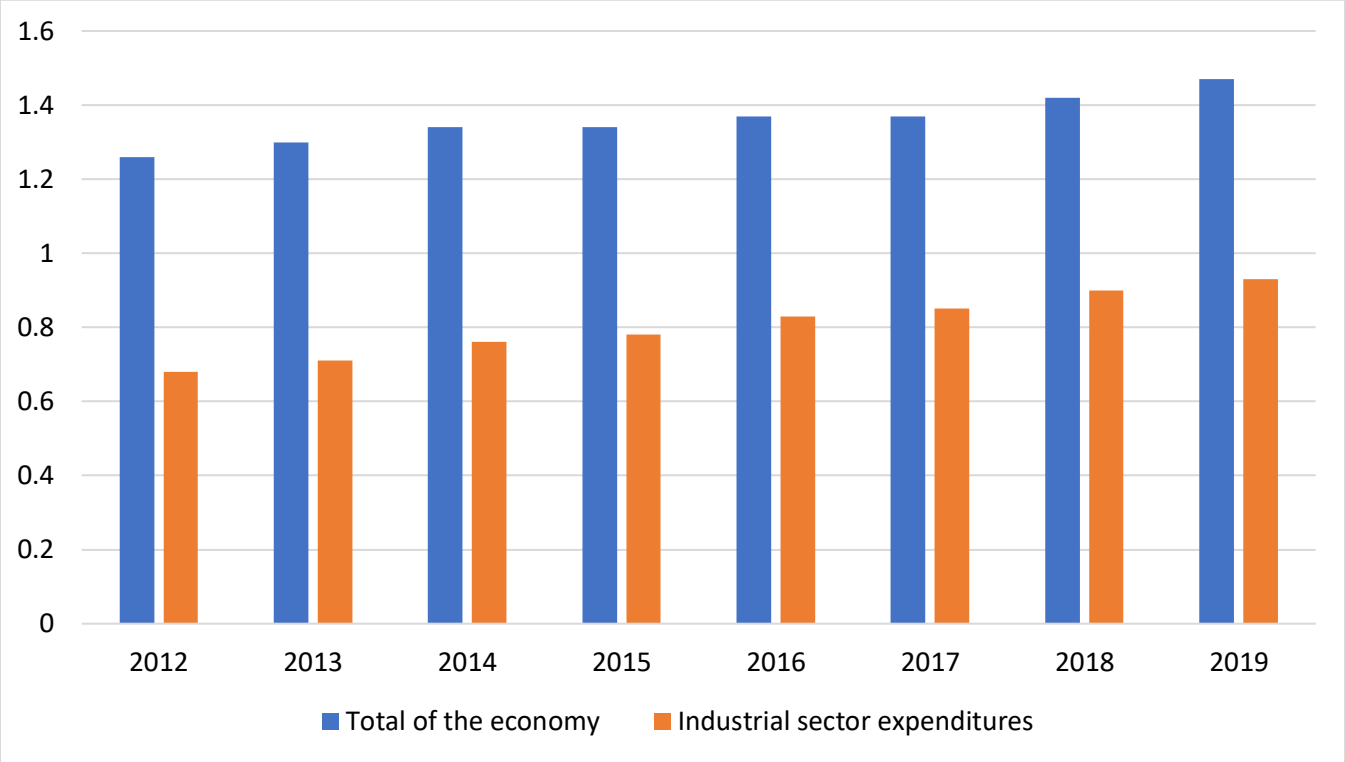


Source: EUROSTAT

We can see that Italy outperforms only Spain in the business enterprise expenditure on R&D and its expenditures over the 2011-2019 decade is way far from the European mean.

However, we can observe a slight increase through the years. This trend is also shown in the graph below (4) which represents the R&D expenditures in Italy as a percentage of the GDP of both the total economy and industrial sector.

Chart 4: R&D expenditures as a percentage of the Italian GDP



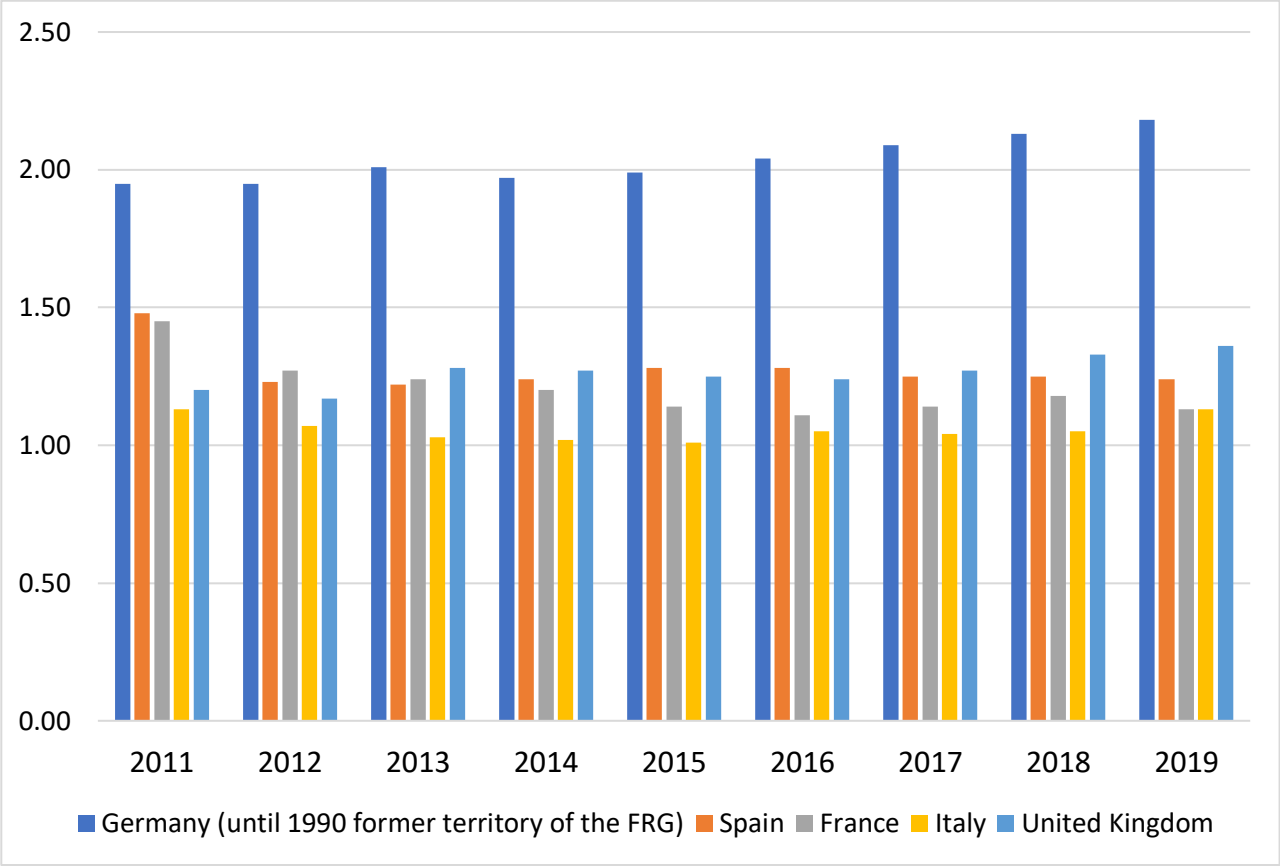
Source: ISTAT

It is relevant to the extent of this study to also represent the expenditures of the industrial sector as the role of CVC is highlighted as an important tool for shaping innovation and economic growth. As explained in the previous chapter, CVC is the investment relationship between the established company and the young venture. Hence, it is important to also consider the investments made by the industrial sector in innovation. As it has been explained and problematized in the literature review, enterprises can explore and exploit (Reinabsch & Hauschild, 2012) innovation both internally and externally. When talking about the latter strategy, the focus in this study is on corporate venture capital strategy.

It is important, from an institutional point of view, to foster innovation through the economy via national budget allocations. When talking about Italy and its economic structure, this argument becomes increasingly significant as there is a need for a better monetary allocation through the territory and for a technological change in the Public Sector.

The chart below (5) displays the Government budget allocation for R&D (GBARD) in the European major economies from the year 2011 to 2019. The values reported in the graph are expressed as a percentage of the total national budget.

Chart 5: Government budget allocation for R&D (GBARD) in the European major economies



Source: EUROSTAT

As we observed in the previous representations, the graph above shows that the Italian Government budget allocation for R&D is far below the other expenditures in Europe.

These negative results are only one of the many aspects that have been leading Italy through stagnant economic growth in the last two decades. In this study, it is taken into consideration only the innovation process point of view. A process that has been empirically shown as also top-down, thus regarding in the first instance the public institutions.

In this context, startups may play a crucial role in filling this innovation gap between Italy and other European countries, helping it overcome the stagnation in productivity and the economic growth rate registered in the

last two decades. Thus, Corporate Venture Capital practices may have a significant role in fostering the growth of Italian startups and therefore sustaining the economic growth.

Since 2012 the Italian government has been promoting different incentive laws to favor and encourage the development of startups and the investments in them. From October 18^{th} 2012 the government promulgated the Decree-Law n. 179, "Decreto Crescita 2.0", converted in Law 12 December 2012, n. 221, which proposed a more agile economic, bureaucratic, and legal environment to foster the growth of innovative start-ups (Torzi, 2018). Since the promulgation of the DL n. 129/2012, the Italian government has adopted different laws to foster innovative startups and SMEs' growth and development. A summary of the most important regulatory incentive factors is proposed in the table below.

Table 7: Summary of legislative interventions of the Italian government in favor of innovative startups and SMEs

Regulatory Actions	**Objectives**
Decree-Law n. 179/2012, converted in Law n. 221/2012	Formal definition of Innovative Startups
	"Work for Equity"
	Online procedures for equity crowdfunding - modified by the Consob Regulation 18592/2013
	Preferential treatment in the compensation of VAT credits
	Exemption from specific Corporate Laws
	"Fail Fast"
Decree-Law n. 147/2013	Simplified procedures to access the guarantee fund for innovative startups and certified incubators
Decree-Law n. 3/2015	Agile procedures for the transition from innovative startup to innovative SME
Decree-Law n. 58/2016	Definition of agile procedures for the draft of deed of incorporation of innovative startups
	"De minimis" incentives - Tax benefits from investing in innovative startups

Decree-Law n. 34/2020, regulated by the DM 28 December 2020, following the Regulation (EU) n. 1407/2013	Non-refundable aids of €10 million for startups, accelerators, incubators, business angels and development of innovative corporations
	€200 million allocated for the National Fund for Innovation
DM 24 February 2022, modifying the DM 24 September 2014; Not officially published yet	Smart & Start - Financing loan for innovative startups with 0% interest rate

Source: Personal elaboration

2.3.1 *Decreto Crescita 2.0*

In the previous section of this chapter, has already been introduced and explained the article 25 of the DL n. 179/2012, converted into Law n. 221/2012, regarding the formal definition of an innovative startup.

As mentioned above, Law n. 221/2012 has introduced various measures to create a more agile legal and bureaucratic environment for startups. For instance, startups, after the first registration in the Commerce Register, are exempted to pay cameral taxes and stamp duty for the first five years after the foundation. These exemptions are valid unless the company is canceled from the special section of the Commerce Register.

The Law n. 221/2012 also provided a set of exemptions from the Corporate Law dispositions. Innovative startups founded in form of limited companies can:

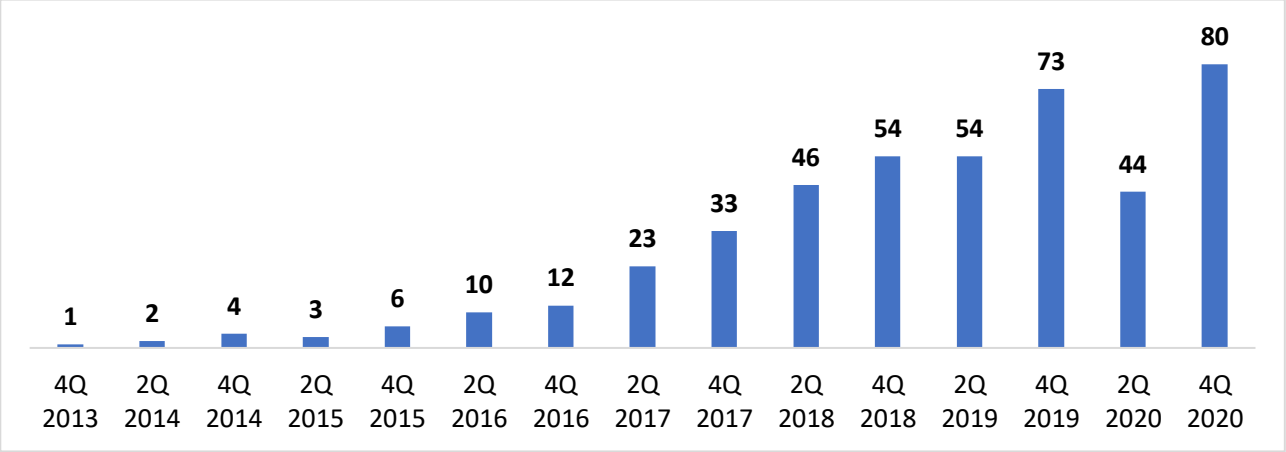
a) Issue preferred stocks (e.g., categories of shares that do not grant voting rights or grant rights that are not proportional to the equity stake)
b) Do operations on its shareholding
c) Issue participatory financial instruments
d) Offer equity shares to the public

The scope of this law is to create an agile environment for startups when looking for equity investors such as privates, business angels, venture capitalists, and corporate ventures.

Another exemption from corporate laws of the Civil Code is in regard to loss coverage. In fact, if operating losses result in a reduction of the company's capital by more than one-third, deviating from the Civil Code, the deadline by which the loss must be reduced to less than one-third is postponed to the second subsequent fiscal year – instead of the first subsequent fiscal year, following the articles 2446 or 2482*bis* of the Civil Code.

In 2013, Italy regulated the equity crowdfunding market, including through the creation of a special register of authorized online portals. Initially intended only for innovative startups, equity crowdfunding was gradually extended first to innovative SMEs, UCIs, and corporations that invest primarily in startups and innovative SMEs (2015) and then, with the 2017 Budget Law, to all Italian small and medium-sized enterprises. The instrument falls under the responsibility of Consob, the Financial Markets Supervisory Authority.

Chart 6: Equity crowdfunding time flow



Source: Annual Report to the Parliament 2021(MiSE)

The Law n. 221/2012 also disposed of the so-called "Work for Equity". Innovative startups and certified incubators can remunerate their employees with equity instruments (such as stock options), and external service providers through work-for-equity schemes. Income from the awarding of such instruments does not contribute to taxable income, either for tax or contribution purposes.

From a tax perspective, with the above-mentioned law, the regulator has disposed of an incentive measure for the compensation of VAT credits for innovative startups. The ordinary rule, which requires compliance endorsement for the offsetting of VAT credits via the F24 form, maybe a disincentive to the use of so-called horizontal offsetting (i.e., to apply to tax types other than VAT). The exemption from the endorsement requirement for offsetting VAT credits of up to €50,000 can result in significant liquidity benefits for startups.

In the field of bankruptcy law, the Law n. 221/2012 introduced the so-called “Fail fast” system. In case of bankruptcy, innovative startups can rely on faster and less burdensome procedures than ordinary ones to conclude their activities. They are subject exclusively to the over-indebtedness crisis resolution and asset liquidation procedure, with exemption from bankruptcy, composition with creditors, and administrative compulsory liquidation procedures. Innovative startups are thus counted among the so-called "non-bankruptcy" subjects, to allow them access to simplified procedures for the settlement of the crisis in continuity and to reduce the time for judicial liquidation, limiting the burdens associated with bankruptcy, including its stigmatization in the cultural level. Moreover, after twelve months from the opening of the liquidation process, access to chamber-sourced data on members and corporate bodies of the liquidation is allowed only to judicial and supervisory authorities.

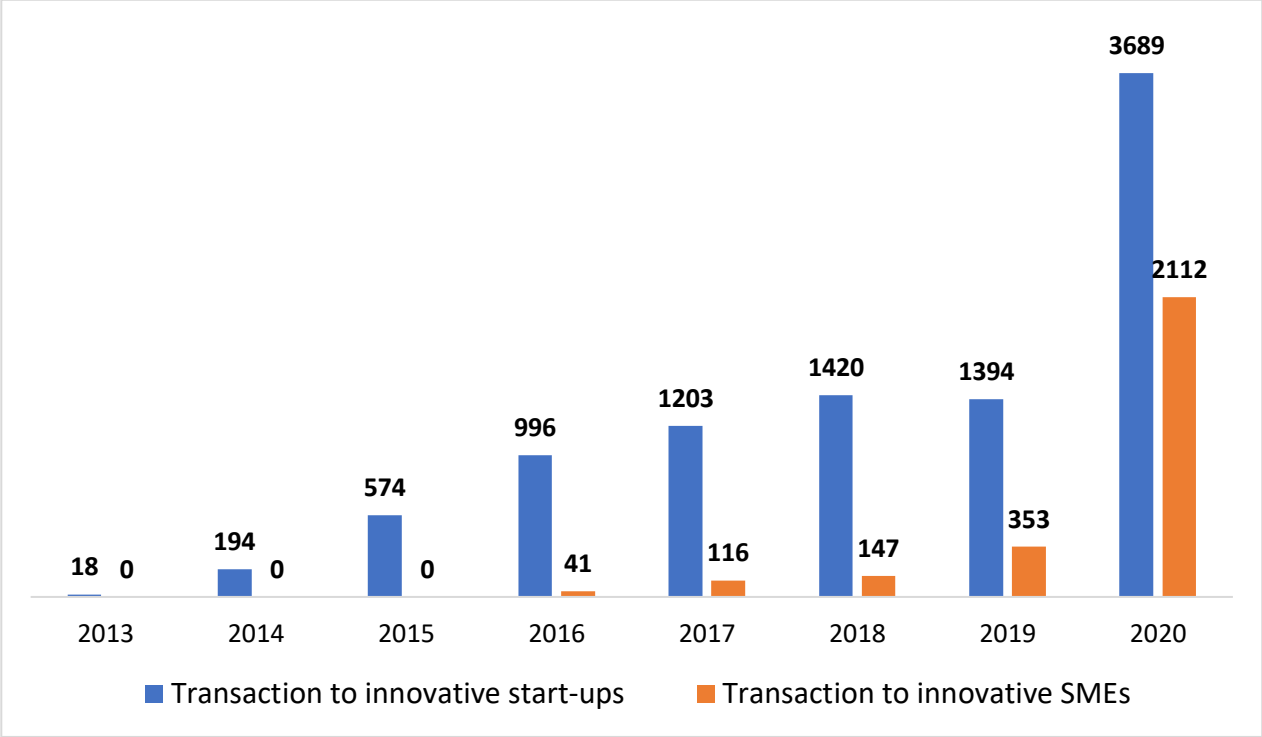
2.3.2 *Guarantee Fund*

In the following year, with the Decree-Law n. 147/2013, the regulator has conceded innovative startups the access to the guarantee fund for SMEs. Since September 2013, innovative startups have been able to obtain a bank credit guarantee from the SME Guarantee Fund-covering up to 80 percent of each transaction, up to a maximum of €2,5 million. The guarantee is granted in the form of:

a) Automatic: The Fund does not perform any merit assessment of the startup's balance sheet data, relying on the due diligence carried out by the lending institution in charge of the operation
b) Prioritized: Applications from innovative startups or certified incubators are evaluated more quickly than ordinary ones
c) Free: there is no cost to access the Fund

The Decree-Law “Liquidity”, converted into Law No. 40 of June 5, 2020, as a measure to counter the Covid-19 pandemic emergency, to further strengthen the support action for companies' access to credit, introduced exceptions to the Fund's ordinary operation, raising the aforementioned coverage from 80 percent to 90 percent and the maximum guaranteed amount from 2,5 to 5 million euros.

Chart 7: Transactions to innovative companies divided by year



Source: Annual Report to the Parliament 2021 (MiSE)

As of December 31, 2020, the Fund managed a total of 11.183 operations. The total amount of financing potentially mobilized exceeds €2 billion. A total of 9.488 operations were authorized by the Fund and resulted in the granting of financing, with a total of €1.589.403.479 granted. 5.183 innovative startups have obtained bank credit through the intervention of the Central Guarantee Fund; among them, some have received more than one loan – which is why the total number of operations translated into the granting of a loan is significantly higher. Overall, the average amount per single transaction disbursed is €185.896, down from the third quarter of 2020 which amounted to approximately €191.000. The average term of loans granted with Fund intervention is about 60 months. However, subsidized loans vary widely in duration, ranging from 3 to 240 months.

2.3.3 *Digitalized procedures for deed of incorporation and registration*

As explained in the previous section of this chapter, the Decree-Law n. 3/2015 has introduced an agile procedure for the transition of innovative startups into innovative SMEs. Innovative startups can therefore

request simultaneously the cancellation from the Commerce Register and ask for the enrollment in the special section of the innovative SMEs.

The Decree-Law n. 58/2016 has defined a new digital procedure for the draft of the deed of incorporation of innovative startups. As of July 2016, it is possible to constitute an innovative startup in the form of a limited company with a new procedure that is:

a) Online, thanks to digital signature
b) Disintermediated, an alternative to the notarial act
c) Without user fees

Moreover, as of June 2017, startups formed online can also use the same procedure for subsequent amendments to incorporation deeds.

2.3.4 *Incentives for investing in innovative startups and SMEs*

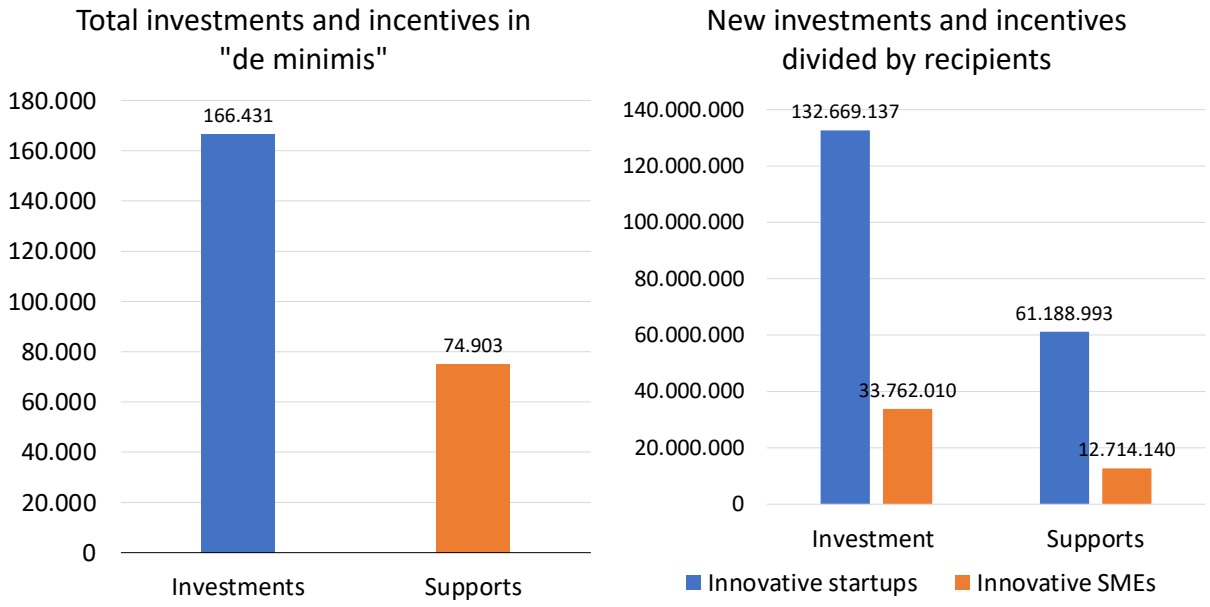
As of January 1, 2017, an important tax break is available for equity investors of innovative startups. The investment incentive, conditional on holding the participation for a minimum of three years, is configured as follows:

a) For natural persons, a deduction from the gross Irpef tax equal to 30 percent of the amount invested (50 percent since the publication of the DL n. 34/2020), up to a maximum of €1 million
b) For legal entities, deduction from Ires taxable income equal to 30 percent of the amount invested, up to a maximum of €1,8 million

These measures have the scope to incentivize the growth of innovative startups and SMEs by proposing tax benefits to equity investors and, regarding the second set of rules, allocating more resources directly to startups and to those that are the major players in Italy for the growth of innovative startups – e.g., incubators, accelerators, and venture capital funds.

During 2019, there were 8.896 investments for which facilitation was requested. The total number of innovative enterprises that received a facilitated investment (both direct and indirect) in 2019 was 1.802, up significantly from the previous year (292 more enterprises involved). This population, however, represents a share equivalent to just 16,5 percent of the total number of innovative startups registered during 2019.

Fig. 7: Quantitative figures of investment and incentives in "*de minimis*"



Source: Annual Report to the Parliament 2021 (MiSE)

As well as in recent years, subsidized investments in startups come predominantly from individuals. A total of 7.927 natural person taxpayers (stemming from 5.784 different individuals) have claimed a deduction, for a total invested – directly in the capital of an innovative startup, in 7.241 cases, and indirectly through intermediaries, in an additional 686 cases – of just over 121,2 million euros.

Significantly smaller are the investments from corporations (969 in total, coming from 809 companies), which, however, have a significantly higher average amount (€ 87.714, compared to the average € 15.294 for each investment from Irpef subjects). Total subsidized investments in startups from other companies amounted to just under €85 million. The significant increase in investments from other companies in 2019 compared to the previous year (+27,7 percent) was accompanied by the even more conspicuous increase in capital from individuals (+33,9 percent), bringing the total equity investments affected by the facilities over the threshold of two hundred million euros (206,2) after 2018 had been characterized by a contraction of this amount.

A natural consequence of this measure is an increase in the total tax benefit granted. Adding up all the benefits accruing to individuals and legal entities, it is possible to estimate a burden on public finance of 42,5 million euros for 2019, equivalent to one-third more than in the previous year (MiSE, 2021).

2.3.5 *National Fund for Innovation*

The National Fund for Innovation (FNI or CDP Venture Capital Sgr) is a tool aimed at micro, small and medium-sized enterprises to enable them to access financial resources for innovation in the form of venture capital participation or subsidized financing in the absence of guarantees. Established in the 2019 Budget Law with an initial budget of about 1 billion euros, it is a vehicle managed by Cassa Depositi e Prestiti (CDP) through a steering committee that aims to bring together and multiply public and private resources dedicated to the strategic theme of innovation.

The Fund acts in four main directions:

a) Direct investments in venture capital funds aimed at the development of the Italian VC market, acting as the anchor and/or co-investor
b) Indirect investments in pre-seed and seed stages are aimed at supporting Italian startups in the pre-seed and seed stages through companies specialized in incubation and acceleration
c) Automatic matching co-investments for the rapid deployment of resources to support impacted startups of the pandemic stage
d) Early and Growth stage direct investments to invest in strategic technologies and sectors for the country, together with domestic/international funds, investors, and Italian companies

Activities are articulated through 9 Funds:

1) **Fund Italy Venture I** invests in the best startups and innovative SMEs in Italy, together with national and international private players
2) **Fund Italy Venture II – Southern Enterprise Fund,** operative from August 2019, Accelerates the competitiveness and development of innovative startups and SMEs in the *Mezzogiorno* and invests in all stages of a company's life cycle, with a budget of 150 million euros

3) **FOF Venturitaly – Venture Capital Fund of Funds**, operative from the year 2020, invest in venture capital funds active across the supply chain, intending to generate returns for investors while developing the venture capital market in Italy
4) **Accelerators Fund** from 2020 allocates 135 million for the development of a network of next-generation vertical accelerators in partnership with Italian and international operators, SMEs, and corporations, to finance the best startups in the acceleration path and subsequent rounds
5) **Boos Innovation Fund** its endowment of 50 million is geared toward supporting Italian corporations in launching and funding startups with a strong innovative impact on the business of the corporations themselves and for the development of the markets in which they operate or are about to enter
6) **CVC Corporate Partners Fund I** from August 2021 intends to invest up to 192 million euros in innovative startups and SMEs operating in strategic sectors for our country to promote the culture of Corporate Venture Capital by collaborating with Italian companies
7) **Evolution Fund** with an endowment of €100 million, from February 2021, makes direct investments in A-B financing rounds whose target funding is between €2 million and €20 million on innovative startups and SMEs
8) **Technology Transfer Fund** with an endowment of 275 million euros, starting in 2020, invests directly by creating Technology Transfer Poles, in collaboration with universities and research centers, and indirectly by investing in venture capital funds specializing in the same areas of scientific and technological research
9) **Start-up recovery fund**, instituted by MiSe with the article 38 paragraph 3 of the Legislation 1^{st} October 2020, aims at supporting investments in capital, including through the subscription of equity financial instruments, as well as through the provision of subsidized loans, the subscription of convertible obligations, or other debt financial instruments that provide for the possibility of the contribution made for the exclusive benefit of innovative startups. The fund became operational on January 7, 2021, with the opening of a dedicated portal where qualified and regulated investors

operating in the area can report the innovative startups and SMEs in which they are about to invest or have invested in recent months

The first data on the instrument, as of December 31, 2020, show that the National Fund with its 9 operational funds supported about 116 startups through 273,3 million euros of deliberated capital. The main sectors receiving direct investments in 2020 involved: the ICT sector (21 percent), Life Science and Lifestyle (at 19 percent, respectively), EdTech (14 percent), and Media and Marketing (12 percent). Smaller shares were allocated to Food & tourism (6 percent), mobility and logistics (4 percent,) and financial services (3 percent). About the geographical distribution, investments were particularly in the South and Islands 53 percent, the North 43 percent, and a significantly smaller share was allocated to the Center 4 percent.

According to data as of the first half of the year 2021, an additional 200.7 million in investments deliberated to 46 new startups were added in the first months of the new year. The Life Science field, standing at 29 percent, is confirmed as the main sector of direct investments, followed by Food & tourism where there is a sustained growth reaching 30 percent. This is followed by ICT, Media, Marketing, EdTech, and Lifestyle. Mobility & Logistics and Financial Services reaffirm their position at the bottom of the ranking. Geographically, in the year 2021, there is further growth in investments directed to the North (56 percent) and a net increase in those directed to the Central regions (21 percent); at the same time, there is a reduction in investments directed to the Southern regions, which stand at 23 percent.

2.3.6 *3I Voucher*

The 3I Voucher - Investing in Innovation was established by the Growth Decree (Decree-Law No. 34 of April 30, 2019, converted with amendments by Law No. 58 of June 28, 2019), to support the enhancement of the innovation process of innovative startups and to accompany them on the path to patenting and enhancing the value of their technological and digital investments. The MISE implementing decree of November 18, 2019, defined the criteria and methods of implementation of the Voucher, and established the services that can be acquired by companies and the amounts granted. Financial resources of 6,5 million euros are available for the measure for each year of the three years 2019-2021.

The Voucher intends to support innovative startups in the first phase of verification regarding the patentability of their invention and the prior search for prior art (Service A) and thus whether or not it is appropriate to take the path leading to the granting of a patent; in the second phase, which is that of filing the patent application with the UIBM (Service B); and in the possible, the third phase of extending a national patent abroad (Service C).

From the launch of the measure (June 15, 2020) until December 31, 2020, a total of 2.749 applications for Vouchers were submitted, half of which were for service B (50,6 percent), another 40,4 percent for service A, and a lesser extent for service C (9 percent). The total amount of grants requested was 11.3 million euros. There were 911 Innovative startups involved, so on average, each startup submitted 3 applications. A fifth of the total applications (572, or 20,8 percent) came from Lombardy, while with shares around 10 percent we find applications made by Veneto, Emilia-Romagna, Lazio, and Campania.

In terms of sector, just under two-thirds of the total (62,6 percent) of the applications submitted refer to startups operating in services (with a strong presence of those falling within the R&D and software production and IT consulting sectors). An additional 34,2 percent relates to startups in industry and handicrafts (with a predominance of those operating in the manufacture of computers and electronics products and the manufacture of machinery and equipment not falling under specific categories). Only 2,3 percent concerns startups in commerce.

2.3.7 *SPIN Program*

SPIN (Scaleup Program Invitalia Network) is a program promoted by the MiSE in the implementation of the PON Imprese e Competitività 2014-2020 and implemented by Invitalia in partnership with ELITE/Italian Stock Exchange. The program, geared toward the entrepreneurial development of innovative startups and SMEs and university spinoffs with operational headquarters in Basilicata, Calabria, Campania, Puglia, and Sicily, was created with the aim: a) to develop the skills necessary for the growth of innovative startups, enhancing their innovation assets; b) to foster the meeting between large companies and innovative realities in the regions involved.

SPIN follows a progressive pathway organized in two phases: a first, in which the selected companies participate in a digital entrepreneurial development program; and a second, in which the best companies gain access to an advanced edition of the ELITE Program with a customized high-level training course. Currently, three calls have been launched: the 80 companies that passed selection in the first two calls completed the first phase of the pathway offered by ELITE in 2020.

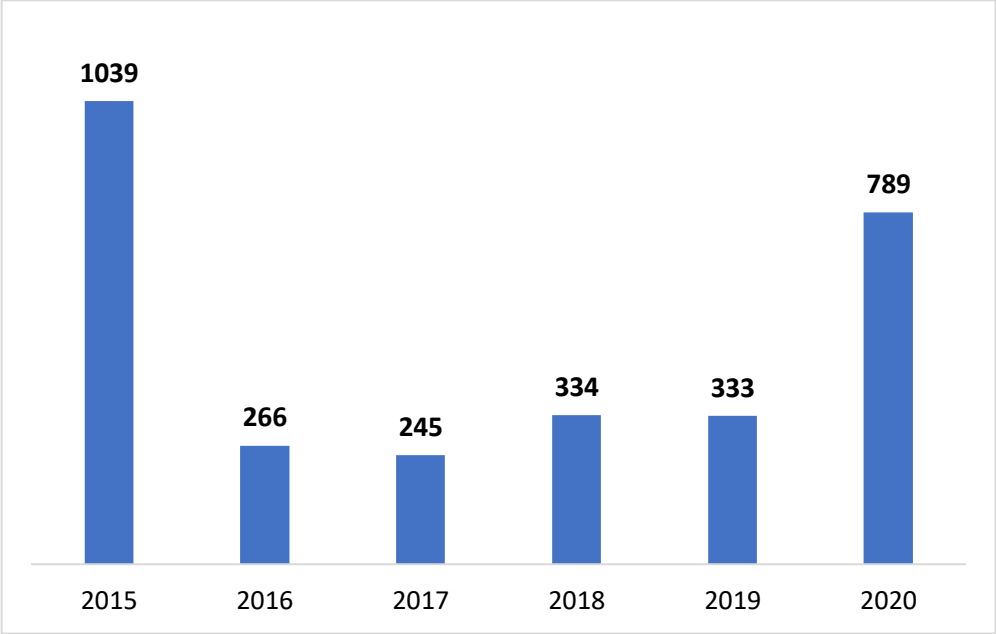
This phase saw for the selected companies the opportunity to access the ELITE platform that provides a self-assessment tool, Growth Compass, which analyzes various aspects of the company and based on which a focus on the mentorship path was identified for each company.

2.3.8 *Smart & Start*

Finally, the DM 24 February 2022 (Not officially published yet), modifying the DM 24 September 2014 promoted the so-called "Smart & Start" measure. It is the leading nationwide facilitated financing program dedicated to innovative startups, providing zero-interest funding for business development projects with an expenditure program of between €100 thousand and €1,5 million. The financing covers, without any guarantee, up to 80 percent of eligible expenses; this percentage can rise to 90 percent if the startup is made up entirely of women and/or young people under 35, or if the partners include an expert with the title of Italian Ph.D. (or equivalent) who works abroad and wants to return to Italy. Moreover, startups based in Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardinia, and Sicily can enjoy a non-repayable grant equal to 30 percent of the loan and thus repay only 70 percent of the funding received.

From June 20, 2020, to December 31, 2020, the Agency received 789 applications for funding, a significant increase over the years 2016-2019 (Chart 8), for a total amount of requested expenditures of just under 684 million euros, of which facilities amounted to about 559 million euros.

Chart 8: Trends in funding applications



Source: Invitalia

Nineteen percent of the submitted initiatives are based in Lombardy, 16 percent in Campania, 10 percent in Lazio, followed by Sicily (8 percent) and Veneto (6 percent). There are 10.248 applicants involved: over 30 percent are under 40. Women involved are about 19 percent of the total; while for men the 36-50 age group prevails (36 percent), for women there is a more even distribution between the 18-35 age group (30 percent) and the 36-50 age group (45 percent). In terms of employment, about a quarter of startup founders were previously employees. Seventy-one percent of the partners hold university degrees; more than 9 percent also hold Ph.

Overall, in the years 2015-2020, 703 innovative startups obtained funding through which they activated investment plans in the following 3 areas:

a) high-tech initiatives: 217 startups with an admitted amount of 163,6 million euros

b) digital economy: 379 startups with an admitted amount of 228,6 million euros

c) enhancement of research: 107 startups with an admitted impetus of 71,5 million euros

At the beginning of the year 2020, an "Evaluation on the Smart & Start Italia tool" was launched, an activity provided for in the Evaluation Plan of the PON Imprese e Competitività and entrusted to an external evaluator (ISMERI EUROPA S.r.l).

The first report analyzed the progress of the measure by highlighting the consistency of the "Smart & Start Italia" intervention with market needs and development goals. An initial analysis was conducted on a sample of 102 innovative startups funded in 2015 (distributed by different turnover classes) that had completed their business development plan to check their status after project funding through Smart & Start, from the perspective of turnover and employment. At the end of 2019, the 102 innovative startups recorded a significant increase in turnover and employment: the former reached 88,5 million euros in 2019 compared to 28 achieved in 2015 while employment increased from 386 to 689. Thus, the average size of the 102 startups increased significantly from 3,8 to 6,8.

The second report, on the other hand, focused on reviewing the "methodologies and criteria for selecting innovative startups". The experts highlighted the high heterogeneity of the target projects regarding three main dimensions: 1) the development cycle of the startups; 2) the technology and R&D intensity of the proposed innovation projects; and 3) the business models and their scalability.

A further theme that emerged relates more generally to the role of a debt instrument to support companies with high growth potential but in the early stage. The report suggested a hypothesis for the evolution of the instrument that could include a debt exit phase, in which the loan could be converted into bonds or venture capital. Finally, the issue of complementarity between the resources made available by Smart & Start and

financing from venture capital investors emerged on several occasions. In particular, the premium in the evaluation of investments by qualified investors is viewed positively.

The evaluation plan for the "Smart & Start Italia" measure will be concluded in 2022 with additional evaluation surveys regarding the competitiveness, strategic positioning, and main characteristics of Smart & Start funded companies, in the context of innovative startups in Italy; a Survey on the satisfaction of beneficiaries of the measure; and a prospective econometric analysis of the effects of Smart & Start-funded projects in the PON IC.

2.4 Corporate Venture Capital in Italy

Corporate venture capital, according to the relevant literature, has been defined in the course of this study as the investment made by an established company toward a startup. The relationship between the company and the venture was defined as favorable for both entities involved in terms of financial, strategic, and technological objectives.

In the previous section, for this study, it was important to first give a formal definition of innovative startups and innovative SMEs. In addition, the most significant incentives for investment in innovative startups and innovative SMEs by the Italian government were reported.

After having defined the regulatory framework for innovative startups and innovative SMEs, in this section the Corporate Venture Capital in Italy will be analyzed qualitatively and quantitatively.

The main source from which information and data were obtained for the analysis is the Report on Open Innovation 2021 by Assolombarda and InnovUp.

2.4.1 *Investors specialized in innovation in Italy*

According to the Politecnico di Milano census, there are 131 specialized innovation investors in Italy, up from those surveyed in 2020 (+36). This particular class of investors is reported to participate in the venture capital of 3.731 innovative companies.

During the research conducted by Politecnico di Milano, the 3.731 innovative companies that are participated by specialized innovation investors were divided into two groups:

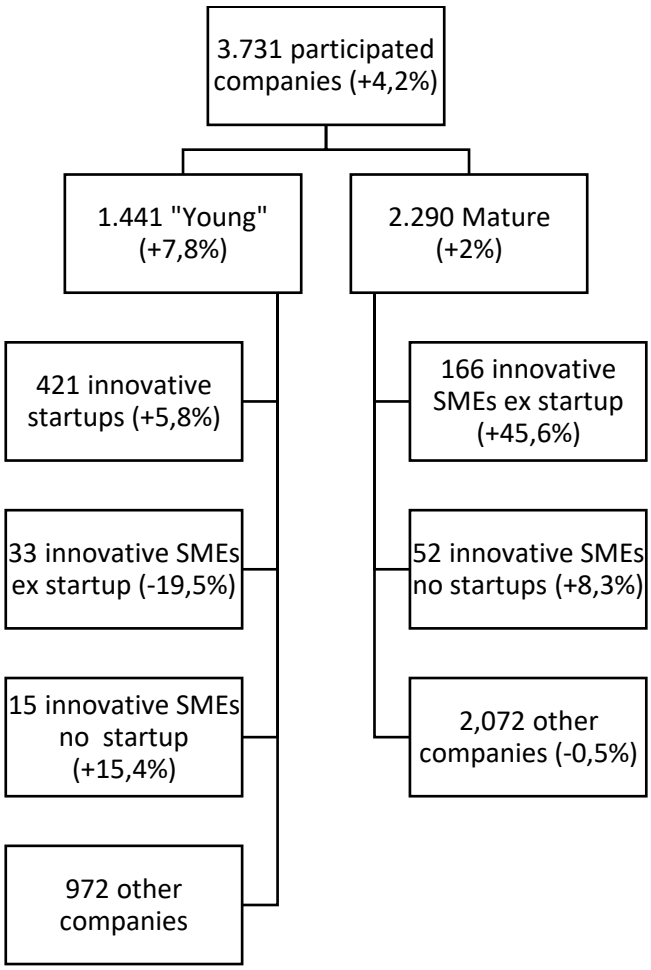
a) Registered within the last 5 years if they have a start date of fewer than 5 years

b) Mature, if with a start date of more than 5 years

As shown in Fig. 8, there are 1.441 (down 8 percent from 2020) companies that can be considered "young." Of these, 421 (5,8 percent) are registered as innovative startups, 48 are innovative SMEs (including 33 former startups), and 972 are other newly established companies.

There are 2.290 mature companies, up slightly from 2020 (+2 percent). Among them, 218 are innovative SMEs (of which 166 are former startups) and 2.072 are other types of companies.

Fig. 8: Breakdown of investee companies by investors specializing in innovation (in comparison with the year 2020)

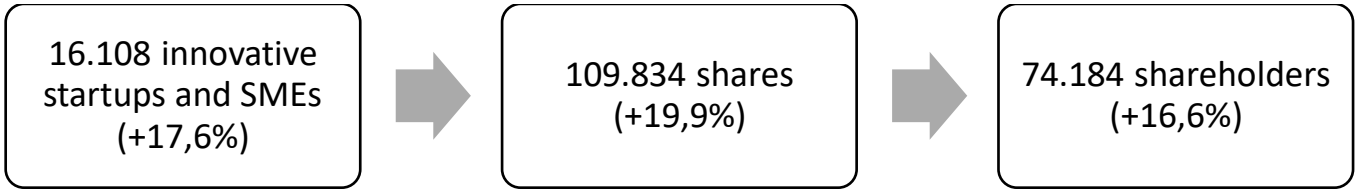


Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

2.4.2 *Innovative Startups and SMEs: numerosity, shares, and shareholders*

As of 23 August 2021, considering the 109.834 shares direct and indirect participation shares of individuals and legal entities, there are 74.184 members of the 16.108 innovative startups and SMEs.

Fig 9: Shares and shareholders in innovative startups and SMEs (in comparison with the year 2020)

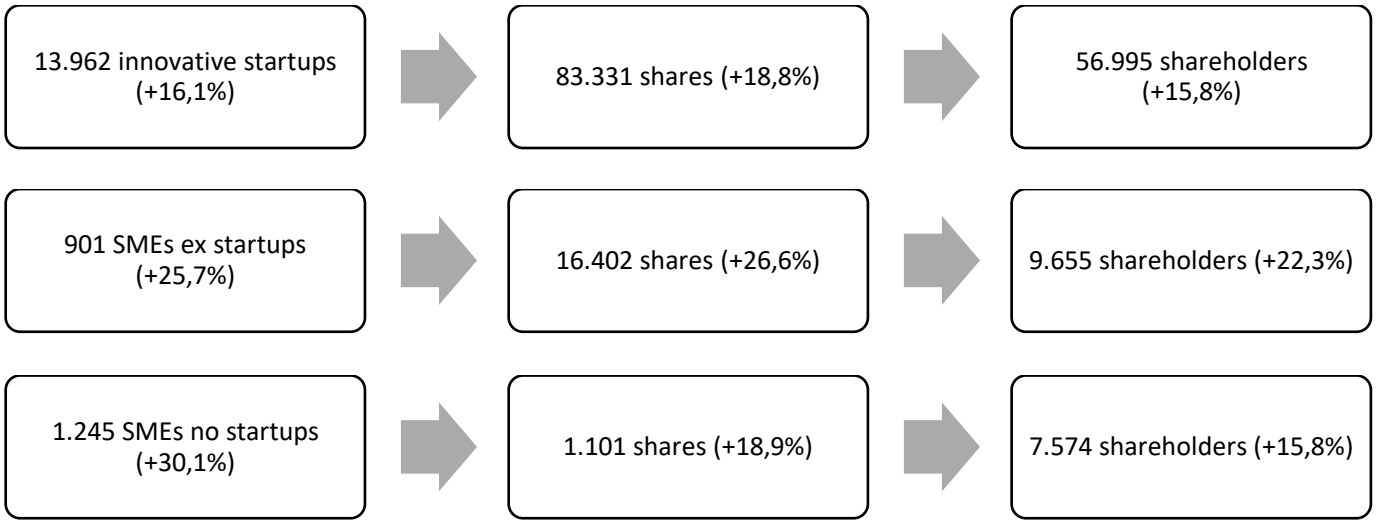


Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

There are 13.962 innovative startups identified in the Commercial Register as of August 2021 (+16,1 percent compared to 2020) and have 83.331 shares (+18,8 percent) held by 56.955 separate partners (+15,8 percent).

The 2.146 innovative SMEs are divided into 901 former startups and 1.245 non-startups. The former present 16.402 shares held by 9.655 separate partners. The latter have 10.101 shares held by 7.574 members.

Fig 10: Breakdown of shares and shareholders in innovative startups and SMEs (in comparison with the year 2020)



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Investors specialized in innovation participate in the capital of 443 innovative startups and 266 innovative SMEs (including 199 former startups). Corporate Venture Capital members alone participate in the capital of 3.921 startups and 831 innovative SMEs (including 344 former startups). Financial investors participate in total in 141ventures (including 113 in startups). Finally, family & friends members participate in the capital of 9.485 startups and 1.021 innovative SMEs (including 350 former startups).

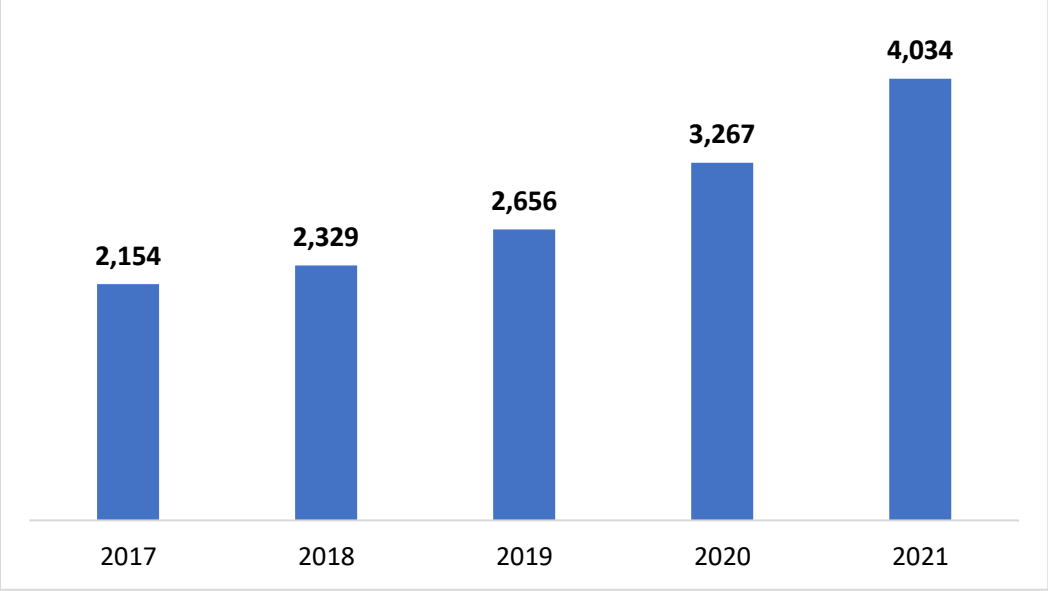
Table 8: Breakdown of investors' characters in innovative startups and SMEs at the end of the year 2021

	Investors specialized in innovation	Corporate Venture Capital	Financial investors	Natural persons
Innovative startups	443	3.921	113	9.485
SMEs former startups	199	344	8	350
SMEs no startups	67	487	20	671
Total	**709**	**4.752**	**141**	**10.506**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

The number of innovative startups in the CVC member portfolio is growing. There are about 4 thousand innovative startups participated by CVC members in 2021 (+23,5 percent). To give even more emphasis to the phenomenon, of these approximately 4 thousand innovative startups, only 113 units are participated by financial companies, namely 2,9 percent. From Chart 9 it is possible to observe the growth of the innovative startups in CVC portfolios since the year 2017.

Chart 9: Innovative startups in CVC portfolios



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

According to the Politecnico di Milano survey, of the approximately 110 thousand shares, more than 20 thousand are shares of CVC actors (19 percent). Moreover, of the 109.834 direct and indirect shares in innovative startups and innovative SMEs, there are:

a) more than 81.000 from individuals and sole proprietorships (74 percent)

b) nearly 21 thousand from CVC members (19 percent), of which 8.977 are first-tier (direct investors)

c) 1.716 those from foreign entities (1,5 percent) and 2.005 those from Italian entities not registered in the Business Register (1,8 percent)

According to the survey, of the more than 20 thousand shares of CVC entities, 14.857 are in innovative startups and 5.946 are in innovative SMEs (including 3.838 in former startup SMEs). Of the total first-tier CVC shares (direct investors), 6.791 are in innovative startups and 2.186 are in innovative SMEs (including 1.210 in former startup SMEs).

Table 9: Breakdown of CVC actors' shares in the year 2021

	Shares of first tier CVC actors	Total shares of CVC actors	Shares of foreign parties	Shares of Italian entities not registered in the Commercial Register
Innovative startups	6.791	14.857	1.085	1.323
SMEs former startups	1.210	3.838	410	446
SMEs no startups	976	2.108	221	236
Total	**8.977**	**20.803**	**1.716**	**2.005**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

According to the survey, of the total 74.184 investors holding shares:

a) Nearly 60.000 are individuals and sole proprietorships (80 percent)

b) Nearly 12.000 CVC ones (16 percent), of which 7.178 are top-level CVC members (direct investors)

c) 1.135 foreign members (1.5 percent) and 713 Italian members who are not registered with the Commercial Registry (1 percent)

According to the Report on Open Innovation (Assolombarda &InnovUp, 2021), of the more than 11 thousand CVC shareholders 8.170 are in innovative startups and 3.558 are in innovative SMEs (including 1.965 in ex-startup SMEs). Of the total top-level CVC shareholders (direct investors), 5.361 are in innovative startups and 1.817 are in innovative SMEs (including 937 in ex-startup SMEs).

Table 10: Breakdown of CVC shareholders in the year 2021

	First tier CVC shareholders	Total CVC shareholders	Foreign shareholders	Italian shareholders not registered in the Commercial Register
Innovative startups	5.361	8.170	686	538
SMEs former startups	937	1.965	249	175
SMEs no startups	880	1.593	200	0
Total	**7.178**	**11.728**	**1.135**	**713**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

2.4.3 *Turnover of innovative startups and SMEs*

Considering the data from the financial statements for the fiscal year 2020 filed l at the time of writing of the Observatory of innovative startups, the turnover is about €1,7 billion

Table 11: Turnover of innovative startups with CVC

In Mill	2016	2.017	2018	2019	2020
Turnover of innovative startups	773	887	1.421	1.987	1.997
Turnover of startups with CVC	268	492	660	763	764
Turnover of startups with foreign investors					30
% Startup with CVC on total turnover	**34,7%**	**46,5%**	**46,5%**	**44,5%**	**44,9%**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Considering the data from the 2020 financial statements filed at the time of writing of the Observatory of innovative SMEs, the value of production generated in 2020 is €5,87 billion, of which €1.44 billion is generated by former startup SMEs.

About 59 percent of these revenues, or 3,457 billion euros based on partial data, are generated by innovative SMEs in CVC's portfolio (of which 2,337 billion are generated by former startup SMEs).

Table 12: Turnover of innovative SMEs

In Mill	2016	2.017	2018	2019	2020
Turnover of innovative SMEs former startups	252	400	765	1.128	1.442
Turnover of innovative SMEs former startups with CVC	182	295	632	852	1.120
Turnover of innovative SMEs former startups with foreign investors					41
% Innovative SMEs former startups with CVC on total turnover	**72,1%**	**73,7%**	**82,6%**	**75,5%**	**77,7%**
Turnover of innovative SMEs no startups	662	776	977	3.553	4.427
Turnover of innovative SMEs no startups with CVC	412	478	548	2.068	2.337
Turnover of innovative SMEs no startups with foreign investors					144
% Innovative SMEs no startups with CVC on total turnover	**62,2%**	**61,6%**	**62,5%**	**58,2%**	**52,8%**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Data reported in the sixth observatory on open innovation in Italy (Assolombarda & InnovUp, 2021), as can be seen in the tables above, show the significance of CVC in the turnover of innovative startups and SMEs. Considering that innovative startups and innovative SMEs participated by CVC members are 19 percent and

16 percent, respectively, the turnover data assume clear significance. The correlation/dependence between CVC and turnover of innovative startups will be investigated in the Empirical Analysis chapter.

2.4.4 *Geographical and industrial distribution of the Italian CVC*

7.911 equity company-type members are investing in innovative startups, an increase of 9,4 percent from the year 2020. For innovative SMEs, the number of equity company members stands at 3.775, of which 2.078 relate to former startup SMEs, an increase from 2020 of 21,3 percent for former startup SMEs and 12,2 percent for non-startup SMEs. The distribution by size class of equity company members highlights an important role of small businesses, with 81 percent in innovative startups and 78 percent for innovative SMEs.

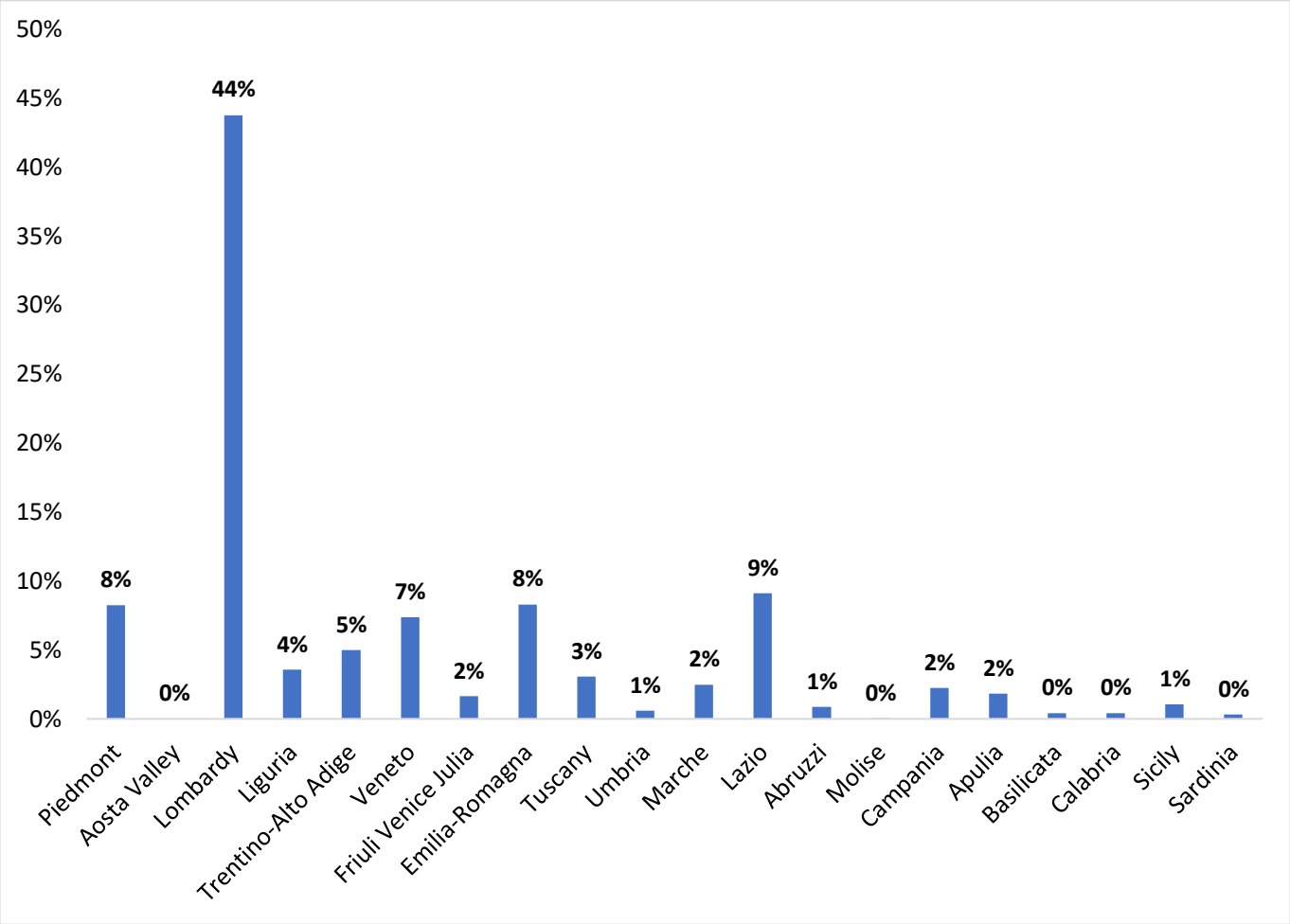
Table 13: Enterprises investing in innovative startups and SMEs (figures at the end of the year 2021)

In mill	Startup shareholders	SMEs former startups shareholders	SMEs non-startup shareholders
Large enterprise	401	173	158
Medium enterprises	630	166	142
Small enterprises	6.443	1.462	1.312
Not classified	437	97	85
Total equity enterprises	**7.911**	**1.898**	**1.697**

Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

The majority of corporate partners of innovative startups (67,2 percent) are based in the North, compared with 54,3 percent of the total number of innovative companies in the same geographic area.

Chart 10: Geographical distribution of CVC startups shareholders (2021)

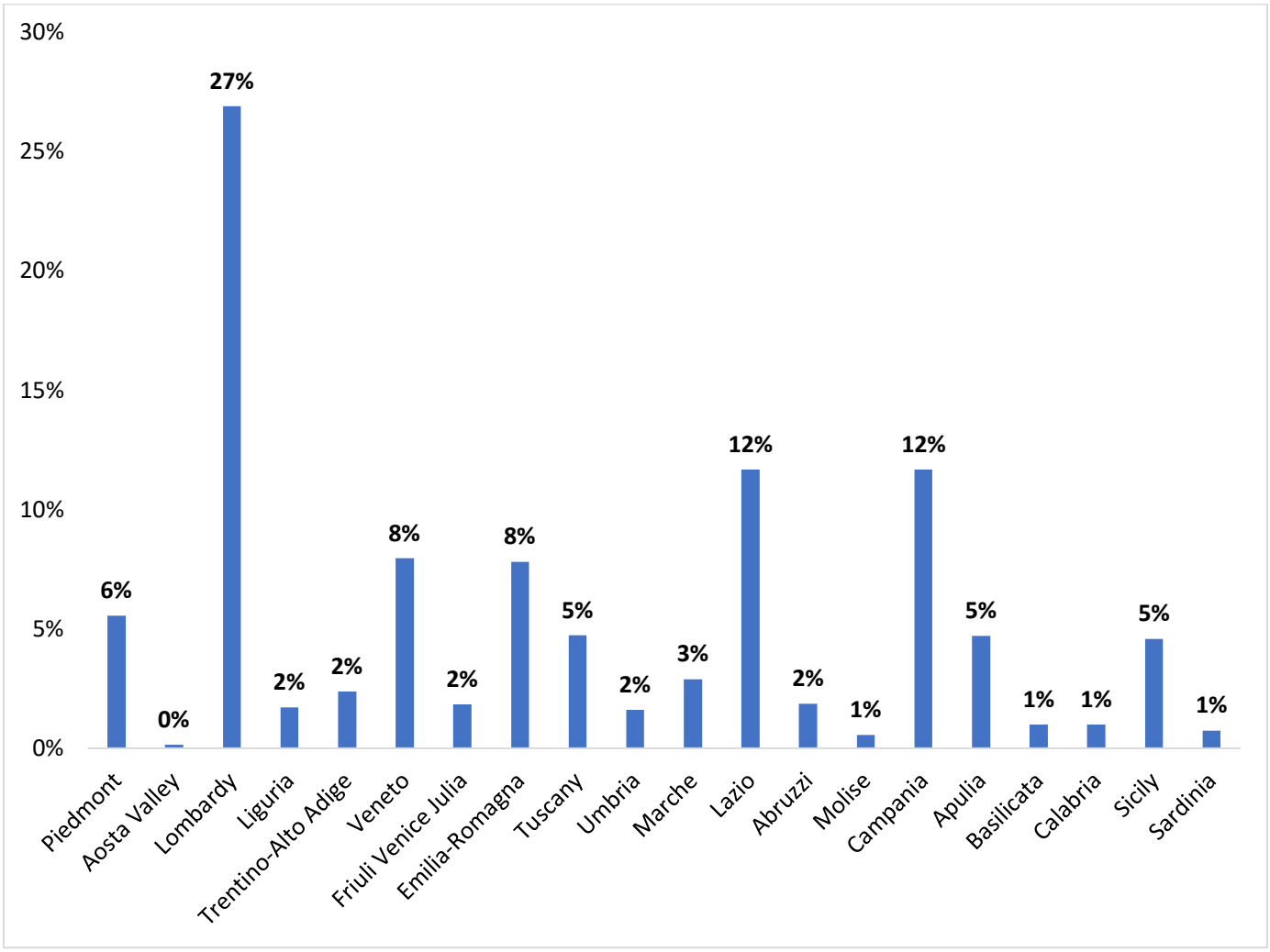


Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

The different distribution in geographical composition between CVC shareholders and innovative startups highlights a potential flow of investment from CVC shareholders in the North to innovative startups operating in the Central and South.

In fact, 67 percent are CVC members in northern regions, compared with 54 percent of innovative startups.

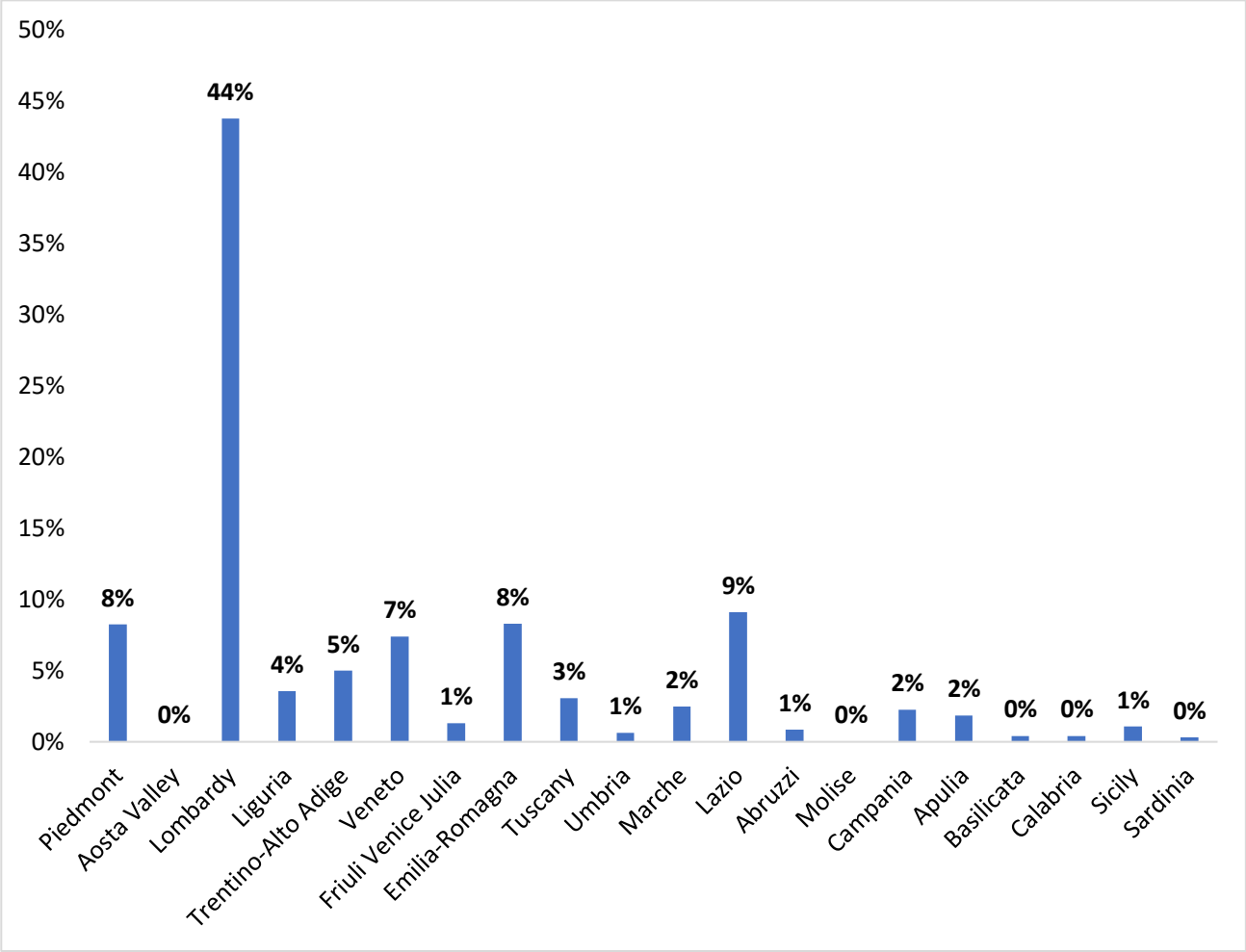
Chart 11: Geographical distribution of startups (2021)



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Innovative SMEs show a different level of concentration in the North between former startup and non-startup SMEs. The former are 60,4 percent concentrated in the North, while the latter is equally distributed between the North and Central and South, with 51 percent of non-startup SMEs in the North of the country.

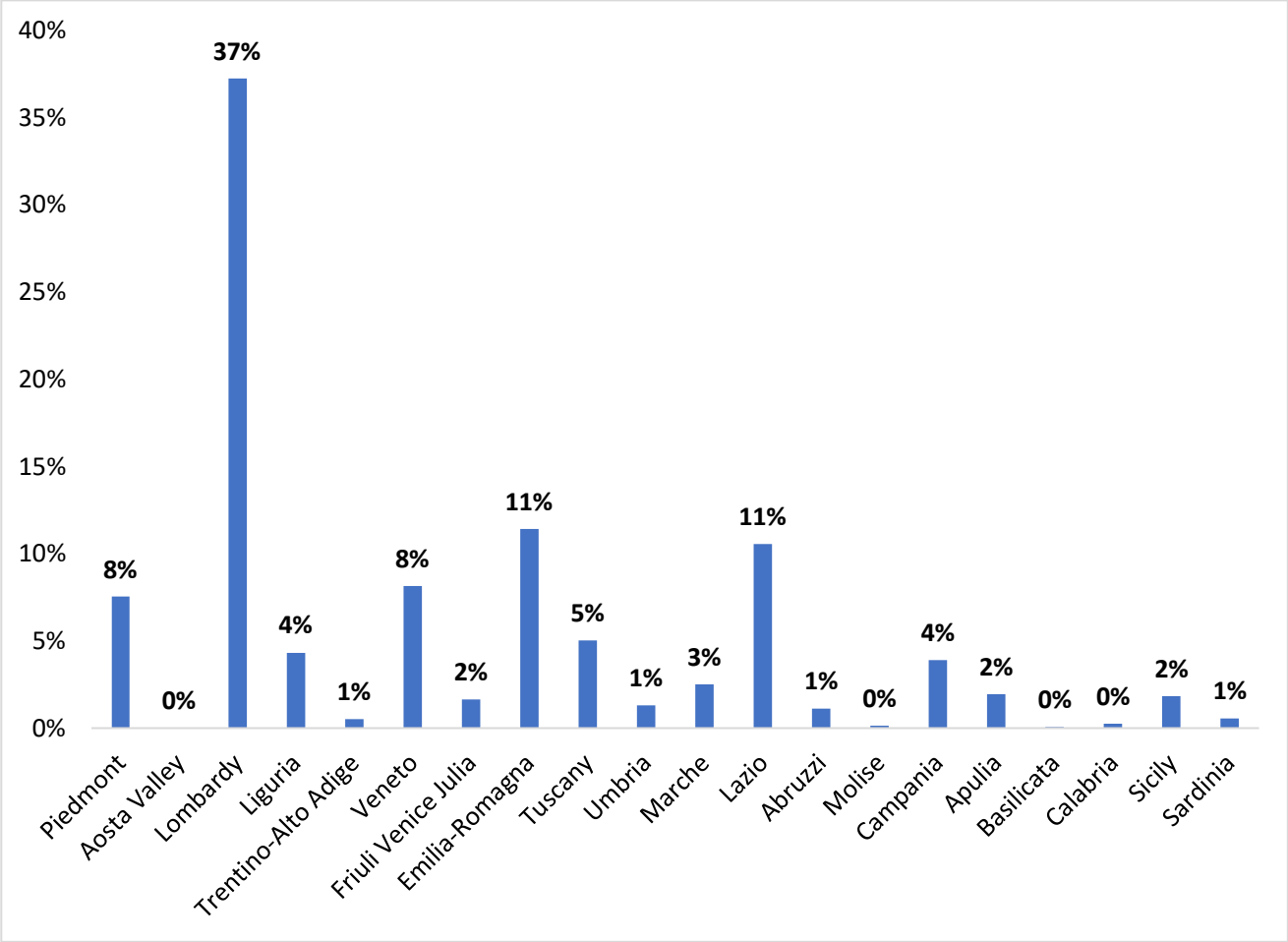
Chart 12: Geographical distribution of CVC SMEs' former startup CVC shareholders (2021)



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

In contrast, territorial bias is confirmed for CVC members of innovative SMEs, reaching 77,6 percent in the North for members of innovative former startup SMEs and 70,8 percent for non-startup SMEs.

Chart 13: Geographical distribution of SMEs' former startups (2021)

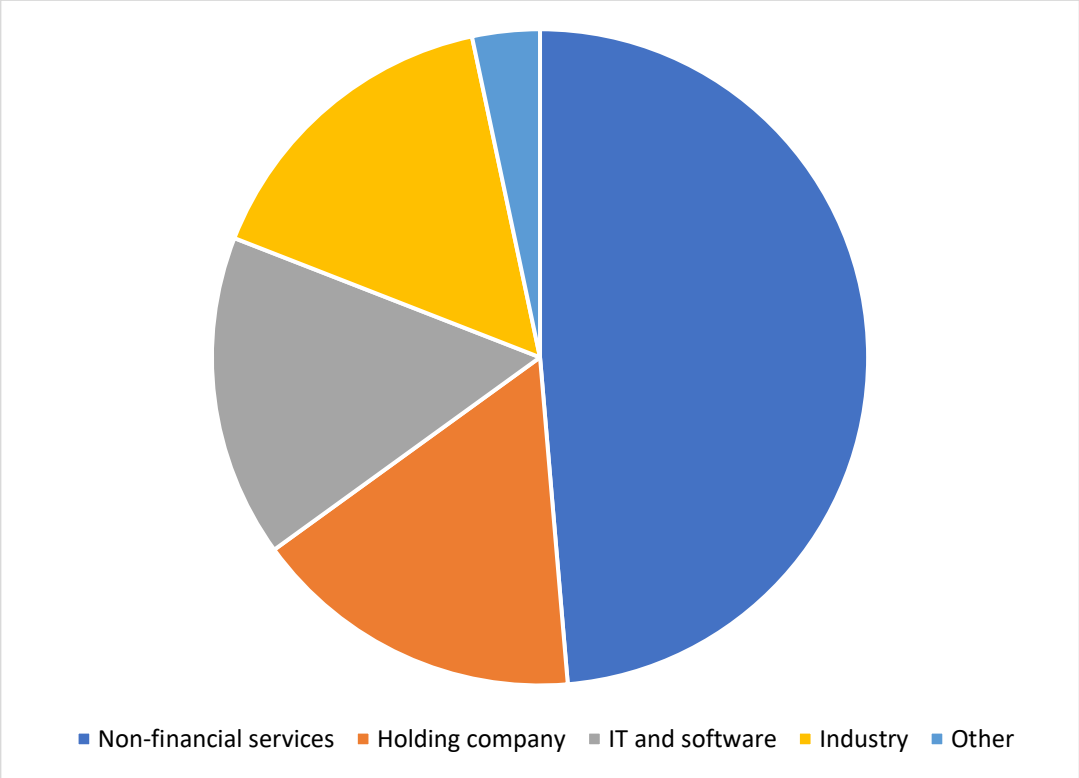


Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

The highest share of CVC investors operates in non-financial services (48,65 percent), business holding companies (16.38 percent), software and information technology (15,89 percent), and industry (15,75 percent).

All of these types of partners invest mainly in startups that deal with software and information technology. The industry sector also invests in industrial businesses.

Chart 14: CVC startups shareholders sectoral distribution (2021)

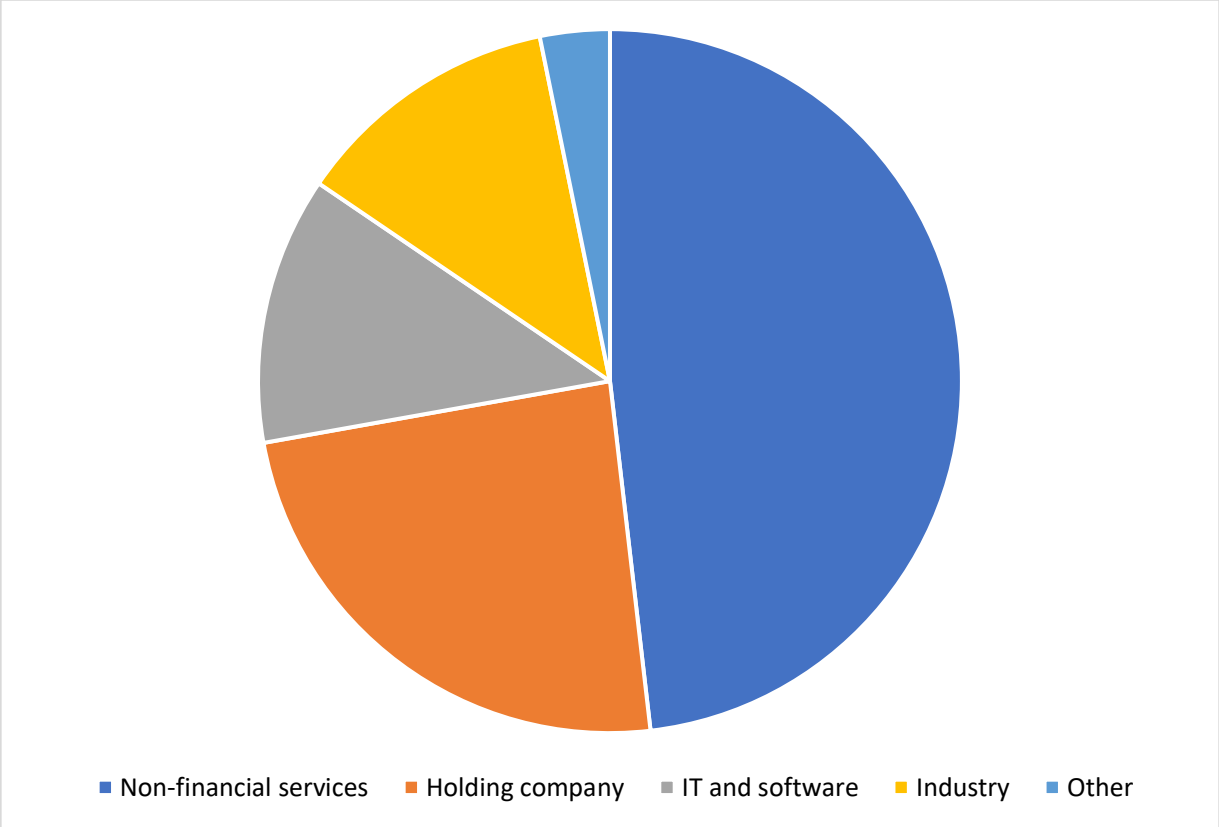


Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Analyzing the geographical and sectoral aspects of the CVC members and the startups in which they invest, we find a strong sectoral dynamism, as opposed to a more reduced territorial dynamism. Specifically, 28,9 percent of CVC members invested in a startup based in another region. From a sectoral perspective, 81,7 percent of CVC members invested in startups operating in sectors other than their own.

Regarding innovative SMEs, the largest share of CVC investors operates in non-financial services (50,1 percent) followed by business holding companies (25 percent), industry (12,8 percent), and software and information technology (12,8 percent). All these types of shareholders invest predominantly in SMEs involved in software and information technology. The industry sector also invests in industrial businesses.

Chart 15: CVC innovative SMEs shareholders sectoral distribution (2021)



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Corporate members investing in innovative SMEs exhibit high sectoral dynamism, compared with more reduced geographical dynamism. In fact, about 33,1 percent of corporate members of innovative SMEs invest in regions other than their own.

In contrast, from a sectoral perspective, about 83,4 percent of corporate members invest in innovative SMEs operating in sectors other than their own.

Considering the data reported by the Annual Report to the Parliament (MiSE, 202) and the Observatory on Open Innovation (Assolombarda & InnovUp, 2021), Italian CVC has grown strongly in the recent years. The two reports, taken as primary sources for this analysis, show a strong prevalence of investors identifiable as CVC in the North. Nonetheless, there is also a tendency to invest in innovative startups and SMEs operating in the territory of the South and, more generally, in the central-south.

Another significant figure, as highlighted during the literature review, relates to the percentage of small and medium-sized CVC investors in startups and innovative SMEs – respectively, 81 percent of the total

considering startups, 77 percent considering SMEs former startups, and 77 percent considering SMEs non-startup (Table 13). These figures clearly show the relevance of Italian SMEs both in the role of fundraisers and investors.

The growth in the number of CVC investors in innovative startups and SMEs is also accompanied by another relevant figure, about the greater weight of firms with CVC rather than non-CVC investors on the total value of the output of innovative startups and innovative SMEs (Table 12). This trend will be analyzed in the next section by taking a sample of 200 startups operating in the Italian territory. Finally, in the next section, the main characteristics of innovative startups that lead to the realization of an investment by CVC partners will be analyzed.

Chapter 3:

EMPIRICAL ANALYSIS

The previous two chapters were relevant for this study to better define both the nature and purposes of corporate venture capital in Italy. The first chapter analyzed the relevant literature, placing emphasis specifically on the value-added for innovative companies involved in the CVC relationship. The second chapter analyzed the spatial and sectoral distribution of innovative startups in Italy as well as that of corporate venture capital.

In particular, in the second chapter, it was inferred that the CVC phenomenon has been growing strongly in recent years in Italy and is playing an increasing role in terms of both involvement in an investment in innovative startups and SMEs and terms of contribution to their total value of production.

This paper has two main objectives, which will be investigated in Model A and Model B, respectively:

a) Is there a relationship between CVC and the growth of startups in Italy?
b) What are the main characteristics of invested startups and SMEs that lead to the realization of an investment definable as CVC?

Thus, the purpose of the analysis is to understand the relationship between CVC and the turnover growth of portfolio companies and what characteristics they must have to receive investment from CVC partners.

In Model A, a simple linear regression was performed between revenue growth, expressed by the Compounded Annual Growth Rate (CAGR), and the presence or absence of CVC.

Model B, on the other hand, was set up as a logit model since the dependent variable that will be investigated is the presence or absence of CVCs, considering as independent variables the main qualitative and quantitative characteristics of the innovative startups and SMEs belonging to the sample used.

In the following of this chapter, the two models and their results will be presented. Before that, the reference sample and observed variables will be introduced.

3.1 Sample and variables definition

3.1.1 *The sample*

Even though as previously highlighted innovative startups and SMEs are and are becoming more and more relevant, related data remain difficult to find. Moreover, the information is very often fee-based and incomplete, so all information related to the sample was hand-collected through multiple sources

Financial data were collected mainly through Infocamere's portal that provides online access to the Italian Chamber of Commerce database. Because the data were very often incomplete, there was a need for cross-referencing through, mainly, “crunchbase.com”, “PitchBook.com” and “reportaziende.it”.

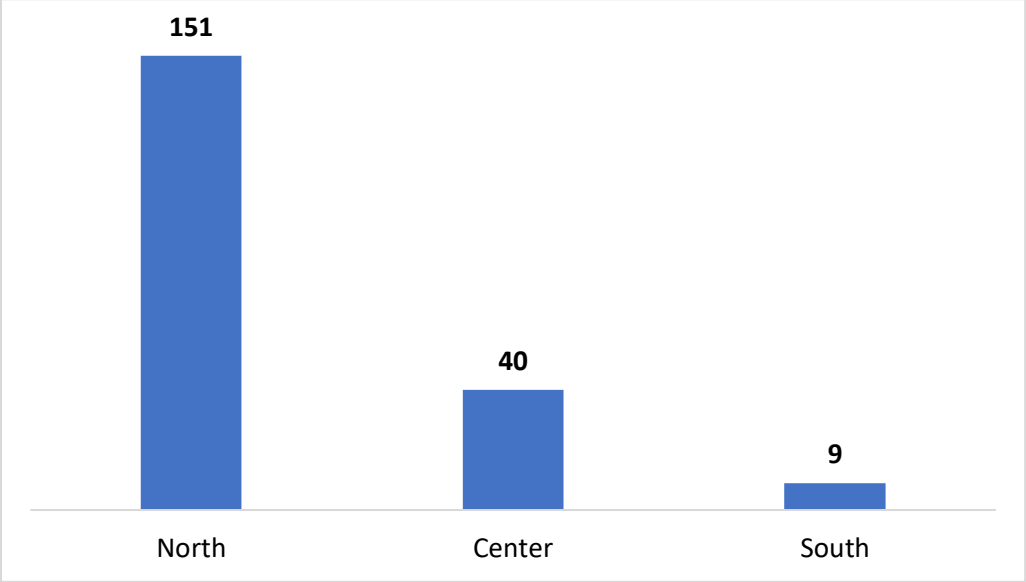
As for the qualitative data of the startups in the sample, the database of "crunchbase.com" and "PitchBook.com" were used. Where information was fragmented, unconventional use was made of "LinkedIn,” the most important business-oriented social network.

The sample consists of 200 Italian startups and innovative SMEs, founded from 2010 to 202, meeting the requirements set by the Growth Decree 2.0. The companies were chosen to try to create as heterogeneous a sample as possible concerning their sector, geographic area, and presence or absence of CVC partners. Were taken into consideration firms founded before 2012, that is before the introduction of the Decree-Law No. 179, to analyze the effect of CVC investments without the fiscal advantages that were later introduced by the Italian government

Due to a lack of data available for all companies in the sample, Model A (regression between CAGR and CVC) was reduced to 126 innovative startups and SMEs. The units in this sub-sample are the same as those in the 200 mentioned above and were chosen from among them solely because of the completeness of data on turnover for the three years 2018-2019-2020.

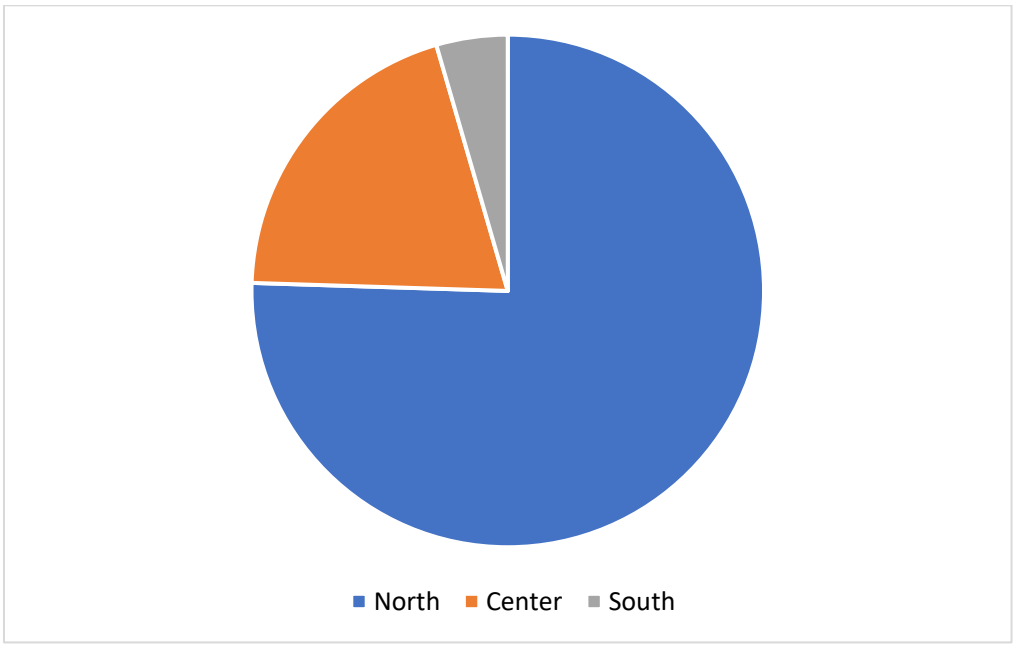
In Model B, on the other hand, the sample is composed by the same 200 startups and innovative SMEs as the data regarding the CAGR are not used to the extent of the analysis.

Chart 16: Geographical distribution of the sample I



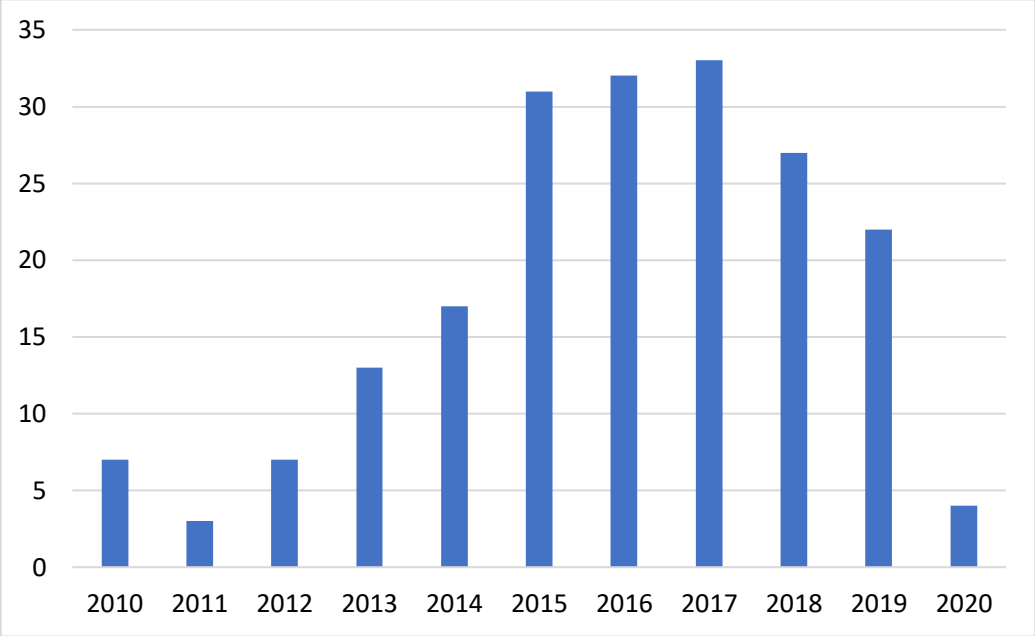
The startups and innovative SMEs composing the sample were taken from all parts of Italy. As it is possible to observe from Chart 16, the majority of them have their headquarters located in the North. Those represent 75,5 percent of the total (Chart 17) and the data is somewhat in line with the distribution reported in both the Annual Report to the Parliament (MiSe, 2021) and the Sixth Observatory on Open Innovation (Assolombarda & InnovUp, 2021).

Chart 17: Geographical distribution of the sample II



As mentioned above, the companies in the sample were founded between the years 2010-2020. The majority of them were founded between the year 2015-2019 (Chart 18). as can be seen from the graph, there is a significant decline in the number of startups and innovative SMEs founded in the year 2020. this figure can be linked to the Covid-19 pandemic, which on the one hand has certainly limited the constitution of new businesses and, on the other hand, has favored the creation of many startups that were born precisely to overcome problems created by the pandemic itself.

Chart 18: No. of startups founded by year within the sample



3.1.2 *Dependent variables*

The dependent variable in Model A is the Compound Annual Growth Rate (CAGR) of the turnover of the startups in the sample. As anticipated above, the difficulty of finding complete data for all units in the initial sample led to the choice of using a sub-sample of the previous one of 126 units.

For these 126 units, turnover data for the years 2018, 2019, and 2020 were collected. After collecting the data for the 126 startups, the following CAGR formula was used to obtain the relative value:

$$\boldsymbol{CAGR} = \left(\frac{\text{End value}}{\text{Begin value}}\right)^{\left(\frac{1}{n}\right)} - 1$$

Table 14 shows the results of the descriptive analysis performed on the collected data. As we are speaking of startups, there was certainly some variability in the data during the analysis. Another relevant factor that affected the variability of the data is certainly the turnover of the year 2020. In fact, the year 2020, since it represents the first year of the global pandemic of Covid 19, has a significant weight on the growth rate of turnover.

Table 14: Descriptive statical analysis of CAGR of the startups within the sub-sample

Mean	Variance	Standard Deviation	Maximum	Minimum
139,4%	31,33	5,60	5709%	-100,0%

Since the data pertaining to the year 2020 turnover were collected for the 126 units in this study, I also wanted to propose a third model which might be able to explain the relationship between CVC and turnover growth rate from year 2019 to 2020, in order to investigate a possible role of CVC in mitigating the negative effects of the pandemic crisis. However, given the excessive variability of the data in the sub-sample, such an investigation was not possible because the regression results were not statistically relevant

As for Model B, the dependent variable is the presence or absence of CVC members. The CVC variable was set as binary (1,0) and the analysis was carried out through a logit model. Model B involves analysis on the initial sample of 200 Italian startups.

Data on the presence of CVC members echo those presented in the previous chapter. The startups participated by CVC members are 52 (Chart 19) and represent 26 percent of the total (Chart 20).

Chart 19: No. of startups with CVC shareholders within the sample I

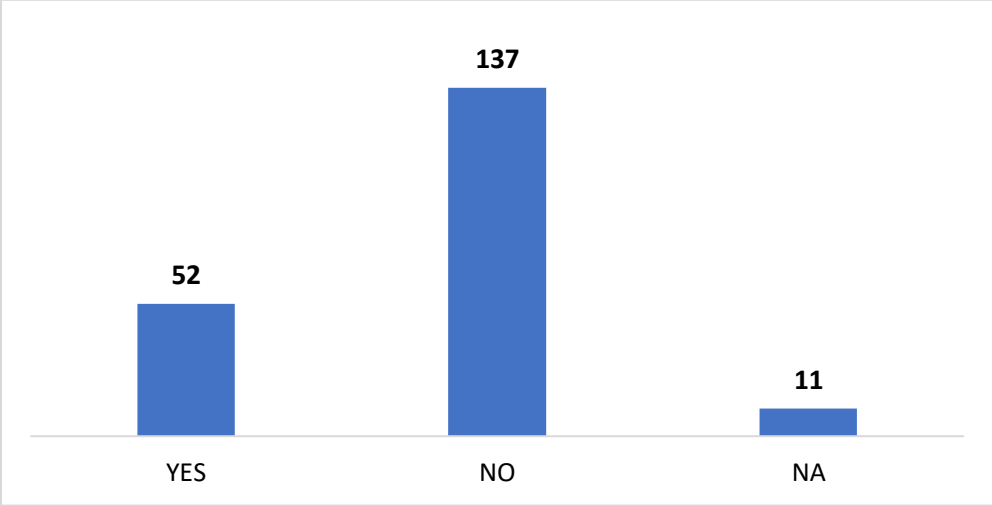
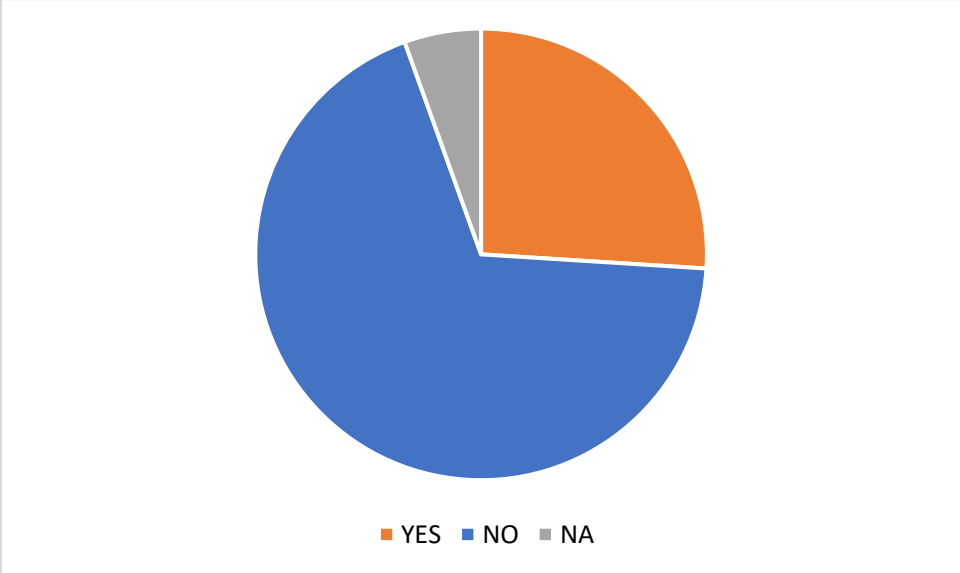


Chart 20: No. of startups with CVC shareholders within the sample II



3.1.3 *Explanatory variables*

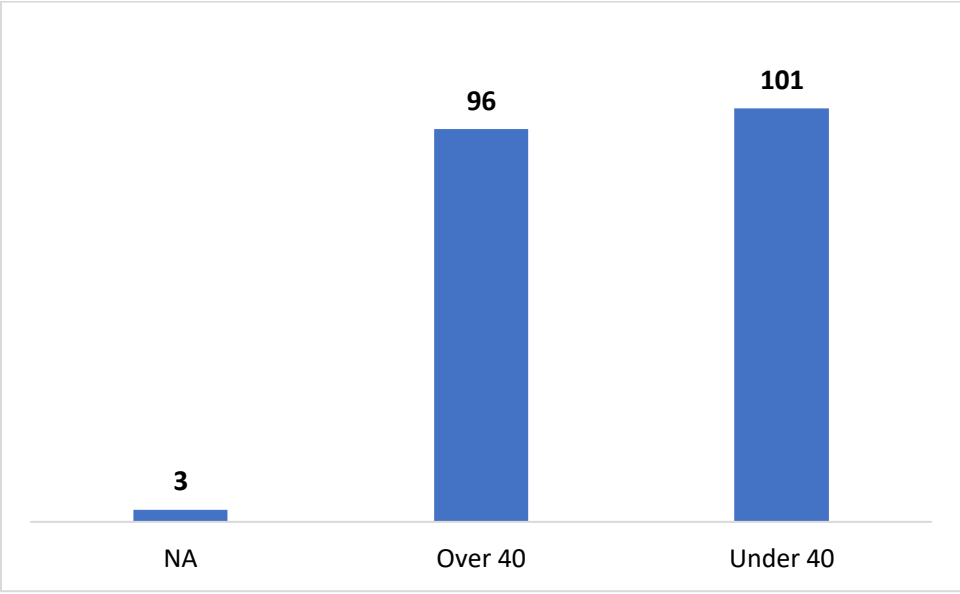
The explanatory variables analyzed in this study can be summed as follows:

Table 15: Explanatory variables

Variables
Headquarters Location
CEO Age
CEO Sex
Founder Age
Founder Sex
Patents
Amount raised
Industry

Regarding the age of the CEO, the distinction made in this analysis is age Under or Over 40. Accordingly, within Model B it was used as a binary variable that takes value 1 if the CEO is under 40, 0 otherwise.

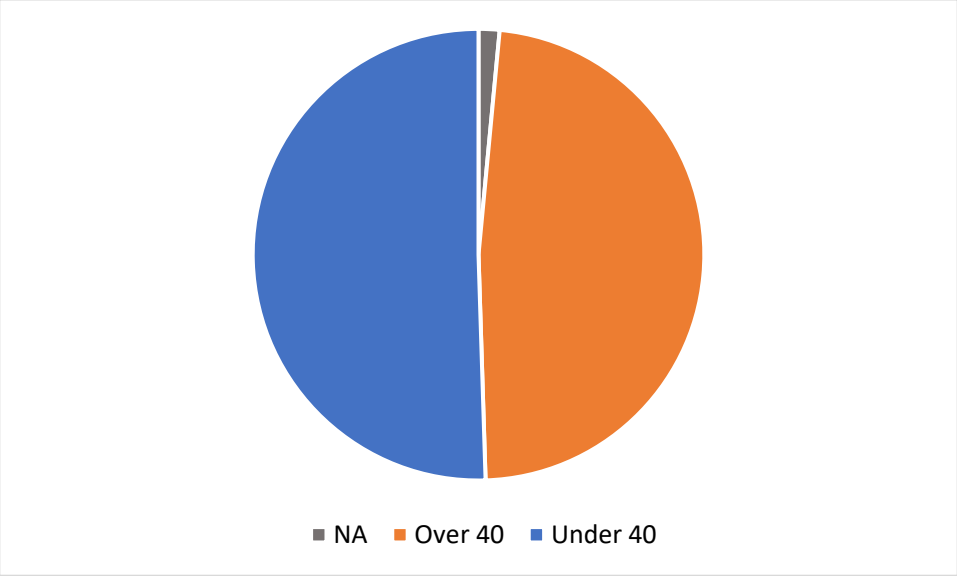
Chart 21: CEO Age distribution within the sample I



It is possible to observe from Chart 21 a certain homogeneity in the age distribution of the CEOs of the startups in the sample. In fact, CEOs aged Over 40 are slightly more than those Under (50,5 percent) (Chart 22). The term "NA" within Charts 18 and 19 is to symbolize the lack of sensitive data to be able to determine with

absolute certainty the age of the CEO. This nomenclature was also used throughout the analysis regarding other variables.

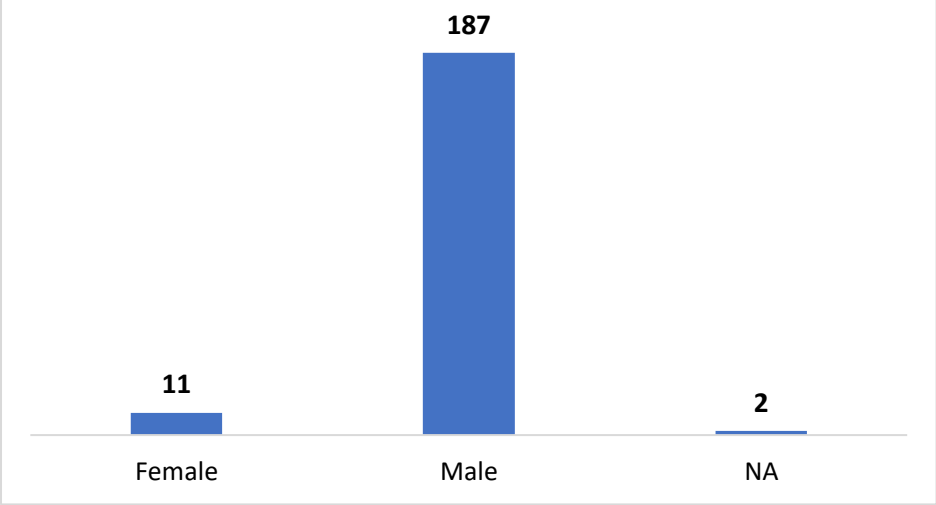
Chart 22: CEO Age distribution within the sample II



The CEO sex variable was also used for regression purposes as a binary variable, with value 1 if CEO is Male, 0 if female.

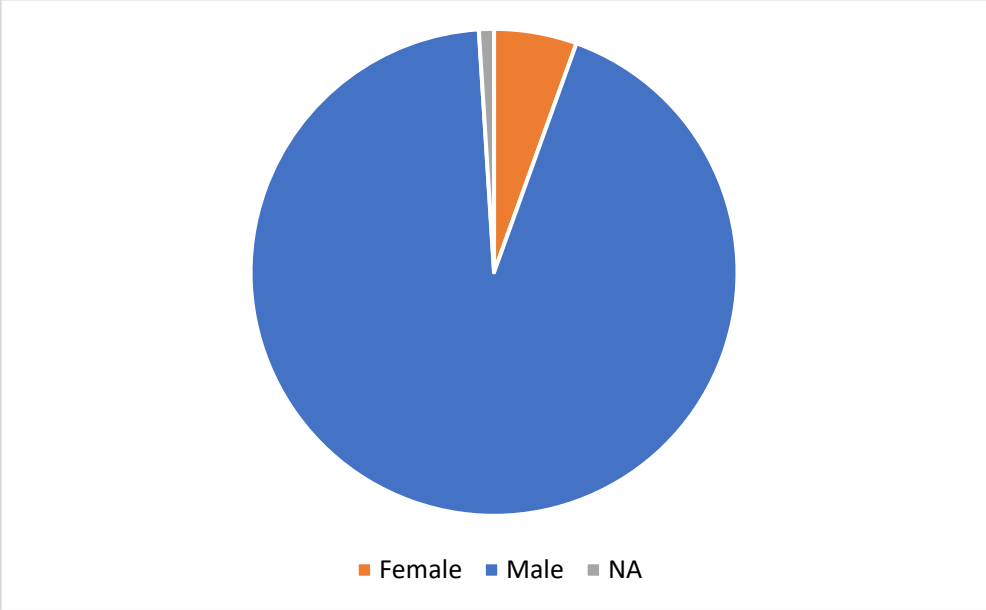
Chart 23 shows the gender distribution of startup CEOs within the sample.

Chart 23: CEO Sex distribution within the sample I



The numbers shown above show a clear male dominance among the CEOs of the Italian startups sampled. These in fact correspond to 93,5 percent of the total (Chart 24).

Chart 24: CEO Sex distribution within the sample II



Similarly to the age of CEOs, the variable Founder Age was also analyzed as binary, taking values 1 if the founders are all, or mostly, Under 40, 0 otherwise. The data shown by Chart 25 show of how the distribution within the sample is rather homogeneous. In fact, the values are equally distributed (Chart 26)

Chart 25: Founder Age distribution within the sample I

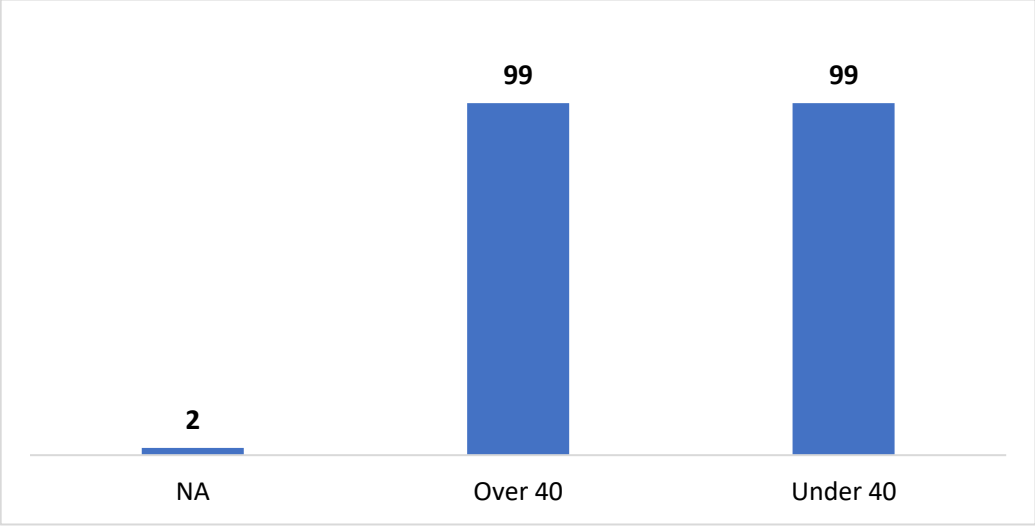
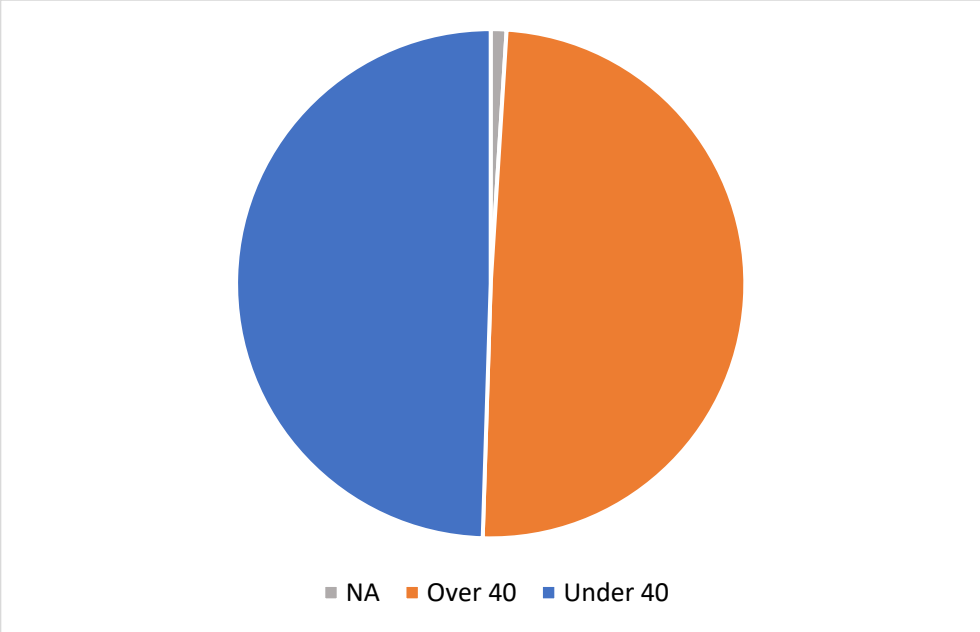


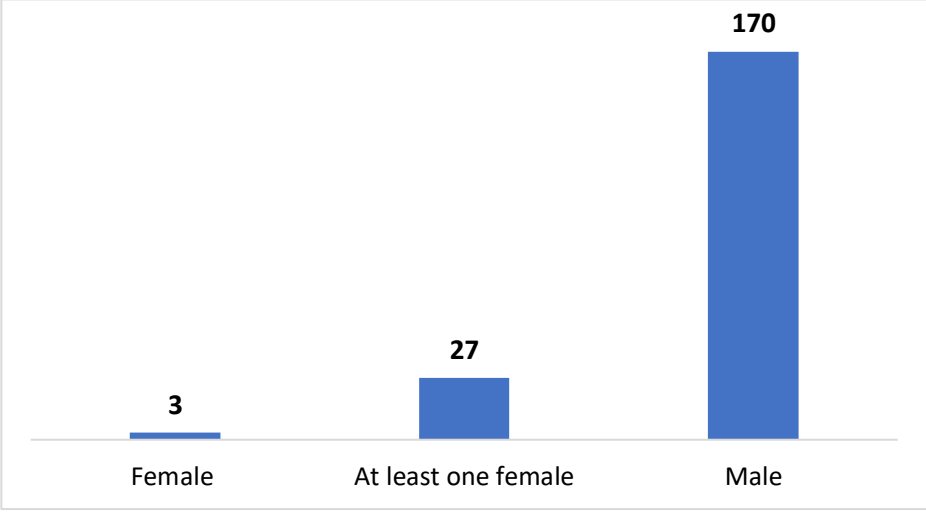
Chart 26: Founder Age distribution within the sample II



Furthermore, the variable Founder Sex was analyzed as binary, with values 1 if Founders are male and 0 otherwise.

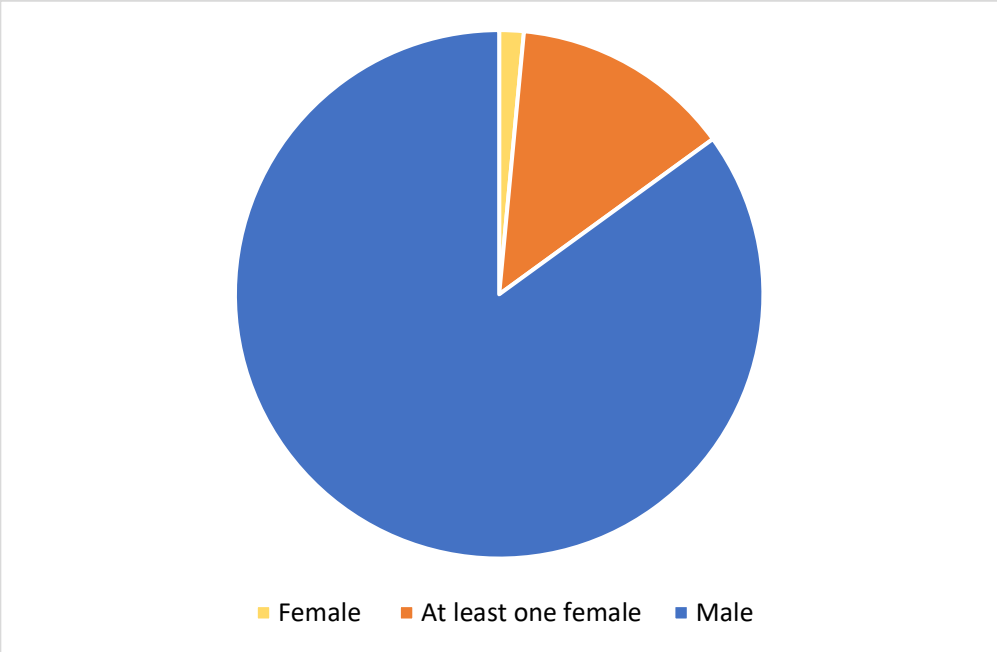
Chart 27 shows the distribution of the variable within the sample. The number of startups that have female-only Founders and those that have at least one woman present among the founders were reported separately.

Chart 27: Founder Sex distribution within the sample I



It is possible to see from the graph above how, again, male founders are the constant within the observed sample. In contrast, startups with founders with at least one woman account for 13,5 percent of the total observed, while those with only women account for only 1,5 percent (Chart 28).

Chart 28: Founder Sex distribution within the sample II



Patents was also taken into account as an explicative variable for Model B. This was considered as a binary variable assuming values 1,0, in case of owning or not owning patents. The significance for regression purposes will be shown later in this chapter. For the purposes of this section, however, it is relevant to show how many startups in the observed sample possess the requirement posed by Decree 2.0 of owning or licensing patents.

As can be seen from Charts 29 and 30, the majority of the observed startups do not own patents. In fact, those that do own them amount to only 28 (14.5 of the total). This can be explained due to the difficulty not only clearly of innovation ingenuity, but also the onerousness of registering patents for young companies.

Chart 29: No. of startups with patents within the sample I

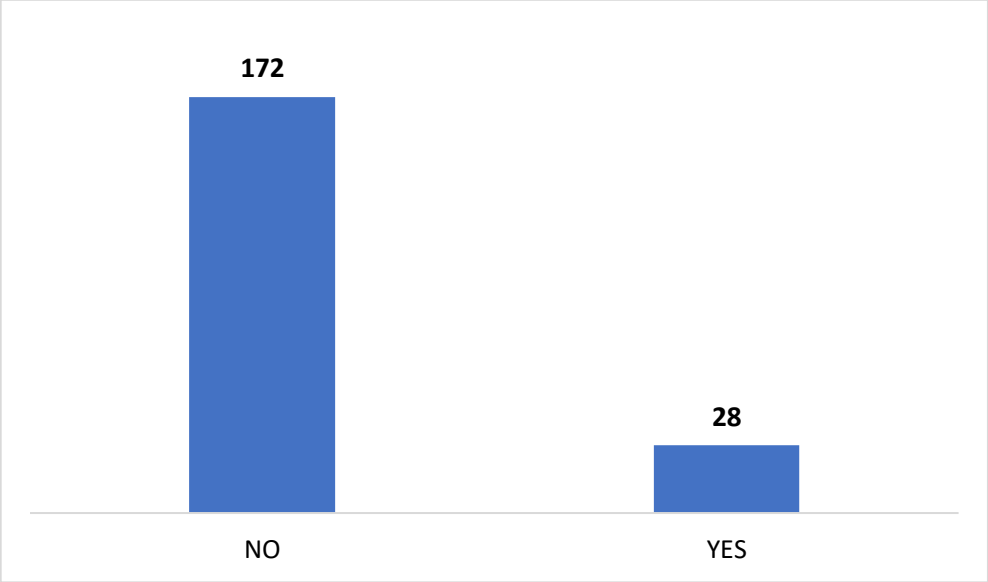
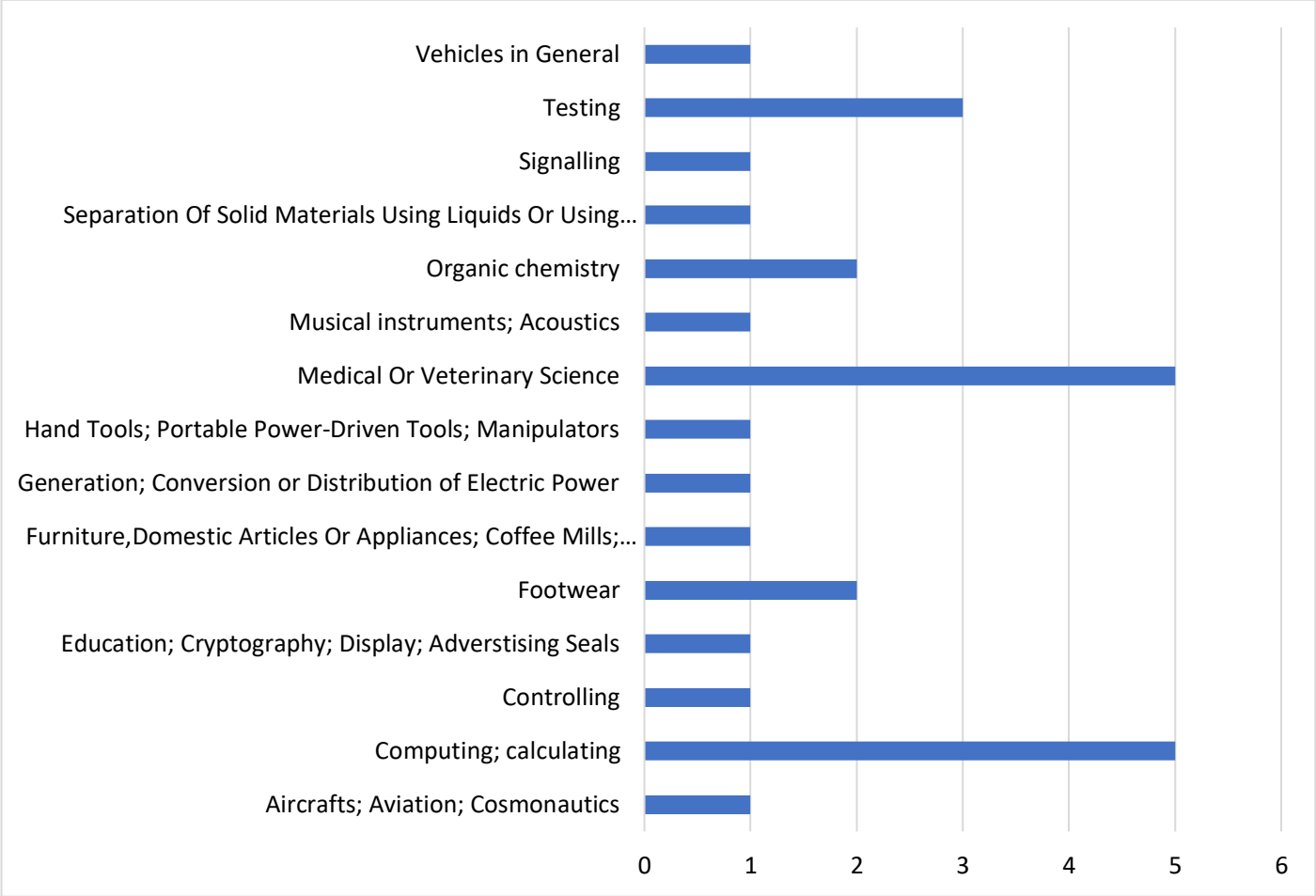


Chart 30: No. of startups with patents within the sample II

The observed sample analysis also considered the variable Patent Section, which reports the patent registration section held by the 28 startups in the sample. This variable, however, was not taken into account for the purposes of the Model B analysis because it was not considered significant to the result.

Chart 31: Patent section



As can be seen from Chart 31, the majority of patents held by the 28 startups in the sample are registered in the "Medical or Veterinary Science," and "Computing, Calculating" sections.

The data shown pertaining to Patent Sections, are somewhat in line with the sectoral distribution of the sample startups. In fact, as can be seen from Table 16 which depicts the breakdown of the sample startups divided by sector (Ateco 2008), the sectors of "Information and Communication services" (25,5 percent) and "Health and social care" (6 percent) have the largest weights. Another sector in which are grouped several startups is "Finance and Insurance services" (14.5 percent).

Table 16: No. of startups divided by industry (Ateco 2008)

Section	No.	weight %
A - Agriculture, silviculture and fishing	4	2,0%
B - Mining of minerals from quarries and mines	0	0,0%
C - Manufacturing activities	17	8,5%
D - Supply of electricity, gas, steam and air conditioning	3	1,5%
E - Water supply; sewerage, waste management and sanitation activities	0	0,0%
F - Constructions	0	0,0%
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	8	4,0%
H - Transportation and storage	1	0,5%
I - Accommodation and food service activities	17	8,5%
J - Information and communication services	51	25,5%
K - Financial and insurance activities	29	14,5%
L - Real estate	6	3,0%
M - Professional, scientific and technical activities	14	7,0%
N - Rental, travel agencies, business support services	5	2,5%
P - Education	4	2,0%
Q - Health and social care	12	6,0%
R - Arts, sports, entertainment and recreation activities	5	2,5%
S - Other service activities	24	12,0%
Total	**200**	**100%**

Finally, the last independent variable analyzed is the amount in millions of euros of fundings received by startups in the reference samples. For the purpose of the statistical analysis performed in Model B, the related data were standardized.

Table 17 shows the main results of the descriptive analysis carried out on the data of the Amount Raised variable.

Table 17: Descriptive statical analysis of Amount raised from the startups within the sample

Mean	Variance	Standard Deviation	Maximum	Minimum
26,9	21058,4	145,1	0,1	1900,0

As mentioned earlier in relation to CAGR, the data for this variable are also highly variable. This is mainly due to the different stage and type of round received by startups and the different years of founding.

3.2 Model A

3.2.1 *First analysis on Model A*

Model A aims to study the relationship between revenue growth of startups in Italy and the presence of CVC members. As argued in the previous chapter, Italian corporate venture capital is growing fast and is also growing in the weight it has in the total volume of production of innovative startups and SMEs. Among the various analyses that have been carried out, it has been found that companies participated by CVC partners show a relatively lower mortality rate than those not participated. However, there has never been an empirical analysis that factually defines, based on historical data, a significant relationship between CVC and revenue growth of Italian startups.

The analysis was therefore set on the sub-sample of 126 Italian startups, meeting the requirements set by the Growth Decree 2.0. Of these 126 entities, relative turnover data for the three-year periods 2018, 2019 and 2020 were collected. From these data, the compound annual growth rate (CAGR) was manually calculated.

Thus, the variable "CAGR" represents the dependent variable.

The independent variable is represented by "CVC." This, for the purpose of the analysis, was set as binary. The independent variable therefore takes value 1 when there is presence of CVC shareholders, 0 in case there are no CVC shareholders.

Hence, the formula for linear regression is as follows:

$$CAGR = \beta_0 + \beta_1 CVC$$

The results of Model A are summarized in the following table (18).

Table 18: Summary of Model A results

R-squared		**0,01**
Adjusted R-squared		**0,001**
No. of observations		**126**
Coefficients:	**coef.est**	**coef.se**
(Intercept)	1,06	0,59
CVC	1,18	1,10
Coefficients:	**Estimate**	**Pr(>|t|)**
(Intercept)	1,0551	0,076
CVC	1,1847	0,285

*Statistical significance: * p ≤ 0.10 (10 %); ** p ≤ 0.05 (5 %); *** p ≤ 0.01 (1 %)*

The results exhibited in Table 18 show undoubtedly very low R-squared indices, as well as p-values.

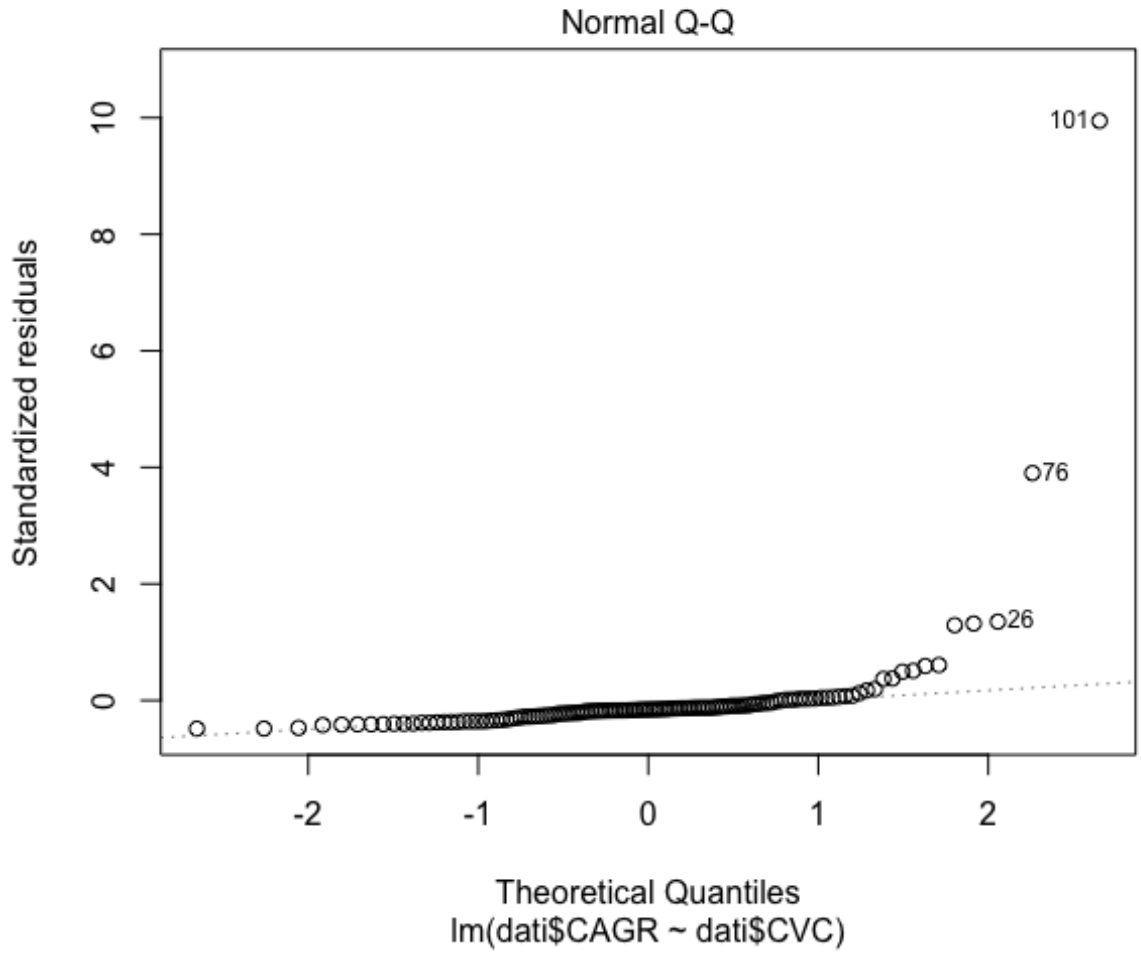
First, it can be observed that the coefficient estimates are within the value of ± 2 their standard deviation. Thus, this result shows that despite the non-excessive sample size, they are statistically significant.

Looking at the data shown in Table 18, the most interesting results concern the estimation of the coefficients themselves. In fact, the CAGR of startups without CVC shareholders is 106% in the sample. In contrast, the CAGR of startups with CVC shareholders is 1.18+1.06= 2.24 (224%).

After performing the regression analysis, an analysis was also performed on the residuals to check their essential conditions and distribution.

The first analysis that was carried out was aimed at understanding whether the model residuals have a normal distribution. Chart 32 shows the distribution of the Model A residuals.

Chart 32: Model A residual distribution



From Chart 32 it is possible to see that the residuals of Model A are distributed along the bisector of the graph. Since therefore the quantiles of the residuals coincide with those of the normal distribution, it can be said that the Model A residuals have normal distribution.

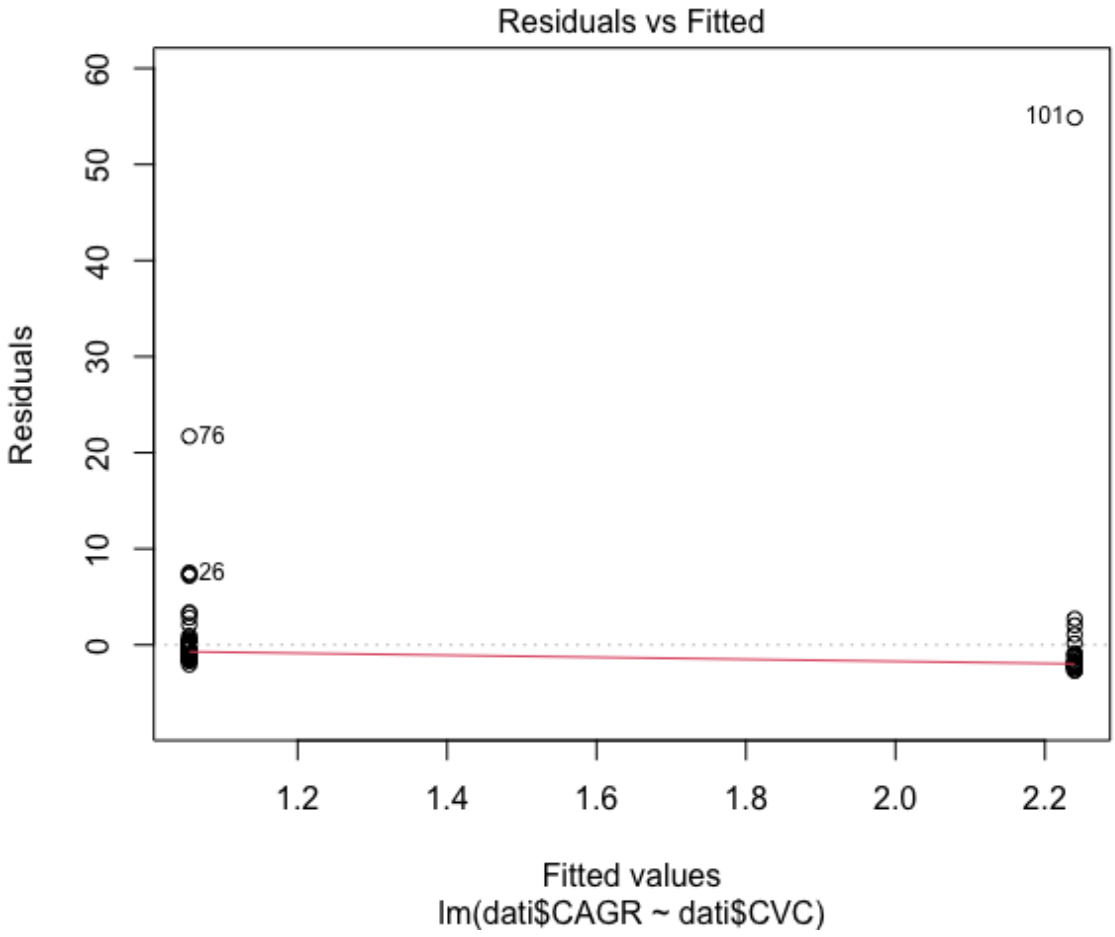
However, in statistical practice it has been shown that the normality of error hypothesis is not as important as other hypotheses.

It was therefore necessary to carry out further analysis on the residuals of the model A.

Then, tests were conducted to see whether the variance of the residuals of Model A is homogeneous, and the distribution of the residuals is linear.

The results of the analysis are shown in Chart 33.

Chart 33: Residuals vs Fitted values (Model A)



First, it is possible to observe how they are similarly dispersed in both the left and right sides of the graph. This means that the variance of the residuals is homogeneous.

Second, a dotted horizontal line is depicted in the graph at the residuals that, by definition, in a linear regression model, have mean equal to zero.

Since the red line in the graph, i.e., the trend line, is superimposable on the dashed horizontal line, then it is possible to say that the linearity hypothesis is verified.

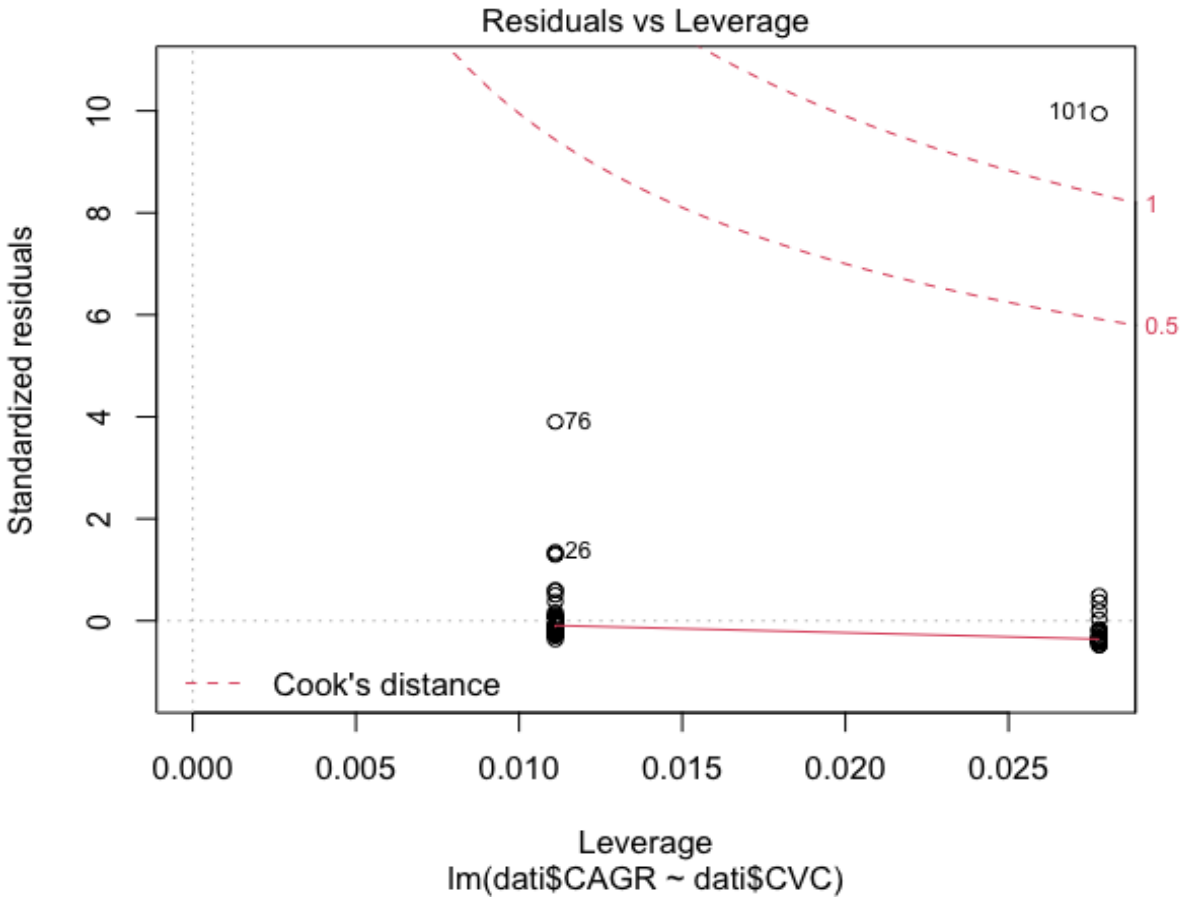
Finally, the homoscedasticity of the residuals was checked using the Breusch-Pagan test and the absence of serial correlation using the Durbin-Watson test.

The resulting p-value from the Breusch-Pagan test is $0{,}1361$. Since $p - value > 0{,}05$, the null hypothesis cannot be rejected, and it is concluded that there may be no homoscedasticity.

In contrast, the Durbin-Watson test led to a value of 1,9748. Recalling that the test always gives values between 0 and 4, since the value given by the Model A residuals test is close to 2, it is possible to say that the residuals are not autocorrelated with each other.

The above results show that the residuals of Model A partially meet the essential conditions. If you look closely at the graphs above (32 and 33) you can see the scattering in the upper right corner of observation No. 101. We then proceeded to analyze whether there are any outliers that affect the slope of the line. The possible outliers are those with the largest residuals - e.g., observation No. 76 and 101. Points with high residual (outliers) or high leverage can distort the result and accuracy of a regression analysis. Cook's distance analysis was then carried out. Cook's distance measures the effect caused on the analysis by the removal of a certain data point. The results of the analysis are depicted in Chart 34.

Chart 34: Cook's distance (Model A)



As expected, observation No. 101 represents an outlier that affects the model result. Observation No. 101 corresponds to the data for the startup, which operates in the Agri-tech sector. The fact that the CAGR variable of this observation has relevance within the model follows the expectations of this study as this represents the startup with the highest CAGR in the three-year period 2018, 2019, 2020 (5709%).

3.2.2 *Second analysis on Model A*

Given the high heterogeneity of the observed data in the sub-sample variables used in Model A, it was decided to conduct a second analysis on the same. The high heterogeneity of the data is explained by the different industries of the observed startups, as well as the relative diversity in business models and the variability of the results in year 2020, i.e., the first year of Covid 19 pandemic.

As shown in the first analysis, Model A demonstrates a higher CAGR in startups participated by CVC members than in those without shareholders classifiable as such. However, given the high variability of the observed data, analyzing the model residuals showed that there are observations that significantly influence the model result.

The second analysis of Model A focuses on the same regression between CAGR and the presence of CVCs but takes as reference only the sub-sample startups belonging to the ICT sector. In addition to the need to limit the heterogeneity of the observed data, it was decided to analyze this sector because ICT represents the one in which Italian CVC members are most present. Therefore, the second analysis of Model A, despite the lower numerosity of the sub-sample, assumes great relevance since it is explanatory of the relationship between CVC and the growth of Italian startups in the sector in which it is most present and most developing in the past years.

The analysis was always conducted using the same following formula:

$$CAGR = \beta_0 + \beta_1 CVC$$

The new model results are shown in Table 19.

Table 19: Summary of Model A results II

	Estimation	**Standard error**	**Pr(>|t|)**
Intercept	0,06	0,22	0,7747
CVC	0,94	0,35	0,0116*
n		35	
R squared		0,18	
Adjusted R squared		0,1529	

*Statistical significance: * p ≤ 0.10 (10 %); ** p ≤ 0.05 (5 %); *** p ≤ 0.01 (1 %)*

The second analysis of Model A confirms the results of the first analysis and undoubtedly poses interesting outcomes.

Indeed, the data shown in Table 19 show the statistical significance of the CVC variables. This demonstrates the relevance of the presence of CVC partners to the growth of startups operating in the ICT sectors. In fact, the average CAGR in these companies is 100 percent, compared to those without CVC partners, which have an average CAGR of 6 percent.

However, the possible limitations of the model can be identified in the numerosity of the observed variables. it is therefore possible to say that there is a trade-off between comparability and number of observations.

3.3 Model B

As mentioned above on opening chapter, Model B aims to investigate what are the most significant characteristics of startups that lead to the realization of CVC investments. Thus, the existence or non-existence of a relationship between the qualitative and quantitative characteristics of the startup and the presence or absence of CVC is analyzed. The sample taken for Model B analysis is the initial sample of 200 Italian startups.

The dependent variable in this model is CVC. Since this represents a dichotomous variable, which takes values 1 if CVC members are present, 0 otherwise, it was necessary to set a logit model.

Below is the logistic formula:

$$E[Y|x] = p(x) = \frac{e^{\beta x}}{1 + e^{\beta x}}$$

That is:

$$logit\big(p(x)\big) = \ln \frac{p(x)}{1 - p(x)} = \beta x$$

The logistic regression is therefore a special case of GLM. In these models, we have a link function transforming E[Y] following a linear model. In particular, in the logit model, the link function is the logit function, namely:

$$E[Y] = p \qquad \ln \frac{\mathrm{p}}{1 - \mathrm{p}} = \beta x$$

The independent variables of the model are represented below in Table 20.

Table 20: Summary of the independent variables of Model B

Headquarters Location	$Character$
CEO Age (Under/Over 40)	$1 = Under\ 40, 0 = Over\ 40$
CEO Sex	$1 = Male, 0 = Female$
Founder Age (Under/Over 40)	$1 = Under\ 40, 0 = Over\ 40$
Founder Sex	$1 = Male, 0 = Female$
Patents	$1 = Yes, 0 = No$
Amount raised (in mill)	$Standardized$
Industry	$Character$

Hence, the equation describing the model is the following:

$$CVC = \beta_0 + \beta_1 Headquarters\ Location_i + \beta_2 CEO\ Age_i + \beta_3 CEO\ Sex_i + \beta_4 Founder\ Age_i + \beta_5 Founder\ Sex_i + \beta_6 Patents_i + \beta_7 Amount\ Raised_i + \beta_8 Industry_i$$

The results of Model B are reported in the next page in Table 21.

Table 21: Summary of Model B results

Dependent variable	CVC	R - squared	0,1129
Indipendent variables	**coef.est**	**coef.se**	**Pr(>|z|)**
(Intercept)	-2,38	1,17	0,0431 *
Headquarters location - North	0,79	0,52	0,13
Headquarters location - South	0,13	0,96	0,89
CEO Age	-1,39	0,91	0,13
CEO Sex	0,57	0,86	0,51
Founder Age	0,91	0,93	0,33
Founder Sex	-0,55	0,58	0,34
Patents	-0,62	0,58	0,29
Amount Raised	-0,50	0,72	0,49
Industry - Agriculture	1,22	1,48	0,41
Industry - Arts, sports, entertainment and recreation activities	0,59	1,37	0,67
Industry - Automotive	1,45	1,10	0,19
Industry - Education	0,78	1,51	0,60
Industry - Energy	3,29	1,60	0,0401 *
Industry - Finance and Insurance services	1,43	0,89	0,11
Industry - Health and social care	1,43	1,02	0,16
Industry - Information and communication services	1,33	0,84	0,11
Industry - Manufacturing	0,21	1,02	0,83
Industry - Other services	0,55	0,92	0,55
Industry - Professional, scientific and technical activities	-0,45	1,33	0,73
Industry - Real Estate	-14,66	969,58	0,99
Industry - Rental, travel agencies and business support services	0,16	1,34	0,91
Industry - Transaportation and storage	-13,77	2399,54	1,00

*Statistical significance: * $p \leq 0.10$ (10 %); ** $p \leq 0.05$ (5 %); *** $p \leq 0.01$ (1 %)*

Model B proposes several interesting results.

First of all, as can be seen from Table 21, the R-squared is not very high, nor are there any statistically significant variables for the purposes of the model – the Energy value in the "Industry" variable.

The coefficient estimates are, however, in the majority of statistical significance in that they have a value of ± 2 their standard deviation.

What is most relevant in the analyzed model, as well as in the case of Model A, are the regression coefficient estimates themselves. This result, at first glance, meets the expectations on the model. In fact, there is a greater chance that CVC partners invest in startups operating in northern Italy (0,79), rather than in the south (0,13). These estimates highlight the results of the geographic and sectoral studies proposed in the previous chapter (Assolomabrda & InnovUp, 2021; MiSE, 2021).

Another interesting finding is the estimated coefficients for the "CEO Age" variable. The estimated value represents the probability that CVC members invest in startups with CEOs younger than 40 years old. This suggests, at first analysis, the possibility that established companies prefer to enter the capital of startups that have an experienced CEO at the helm.

On the other hand, regarding the "Founder Age variable", it was shown that there is a 0,91 percent probability that CVC partners will invest in the startup if the founders are younger than 40 years old.

The estimated coefficient for the "CEO Sex" variable reflects pre-analysis expectations. In fact, since female CEOs in the observed sample are only 0,05 percent of the total.

In contrast, the result pertaining to the "Founder Sex" variable goes against pre-analysis expectations. The fact that male founders amounted to about 85 percent of the total number of startups in the observed sample had created an expectation that the variable would take at least positive values. Thus, despite the relatively low weight of women present among the founders of the observed startups (15 percent), the coefficient estimates instead show the tendency of CVC members to invest in startups in which at least one woman is a founder.

The results on the "Patents" variable mirror the pre-analysis expectations (-0,62). This certainly reflects the difficulty in patenting by young companies that is somewhat acknowledged by potential partners.

The estimated results for the "Amount Raised" variable also reflect expectations. In fact, the discourse related to the amount of capital received in the form of investment is related in part to assessments of the value of the company. Each company has indeed a different potential value from the other, and it is not possible to establish a priori the goodness of one over the other by taking the amounts received as a reference. Moreover, the

variability in the data observed on the "Amount Raised" variable is undoubtedly related to the different years of establishment of the startups in the sample.

Finally, the results regarding the "Industry" (Ateco 2008) of the startups in the observed sample show interesting results.

This confirms the propensity of CVC members to enter the capital of startups belonging to the "Information and communication services", "Health and social care" and "Finance and Insurance services" sectors. The results certainly reflect pre-analysis expectations as the above sectors are those in which CVC members generally invest the most. This trend was confirmed by the sectoral distribution of the analyzed sample.

The most statistically significant correlation is represented by the "Energy" industry. This result also underlines the aspects as it is one of the sectors where there has been the most space for research in recent years for the energy transition to renewable sources. The same applies to the "Automotive" industry, which has an estimated coefficient of 1,45.

The only statistically insignificant values in Model B pertain to the "Real Estate" and "Transportation and storage" industries. This can be explained by the sectoral distribution of startups in the observed sample. In fact, startups belonging to these industries weigh little in the total – 3 and 0,5 percent, respectively.

CONCLUSIONS

This study aimed to fill gaps in the literature on corporate venture capital. Indeed, there has been considerable discussion about corporate venturing strategies and, specifically, corporate venture capital. Most of the authors referenced in the course of the literature review have carried out qualitative and strategic studies. Relevant are the studies pertaining, first and foremost, to the definition of corporate venture capital – a topic often misinterpreted - and its forms. The literature about objectives pursued with CVC strategies is also undoubtedly substantial. Indeed, multiple objectives are highlighted, not only financial, but above all strategic. The most important ones exhibited pertain to the possibility of knowledge and technology transfer, the exploitation of complementary skills, and entry into new markets. In addition, multiple quantitative studies about the acquisition of technological value have been proposed. Finally, no studies have been proposed in recent years pertaining specifically to the Italian case.

Starting with Model A, this aimed to investigate the relationship between the presence of CVC partners within Italian startups and their growth expressed as revenue growth through the Compounded Annual Growth Rate (CAGR) measure. The expectations for this analysis were met. In fact, we did not expect to obtain statistically significant values regarding the CVC variable. Undoubtedly, it is not possible to explain a company's growth through CVC alone, as this depends on numerous factors. In addition, the data analyzed for the companies in the sample referred to a particular historical period that certainly represented a significant contingency.

Nevertheless, as expected, the most interesting results pertaining to the estimation of the regression coefficients themselves. In the first analysis of Model A, the CAGR was shown to be higher on average in startups participated by CVC members than in those in which there are none. The model was shown to be reliable, despite the fact that the sub-sample used was not too large. However, by analyzing Cook's distance of the model residuals, it was possible to identify one observation (No. 101) that had significant weight on the outcome of the analysis.

Given the high heterogeneity of the observed data – due to the fact that the startups in the sample belong to different sectors, thus having different business models, and to the variability inherent in the year 2020 results – the analysis was carried out by considering only the startups in the sample operating in the ICT sectors. This is because this represents the sector in which there are the most CVC members in Italy and has been growing strongly in recent years. The results demonstrated the statistical significance of the CVC variable in the growth of the observed startups, showing how on average the CAGR in startups with CVC partners is parts to 100 percent, compared to the average of 6 percent in startups without CVC partners. However, the significant and

highly relevant data for the purpose of this study have limitations pertaining to the not too large sample size. It is possible, therefore, to say that there is a trade-off between comparability and the number of observations.

Model B aimed instead to explain the relationship between the main characteristics of Italian startups and the presence or absence of CVC partners. The objective was thus to identify the characteristics in this sense that are most relevant to venture capital entry by CVC partners. Because the CVC dependent variable is dichotomous, the model was set up as logit. The independent variables in the model are the following: a) headquarters location; b) CEO age; c) CEO sex; d) founder age; e) founder sex; f) patents; g) amount raised; h) industry (Ateco 2008).

Model B showed very interesting results. As expected, again the most important results pertaining to the estimation of the coefficients themselves and their interpretation.

First of all, the results confirmed a greater propensity of CVC members to enter the capital of startups operating in Northern Italy. These results echo the data shown in Chapter 2 when analyzing the territorial distribution of innovative startups and SMEs.

The results show some preference toward startups where there is a CEO older than 40 and male. The fact that the coefficient on the "CEO Age" variable (1, Male; 0, Female) is undoubtedly influenced by the fact that the absolute majority of startups in the sample have a male CEO.

Regarding the age of the founders, equally distributed in the sample between Under and Over 40, it is shown that there are more CVC members in startups that have young founders. Moreover, despite the low percentage of at least one woman present among the founders of the observed startups, the result showing that in fact the probability of there being CVC partners in startups with male founders is even negative is significant.

The estimated coefficient on the variable "Patents" meets expectations. In fact, the fact that this variable was not significant was put into account since obtaining and registering patents is still a very onerous practice.

The results also show little significance of the amount raised by startups in the choice of CVC partners to enter their capital.

Finally, the results observed on the "industry" variable also show interesting data. CVC partners are confirmed to be very strong and present in the industries of "Information and Communication services," "Health and Social care," and "Finance and Insurance services."

Other industries in the sample where CVC members are shown to be present are "Automotive" and "Energy." One possible explanation for these results relates to changes in the respective industries in recent years toward

more sustainable economies. indeed, the potential to explore new resources and technological expertise through CVC strategies was demonstrated in the literature review.

The results obtained from this study hope to fill the void in the literature pertaining to the study of the relationship between CVC and business performance and the essential characteristics that lead to its realization in Italian startups. Despite the lack and fragmentation of accessible data on startups, the models appear reliable. There is certainly space and a need to examine the phenomenon in more detail. This indeed should include analyses on larger samples and the analysis of historical data based on longer time horizons.

REFERENCES

Alberti, F. G., Ferrario, S., Papa, F., & Pizzurno, E. (2014). Search breadth, open innovation and family firms: evidence in Italian mid–high tech SMEs. International journal of technology intelligence and planning, 10(1), 29-48.

Alter, M., & Buchsbaum, L. (2000). Corporate venturing: Goals, compensation, and taxes. The corporate venturing directory and yearbook, 25-29.

Anokhin, S., Örtqvist, D., Thorgren, S., & Wincent, J. (2011). Corporate venturing deal syndication and innovation: the information exchange paradox. Long Range Planning, 44(2), 134-151.

Assolombarda & InnovUp (2021). Sixth Observatory on Open Innovation and Corporate Venture Capital. <https://osservatorio-openinnovation.it/wp-content/uploads/2021/11/2021_ReportOpenInnovation_01.pdf>

Backholm, A. (2000). Corporate venturing as a tool for innovative R&D. In R&D Management, Manchester, UK, 10-12.7. 2000 (p. 5). RADMA.

Barry, D. G. (2000). Latest Corporate Venturing Boom Rings Bells for Independent VCs. The Corporate Venturing Directory and Yearbook, Barry D.(ed.), Asset Alternatives, Inc., Wellesley, MA, 9-14.

Belderbos, R., Jacob, J., & Lokshin, B. (2018). Corporate venture capital (CVC) investments and technological performance: Geographic diversity and the interplay with technology alliances. Journal of Business Venturing, 33(1), 20-34.

Benson, D., & Ziedonis, R. H. (2009). Corporate venture capital as a window on new technologies: Implications for the performance of corporate investors when acquiring startups. Organization Science, 20(2), 329-351.

Bisesi, M. (1984). The Change Masters: Innovations for Productivity in the American Corporation.

Block, Z. (1982). Can corporate venturing succeed? Journal of Business Strategy 3(2): 21-33

Block, Z. (1989). Damage control for new corporate ventures. Journal of Business Strategy 10(2): 22-28

Brav, A., & Gompers, P. A. (1997). Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture and non-venture capital-backed companies. The journal of finance, 52(5), 1791-1821.

Burgelman, R. A. (1985). Managing the new venture division: Research findings and implications for strategic management. Strategic Management Journal, 6(1), 39-54.

Burgelman, R. A., & Doz, Y. L. (2001). The power of strategic integration. MIT Sloan Management Review, 42(3).

Burgelman, R. A., & Sayles, L. R. (1988). Inside corporate innovation. Simon and Schuster.

Burgelman, R. A., & Välikangas, L. (2005). Managing internal corporate venturing cycles. MIT Sloan Management Review, 46(4), 26.

Bygrave, W. D., & Timmons, J. (1992). Venture capital at the crossroads. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.

Caves, R. E., & Porter, M. E. (1977). From entry barriers to mobility barriers: Conjectural decisions and contrived deterrence to new competition. The quarterly journal of economics, 241-261.

CB Insights. (2022). State of CVC 2021. Global data and analysis on CVC private market dealmaking, funding, and exits. <https://www.cbinsights.com/reports/CB-Insights_CVC-Report-2021.pdf>

Chesbrough, H., & Tucci, C. L. (2002). Corporate venture capital in the context of corporate innovation (No. REP_WORK).

Christopher, A. (2000). Corporate Venture Capital: Moving to the Head of the Class. Venture Capital Journal, 40(11), 43-46.

Continolo, F. (2021). Le Piccole e Medie imprese in Italia. Redazione PMI.it. Url <https://www.pmi.it/economia/mercati/372150/le-piccole-e-medie-imprese-in-italia.html>

Covin, J. G., & Miles, M. P. (2007). Strategic use of corporate venturing. Entrepreneurship theory and practice, 31(2), 183-207.

Dassisti, M., Panetto, H., Lezoche, M., Merla, P., Semeraro, C., Giovannini, A., & Chimienti, M. (2017, March). Industry 4.0 paradigm: The viewpoint of the small and medium enterprises. In 7th International Conference on Information Society and Technology, ICIST 2017 (Vol. 1, pp. 50-54).

Della Torre, E., & Solari, L. (2011). High performance work systems, technological innovations and firm performance in SME: evidence from Italy. International Journal of Entrepreneurial Venturing, 3(4), 375-391.

Drucker, P. (1985). Innovation and Entrepreneurship, New York: Harper & Row. B. Dubois and S. Czellar (2002) 'Prestige Brandsor Luxury Brands.

Dushnitsky, G., & Lenox, M. J. (2005). When do incumbents learn from entrepreneurial ventures? Corporate venture capital and investing firm innovation rates. Research Policy, 34(5), 615-639.

Dushnitsky, G., & Lenox, M. J. (2006). When does corporate venture capital investment create firm value? Journal of business venturing, 21(6), 753-772.

Erdogan, I., Rondi, E., & De Massis, A. (2020). Managing the tradition and innovation paradox in family firms: A family imprinting perspective. Entrepreneurship theory and practice, 44(1), 20-54.

EUROSTAT

Gaba, V., & Bhattacharya, S. (2012). Aspirations, innovation, and corporate venture capital: A behavioral perspective. Strategic Entrepreneurship Journal, 6(2), 178-199.

Gerpott, T. J. (2009). Forschung & Entwicklung und technologieorientierte Unternehmensakquisitionen. Zeitschrift für Planung & Unternehmenssteuerung, 20(1), 9-41.

Gompers, P. A. (2002). Corporations and the financing of innovation: The corporate venturing experience. Economic Review-Federal Reserve Bank of Atlanta, 87(4), 1-18.

Gompers, P. A., & Lerner, J. (2004). The venture capital cycle. MIT press.

Gompers, P., & Lerner, J. (2000). The determinants of corporate venture capital success: Organizational structure, incentives, and complementarities. In Concentrated corporate ownership (pp. 17-54). University of Chicago Press.

Hellmann, T. (2002). A theory of strategic venture investing. Journal of financial economics, 64(2), 285-314.

Hellmann, T., & Puri, M. (2000). The interaction between product market and financing strategy: The role of venture capital. The review of financial studies, 13(4), 959-984.

Hellmann, T., & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. The journal of finance, 57(1), 169-197.

Henderson, J., Leleux B. (2001). Corporate Venture Capital: Leveraging "Strategic" investments. Paper presented at the 21st Annual International Conference of the Strategic Management society

Hines, H. H. (1957). Effectiveness of “entry” by already established firms. The Quarterly Journal of Economics, 71(1), 132-150.

Husted, K., & Vintergaard, C. (2004). Stimulating innovation through corporate venture bases. Journal of World Business, 39(3), 296-306.

INFOCAMERE

INVITALIA

ISTAT

Jain, B. A., & Kini, O. (1995). Venture capitalist participation and the post-issue operating performance of IPO firms. Managerial and decision economics, 16(6), 593-606.

Jain, B. A., & Kini, O. (2000). Does the presence of venture capitalists improve the survival profile of IPO firms? Journal of Business Finance & Accounting, 27(9-10), 1139-1183.

Kann, A. (2001). Strategic venture capital investing by corporations: A framework for structuring and valuing corporate venture capital programs. Stanford University.

Kanter, R. (1985). Supporting innovation and venture development in established companies. Journal of business venturing, 1(1), 47-60.

Kanter, R. M. (1989). Swimming in newstreams: Mastering innovation dilemas. California management review, 31(4), 45.

Keil, T. (2000). External corporate venturing: cognition, speed, and capability development. Helsinki: Helsinki University of Technology.

Keil, T., McGrath, R. G., & Tukiainen, T. (2009). Gems from the ashes: Capability creation and transformation in internal corporate venturing. Organization Science, 20(3), 601-620.

Kelley, D., & Spinelli, S. (2001, June). The role of corporate investor relationships in the formation of alliances for corporate venture capital funded startups. In Babson College-Kauffman Foundation Entrepreneurship Research Conference.

Klonowski, D., Klonowski, & Graber. (2018). Venture Capital Deformation. Palgrave Macmillan.

Kotlar, J., & De Massis, A. (2013). Goal setting in family firms: Goal diversity, social interactions, and collective commitment to family–centered goals. Entrepreneurship Theory and Practice, 37(6), 1263-1288.

Lilleøkdal, F., Mauritzen, A., & Skogly, M. (2020). SMEs investing Corporate Venture Capital in entrepreneurial ventures (Master's thesis, NTNU).

Lorenz A. (1989). Venture Capital Today. Woodhead Faulkner: London

Manigart, S., & Van Hyfte, W. (1999). Post-investment evolution of Belgian venture capital backed companies: an empirical study. In Nineteenth Annual Entrepreneurship Research Conference. Babson Center for Entrepreneurial Studies.

Markham, S. K., Gentry, S. T., Hume, D., Ramachandran, R., & Kingon, A. I. (2005). Strategies and tactics for external corporate venturing. Research-Technology Management, 48(2), 49-59.

Maula, M. V. (2001). Corporate venture capital and the value-added for technology-based new firms. Helsinki University of Technology.

Maula, M., & Murray, G. (2017). Corporate venture capital and the creation of US public companies: The impact of sources of venture capital on the performance of portfolio companies. Creating value: Winners in the new business environment, 161-183.

Mcgrath, R. G., Venkataraman, S., & MacMillan, I. C. (1994). The advantage chain: Antecedents to rents from internal corporate ventures. Journal of business venturing, 9(5), 351-369.

McNally, K. (1997). Corporate venture capital: Bridging the equity gap in the small business sector. Routledge.

Miles, M. P., & Covin, J. G. (2002). Exploring the practice of corporate venturing: Some common forms and their organizational implications. Entrepreneurship theory and practice, 26(3), 21-40.

Ministry of Economic Development (MiSE) (2020). The national strategy for innovative startups and SMEs. Summary Sheet October 2020. <https://www.mise.gov.it/images/stories/documenti/Scheda_di_sintesi_ITA-ott2020.pdf>

Ministry of Economic Development (MiSE) (2021). Annual Report to the Parliament 2021. <https://www.mise.gov.it/images/stories/documenti/RELAZIONE_ANNUALE_2021.pdf>

Mussolino, D., Pugliese, A., & Viganò, R. (2005). Ownership structure and business evaluation practices in family SMEs: Evidence from empirical research in Italy. In 50th World Conference of International Conference of Small Business (ICSB2005). ISO 690

Nathusius, K. (1979). Grundsatz und Formen des Venture Management. Zeitschrift Für Betrieb-swirtschaftliche Forschung, 31, 507–526.

NVCA. (2001). The Venture Capital Industry: An Overview. Online document, Url <http://www.ncva.org/def/html>, Referred 2001-10-08

Parhankangas, A. (1999). Disintegration of technological competencies-an empirical study of divestments through spin-off arrangements. Finnish Academy of Technology.

Ramírez-Pasillas, M., Lundberg, H., & Nordqvist, M. (2021). Next generation external venturing practices in family-owned businesses. Journal of Management Studies, 58(1), 63-103.

Reimsbach, D., & Hauschild, B. (2012). Corporate venturing: an extended typology. Journal of Management Control, 23(1), 71-80.

Salatino, A. (2015). Early detection and forecasting of research trends.

Sapienza, H. J. (1992). When do venture capitalists add value? Journal of business venturing, 7(1), 9-27.

Sayles, L. R. (1986). Inside Corporate Innovation: Strategy, Structure, and Managerial Skills. New York: Free Press; London: Collier-Macmillan.

Schildt, H. A., Maula, M. V., & Keil, T. (2005). Explorative and exploitative learning from external corporate ventures. Entrepreneurship Theory and Practice, 29(4), 493-515.

Sharma, P., & Chrisman, S. J. J. (2007). Toward a reconciliation of the definitional issues in the field of corporate entrepreneurship. In Entrepreneurship (pp. 83-103). Springer, Berlin, Heidelberg.

Shrader, R. C., & Simon, M. (1997). Corporate versus independent new ventures: Resource, strategy, and performance differences. Journal of Business Venturing, 12(1), 47-66.

Silver, A. D. (1993). Strategic partnering. McGraw-Hill Companies.

Smith, G. (2001). How early-stage entrepreneurs evaluate venture capitalists. The Journal of Private Equity, 4(2), 33-45.

Starr, M. K. (1993). Corporate Venturing: Creating New Business Within the Firm. Columbia Journal of World Business, 28(4), 97-99.

Stead, J. G., & Stead, W. E. (2014). Sustainable strategic management. Routledge.

Sykes, H. B. (1990). Corporate venture capital: Strategies for success. Journal of Business Venturing, 5(1), 37-47.

Teng, B. S. (2007). Corporate entrepreneurship activities through strategic alliances: A resource-based approach toward competitive advantage. Journal of Management studies, 44(1), 119-142.

Thornhill, S., & Amit, R. (2001). A dynamic perspective of internal fit in corporate venturing. Journal of business venturing, 16(1), 25-50.

Torzi, L. (2018). The start-up venture capitalist relationshipn the Italian market: an empirical analysis.

Überbacher, R., Brozzi, R., & Matt, D. T. (2020). Innovation in craftsmanship family Smes in times of digitalization. Piccola Impresa/Small Business, (1).

Wadhwa, A., & Kotha, S. (2006). Knowledge creation through external venturing: Evidence from the telecommunications equipment manufacturing industry. Academy of Management journal, 49(4), 819-835.

Wadhwa, A., Phelps, C., & Kotha, S. (2016). Corporate venture capital portfolios and firm innovation. Journal of Business Venturing, 31(1), 95-112.

Weiss, L. A. (1981). Start-up businesses: A comparison of performances. Sloan Management Review (pre-1986), 23(1), 37.

Williams, C., & Lee, S. H. (2009). Exploring the internal and external venturing of large R&D-intensive firms. R&d Management, 39(3), 231-246.

Winters, T. E., & Murfin, D. L. (1988). Venture capital investing for corporate development objectives. Journal of Business Venturing, 3(3), 207-222.

Witt, P., & Brachtendorf, G. (2001). Gründungsfinanzierung durch Großunternehmen. Wissenschaftliche Hochschule für Unternehmensführung WHU-Otto-Beisheim-Hochschule.

Zahra, S. A. (1996). Technology strategy and new venture performance: A study of corporate-sponsored and independent biotechnology ventures. Journal of business venturing, 11(4), 289-321.

Zahra, S. A., Nielsen, A. P., & Bogner, W. C. (1999). Corporate entrepreneurship, knowledge, and competence development. Entrepreneurship theory and practice, 23(3), 169-189.

Zhang, Y. (2021). Corporate Venture Capital and Firm Scope. Available at SSRN 3862627.

APPENDIX

THESIS SUMMARY

STARTUPS AND CORPORATE VENTURE CAPITAL (CVC) IN ITALY: AN EMPIRICAL ANALYSIS

1.Introduction

The purpose of this paper is to investigate corporate venture capital (CVC) in Italy and its impact on the Italian economy and startups.

Corporate venturing capital has been defined as one of the modes of external corporate venturing. Corporate venture capital activities comprehend both regular management of corporate investments (direct external VC) and investment decisions made by a venture capital fund in which the corporation participates with a certain stock of capital (indirect external VC (Miles & Covin, 2002). This can be either self-managed, and thus exists within the firm, or exists as a dedicated fund outside the company that is a separate entity with well-defined strategic objectives (Gompers 2002; Keil, 2000; Markham et al, 2005; Reinbasch & Hauschild, 2012).

From the startup perspective, corporate venture capital is seen as an alternative source of funding for traditional venture capital (Maula, 2001). The main difference between CVC and venture capital is the direct link between the parent company and the portfolio companies. This relationship is the key concept on which it is based the argument that corporate venture capital might create (add) value to young and innovative companies.

In the second chapter, the Italian context of innovative startups and SMEs and corporate venture capital is analyzed. The Italian legal framework for innovative startups and SMEs is then analyzed. The interventions of the legislature in recent years to foster the growth of young and innovative companies are specifically discussed. In the second chapter it is also analyzed and discussed the geographical and sectoral distribution of innovative startups and SMEs in Italy. Furthermore, the territorial and sectoral distribution of CVC members registered in the area is discussed

Finally, the empirical analysis conducted on Italian startups is discussed. This analysis aims to answer two research questions:

a) Is there a relation between CVC and startups' performance? – Model A

b) What are the startup characteristics that lead to a CVC relationship? – Model B

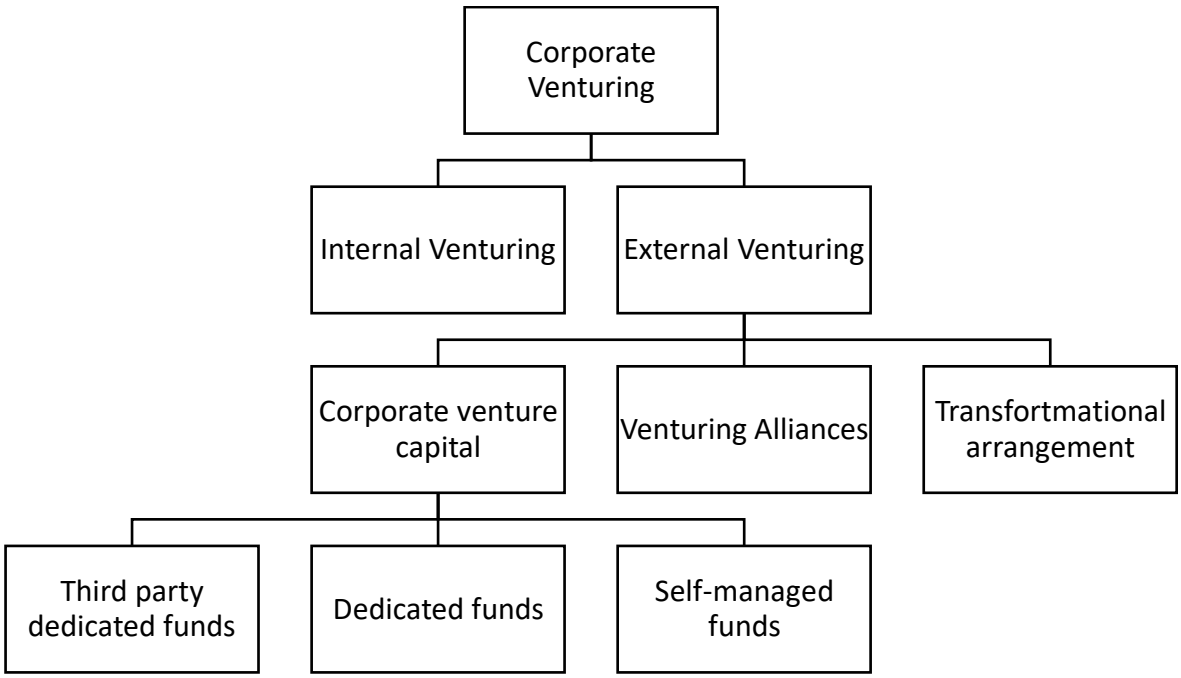
The analysis was conducted on a sample of 200 Italian startups operating in Italy and founded between 2010 and 2020. The main problem encountered throughout the empirical analysis is the lack and fragmentation of data. This problem particularly pertains to financial data. The data collected were therefore hand-collected from multiple sources.

2.Literature review

The concept of Corporate Venture Capital can be expressed in several ways. Firstly, there are two main alternative perspectives: (1) corporate venturing as a mode of external venturing from the perspective of the corporation (Henderson & Leleux, 2001; Kann, 2001; Keil, 2000) or (2) as an alternative source of funding from the perspective of an entrepreneurial company (Gompers & Lerner, 2000; Maula & Murray, 2000a). This study is focused mostly on the latter as the extent is to empirically analyze the relation between corporate venturing and a startup's growth and the qualitative and quantitative factor that makes the venture more attractive for a corporate venturing investment. Secondly, as it is argued in this section of study, it is important to define the taxonomy of corporate venturing as the expression Corporate Venture Capital (CVC), which is critical for the purpose of the analysis, has been utilized in the literature in different ways (Nathusius, 1979). Besides the differences in classifying this tool and the problem of fragmentation within the relevant literature, corporate venturing is defined as equity or equity-linked investment in young, privately held companies (Maula, 2001), where the investor is a well-established corporation pursuing financial and strategic objectives.

Corporate venturing can be divided in many forms depending on the form with which it is realized (Fig. 1).

Fig. 1: Corporate venturing modes



Source: Keil (2000)

Corporate venture capital activities are therefore a form of external corporate venturing, and they comprehend both regular management of corporate investments (direct external CV) and investment decisions made by a venture capital fund in which the corporation participate with a certain stock of capital (indirect external CV (Miles & Covin, 2002). This can be either self-managed, and thus exists within the firm, or exists as a dedicate fund outside the company that is a separate entity with well-defined strategic objectives (Gompers 2002; Keil, 2000; Markham et al, 2005; Reinbasch & Hauschild, 2012). Furthermore, established companies can invest in the stock capital of third party dedicated funds, becoming a passive limited partner of them (Reinbasch & Hauschild, 2012). However, the consideration previously made about strategic objectives with this form of CVC doesn't have that much value as becoming passive limited partners respond to the purpose of gaining mainly financial returns.

Several studies have argued and proved that external corporate venturing have positive effects in terms of technological competencies (e.g., Belderbos et al, 2018; Husted & Vintergaard, 2004; Maula, 2001; Wadhwa et al, 2016). It has also been argued that corporate venturing activities can have explorative and exploitative orientations (Keil, 2000; Gaba & Bhattacharya, 2012; Reinbasch & Hauschild, 2012).

corporate venturing can be an important tool to enable the firm to gain greater from its core competencies by leveraging those within product-market arenas that are operationally or strategically linked to its business area (Burgelman & Doz, 2001). Corporate venturing can be used also to reach new competencies and resources that were previously outside the firm's operations (Kanter, 1989). However, firms have historically struggled with the successful use of corporate venturing for long-term growth as there has been uncertainty over how CV might be operationally linked to a firm's scope and strategy (Covin & Miles, 2007).

Kann (2000) distinguish three classes of strategic objectives: (1) external R&D, (2) accelerated market entry, and (3) demand enhancement.

Keil (2000), on the other hand, identified the following four objectives: (1) monitoring markets, (2) learning of markets and new technologies, (3) option building, and (4) market enhancement. Maula (2001) has summarized and integrated the objectives found by Kann (2000) and Keil (2000).

From the startup perspective, corporate venture capital is seen as an alternative source of funding for traditional venture capital (Maula, 2001). The main difference between CVC and venture capital is the direct link between the parent company and the portfolio companies. This relationship is the key concept on which it is based the argument that corporate venture capital might create (add) value to young and innovative companies.

The characteristics of both the parent firm and the venture are really linked to each other when analyzing the potential of their relationship (Maula, 2001) as their fit might have positive role in the value creation. Thornhill & Amit (2001) found that a tight fit was positively associated with the venture performance because of the possibility to access its parent's resources. The authors also distinguished two dimensions of the fit between parent firms and portfolio companies: relational and economic. The relational fit is based upon the organizations' culture and structure, while the economic fit depends on the alignment of needs of the venture and the resources of the parent company.

Finally, Maula (2001) identifies three main mechanisms through which the portfolio companies receive value-added from the parent company: knowledge acquisition, resources acquisition, and endorsement.

3.Startups and Corporate Venture Capital (CVC)

The Italian Startup Act has been introduced by the Decree-Law 18 October 2012, n. 179. The aim of the decree was to define a holistic strategy to foster the constitutions and development of new innovative enterprises with high technological value. When firstly promulgated, the DL n. 179/2012 represented a new approach for Italy and the other OECD (Organization for Economic Co-operation and Development) States on innovative startups.

The definition of innovative startup is introduced by the article 25 of the DL n. 179/2018. Firstly, the startup must be a limited company whose shares are on a regulated market nor in a multilateral negotiation system. Furthermore, the company must be in possess of the requisites posed by the article 25, paragraph 2, of the same Decree.

The number of startups and SMEs enrolled in the special section of the Commerce Register saw a 11,60 percent increase from year 2019 to 2020, which consequently has resulted into a growth in employment (26 percent) as well. Furthermore, it is possible to observe a growth in the number of business partners of innovative startups and SMEs which amounts to 51,60 percent. Moreover, the total value of production has significantly increased to the €7 billion with a registered growth of 33 percent. These positive trends of the year 2020 are sustained in 2021. Confirming the high resilience and adaptability to the new challenges posed by the Covid-19 pandemic, as of September 30, 2021, the number of innovative startups continued to grow, standing at 13.999 (+16,8 percent compared to the end of 2020). Innovative SMEs also show significant growth, amounting to 2.066 (+15,5 percent compared to the end of 2020.

34,3 percent of innovative startups are located in Northwestern Italy with Lombardy leading the way (27,1 percent of the national total). The presence of startups in Southern Italy is also significant: in fact, about one in four companies operates in the South. In particular, it is Campania that has the largest number with more than a thousand startups (the only southern region to exceed this threshold).

Relative to sectors of economic activity, just under half of the startups have an activity that falls under the Ateco section (2008) "J – Information and communication services". Within it, 4.375 companies, equivalent to 36,5 percent of the total, operate in software production, IT consulting and related activities. It is worth highlighting both the approximately 2,800 innovative startups (23,3 percent) in section "M – Professional, scientific and technical activities", where 60 percent operate in the field of scientific research and development, and the 1,902 manufacturing startups (15.9 percent), driven by the latter by divisions "C 26 – Manufacture of computers and electronic and optical products" and "C 28 – Manufacture of machinery and equipment".

Since 2012 the Italian government has been promoting different incentive laws in order to favor and encourage the development of startups and the investments in them. In October 18^{th} 2012 the government promulgated the Decree Law n. 179, "Decreto Crescita 2.0", converted in Law 12 December 2012, n. 221, which proposed a more agile economic, bureaucratic, and legal environment in order to foster growth of innovative startups (Torzi, 2018). Since the promulgation of the DL n. 129/2012, the Italian government has adopted different laws to foster innovative startups and SMEs growth and development. A summary of the most important regulatory incentive factors is proposed in the table below.

Table 1: Summary of legislative interventions of the Italian government in favor of innovative startups and SMEs

Regulatory Actions	Objectives
Decree-Law n. 179/2012, converted in Law n. 221/2012	Formal definition of Innovative Startups
	"Work for Equity"
	Online procedures for equity crowdfunding - modified by the Consob Regulation 18592/2013
	Preferential treatment in the compensation of VAT credits
	Exemption from specific Corporate Laws
	"Fail Fast"
Decree-Law n. 147/2013	Simplified procedures to access the guarantee fund for innovative start-ups and certified incubators
Decree-Law n. 3/2015	Agile procedures for the transition from innovative startup to innovative SME
Decree-Law n. 58/2016	Definition of agile procedures for the draft of deed of incorporation of innovative startups
Decree-Law n. 34/2020, regulated by the DM 28 December 2020, in accordance with the Regulation (EU) n. 1407/2013	"De minimis" incentives - Tax benefits from investing in innovative startups
	Non-refundable aids of €10 million for start-ups, accelerators, incubators, business angels and development of innovative corporations
	€200 million allocated for the National Fund for Innovation
DM 24 February 2022, modifying the DM 24 September 2014; Not officially published yet	Smart & Start - Financing loan for innovative start-ups with 0% interest rate

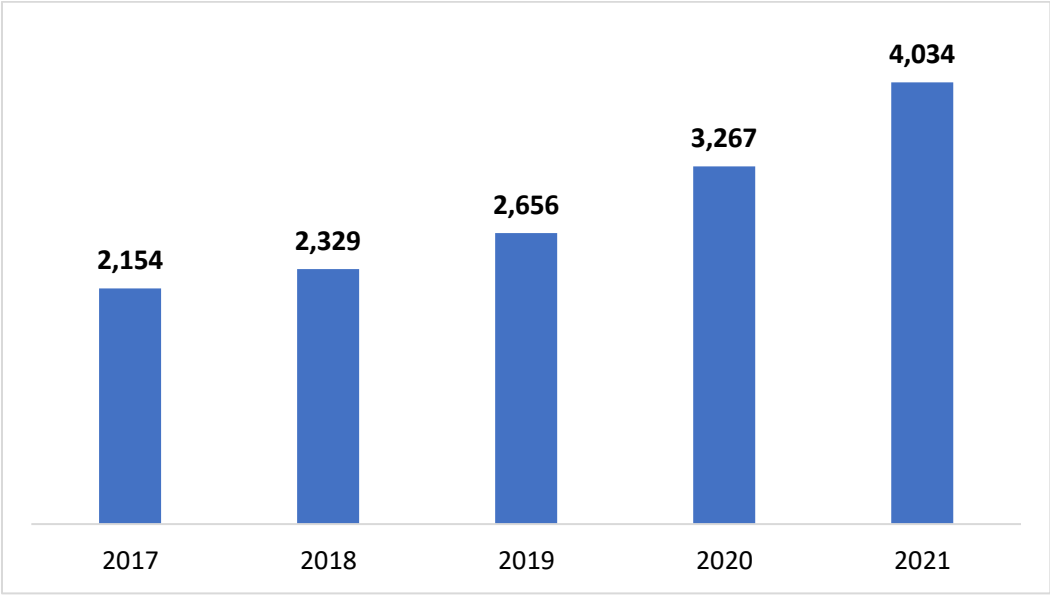
Source: Personal elaboration

All these interventions have helped fostering Italian startups growth in the recent years and have also favored an environment with incentives for investing in innovative startups and SMEs.

As of 23 August 2021, considering the 109.834 shares direct and indirect participation shares of individuals and legal entities, there are 74.184 members of the 16.108 innovative startups and SMEs. Investors specialized in innovation participate in the capital of 443 innovative startups and 266 innovative SMEs (including 199 former startups). Corporate Venture Capital members alone participate in the capital of 3.921 startups and 831 innovative SMEs (including 344 former startups). Financial investors participate in total in 141ventures (including 113 in startups). Finally, family & friends members participate in the capital of 9.485 startups and 1.021 innovative SMEs (including 350 former startups).

The number of innovative startups in the CVC member portfolio is growing. In fact, there are about 4 thousand innovative startups participated by CVC members in 2021 (+23,5 percent). To give even more emphasis to the phenomenon, of these approximately 4 thousand innovative startups, only 113 units are participated by financial companies, namely 2,9 percent. From Chart 1 it is possible to observe the growth of the innovative startups in CVC portfolios since the year 2017.

Chart 1: Innovative startups in CVC portfolios



Source: Report on Open Innovation (Assolombarda & InnovUp, 2021)

Of the approximately 110 thousand shares, more than 20 thousand are shares of CVC actors (19 percent). According to the survey, of the more than 20 thousand shares of CVC entities 14.857 are in innovative startups and 5.946 are in innovative SMEs (including 3.838 in former startup SMEs).

Considering the data from the 2020 financial statements filed at the time of writing of the Sixth Observatory of innovative SMEs, the value of production generated in 2020 is €5,87 billion, of which €1.44 billion is generated by former startup SMEs. About 59 percent of these revenues, or 3,457 billion euros based on partial data, are generated by innovative SMEs in CVC's portfolio (of which 2,337 billion are generated by former startup SMEs).

There are 7.911 equity company-type members investing in innovative startups, an increase of 9,4 percent from the year 2020. For innovative SMEs, the number of equity company members stands at 3.775, of which 2.078 relate to ex-startup SMEs, an increase from 2020 of 21,3 percent for ex-startup SMEs and 12,2 percent for non-startup SMEs. The distribution by size class of equity company members highlights an important role of small businesses, with 81 percent in innovative startups and 78 percent for innovative SMEs.

The majority of corporate partners of innovative startups (67,2 percent) are based in the North, compared with 54,3 percent of the total number of innovative companies in the same geographic area. Analyzing the geographical and sectoral aspects of the CVC members and the startups in which they invest, we find a strong sectoral dynamism, as opposed to a more reduced territorial dynamism. Specifically, 28,9 percent of CVC members invested in a startup based in another region. From a sectoral perspective, 81,7 percent of CVC members invested in startups operating in sectors other than their own.

4.Empirical Analysis

The previous two chapters were relevant for the purpose of this study to better define both the nature and purposes of corporate venture capital in Italy. The first chapter analyzed the relevant literature, placing emphasis specifically in the value added for innovative companies involved in the CVC relationship. The second chapter analyzed the spatial and sectoral distribution of innovative startups and SMEs in Italy as well as that of corporate venture capital.

This analysis has two main objectives, which will be investigated in Model A and Model B, respectively:

c) Is there a relationship between CVC and the growth of startups and innovative SMEs in Italy?

d) What are the main characteristics of invested startups and SMEs that lead to the realization of an investment definable as CVC?

The sample

The sample consists of 200 Italian startups and innovative SMEs, founded from 2010 to 202, meeting the requirements set by the Growth Decree 2.0. The companies were chosen trying to create as heterogeneous a sample as possible with reference to their sector, geographic area and presence or absence of CVC partners. Were taken into consideration firms founded before 2012, that is before the introduction of the Decree-Law No. 179, in order to analyze the effect of CVC investments without the fiscal advantages that were later introduced by the Italian government

Due to lack of data availability for all companies in the sample, in Model A (regression between CAGR and CVC) was reduced to 126 innovative startups and SMEs. The units in this sub-sample are the same as those in the 200 mentioned above and were chosen from among them solely because of the completeness of data pertaining to turnover for the three-year period 2018-2019-2020.

In Model B, on the other hand, the sample is composed by the same 200 startups and innovative SMEs as the data regarding the CAGR are not used to the extent of the analysis.

The majority of the startups in the sample have their headquarters in the North of Italy (75,5 percent).

Dependent variables

The dependent variable in Model A is the Compound Annual Growth Rate (CAGR) of turnover of the startups in the sample. As anticipated above, the difficulty of finding complete data for all units in the initial sample led to the choice of using a sub-sample of the previous one of 126 units.

For these 126 units, turnover data for the years 2018, 2019, and 2020 were collected. After collecting the data for the 126 startups, the following CAGR formula was used to obtain the relative value:

$$\boldsymbol{CAGR} = \left(\frac{\text{End value}}{\text{Begin value}}\right)^{\left(\frac{1}{n}\right)} - 1$$

As for Model B, the dependent variable is the presence or absence of CVC members. The CVC variable was set as binary (1,0) and the analysis was carried out through a logit model. Model B involves analysis on the initial sample of 200 Italian startups.

Data on the presence of CVC members echo those presented in the previous chapter. The startups participated by CVC members are 52 and represent 26 percent of the total.

Explanatory variables

The explanatory variables analyzed in this study can be summed as follows:

Table 12: Explanatory variables

Variables
Headquarters Location
CEO Age
CEO Sex
Founder Age
Founder Sex
Patents
Amount raised
Industry

CEOs aged Over 40 are slightly more than those who are Under 40 (50,5 percent). In the sample a male dominance is observed within the CEOs of the startups observed (95,5 percent).

Again, male founders are the constant within the observed sample. In contrast, startups with founders with at least one woman account for 13,5 percent of the total observed, while those with only women account for only 1,5 percent.

the majority of the observed startups do not own patents. In fact, those that do own them amount to only 28 (14.5 of the total). This can be explained due to the difficulty not only clearly of innovation ingenuity, but also the onerousness of registering patents for young companies.

Finally, the last independent variable analyzed is the amount in millions of euros of fundings received by startups in the reference samples. For the purpose of the statistical analysis performed in Model B, the related data were standardized.

Model A

The analysis was therefore set on the sub-sample of 126 Italian startups, meeting the requirements set by the Growth Decree 2.0. Of these 126 entities, relative turnover data for the three-year periods 2018, 2019 and 2020 were collected. From these data, the compound annual growth rate (CAGR) was manually calculated.

The independent variable is represented by "CVC." This, for the purpose of the analysis, was set as binary. The independent variable therefore takes value 1 when there is presence of CVC shareholders, 0 in case there are no CVC shareholders.

Hence, the formula for linear regression is as follows:

$$CAGR = \beta_0 + \beta_1 CVC$$

In the first analysis, Model A did not return statistically significant results. However, by interpreting the estimated coefficients of the regression, it can be seen that the CAGR is on average higher in startups participated by CVC members than in those not participated by CVC members. After continuing with the analysis of the residuals of the model, an observation (No. 101) was identified that greatly influences the result of the model.

Given the high heterogeneity of the observed data in the sub-sample variables used in Model A, it was decided to conduct a second analysis on the same. The high heterogeneity of the data is explained by the different industries of the observed startups, as well as the relative diversity in business models and the variability of the results in year 2020, i.e., the first year of Covid 19 pandemic.

The second analysis of Model A focuses on the same regression between CAGR and the presence of CVCs but takes as reference only the sub-sample startups belonging to the ICT sector. In addition to the need to limit the heterogeneity of the observed data, it was decided to analyze this sector because ICT represents the one in which Italian CVC members are most present. Therefore, the second analysis of Model A, despite the lower numerosity of the sub-sample, assumes great relevance since it is explanatory of the relationship between CVC and the growth of Italian startups in the sector in which it is most present and most developing in the past years.

The analysis was always conducted using the same following formula:

$$CAGR = \beta_0 + \beta_1 CVC$$

The second analysis of Model A confirms the results of the first analysis and undoubtedly poses interesting outcomes.

Indeed, the data shown in Table 19 show the statistical significance of the CVC variables. This demonstrates the relevance of the presence of CVC partners to the growth of startups operating in the ICT sectors. In fact, the average CAGR in these companies is 100 percent, compared to those without CVC partners, which have an average CAGR of 6 percent.

However, the possible limitations of the model can be identified in the numerosity of the observed variables. it is therefore possible to say that there is a trade-off between comparability and number of observations.

Model B

As mentioned above on opening chapter, Model B aims to investigate what are the most significant characteristics of startups that lead to the realization of CVC investments. Thus, the existence or non-existence of a relationship between the qualitative and quantitative characteristics of the startup and the presence or absence of CVC is analyzed. The sample taken for Model B analysis is the initial sample of 200 Italian startups.

The dependent variable in this model is CVC. Since this represents a dichotomous variable, which takes values 1 if CVC members are present, 0 otherwise, it was necessary to set a logit model.

The independent variables in Model B are set as follows:

Table 3: Summary of the independent variables of Model B

Headquarters Location	$Character$
CEO Age (Under/Over 40)	$1 = Under\ 40, 0 = Over\ 40$
CEO Sex	$1 = Male, 0 = Female$
Founder Age (Under/Over 40)	$1 = Under\ 40, 0 = Over\ 40$
Founder Sex	$1 = Male, 0 = Female$
Patents	$1 = Yes, 0 = No$
Amount raised (in mill)	$Standardized$
Industry	$Character$

Hence, the equation describing the model is the following:

$$CVC = \beta_0 + \beta_1 Headquarters\ Location_i + \beta_2 CEO\ Age_i + \beta_3 CEO\ Sex_i + \beta_4 Founder\ Age_i + \beta_5 Founder\ Sex_i + \beta_6 Patents_i + \beta_7 Amount\ Raised_i + \beta_8 Industry_i$$

What is most relevant in the analyzed model, as well as in the case of Model A, are the regression coefficient estimates themselves. This result, at first glance, meets the expectations on the model. In fact, there is a greater chance that CVC partners invest in startups operating in northern Italy (0,79), rather than in the south (0,13). These estimates highlight the results of the geographic and sectoral studies proposed in the previous chapter (Assolomabrda & InnovUp, 2021; MiSE, 2021).

Another interesting finding is the estimated coefficients for the "CEO Age" variable. The estimated value represents the probability that CVC members invest in startups with CEOs younger than 40 years old. This suggests, at first analysis, the possibility that established companies prefer to enter the capital of startups that have an experienced CEO at the helm.

On the other hand, regarding the "Founder Age variable", it was shown that there is a 0,91 percent probability that CVC partners will invest in the startup if the founders are younger than 40 years old.

The estimated coefficient for the "CEO Sex" variable reflects pre-analysis expectations. In fact, since female CEOs in the observed sample are only 0,05 percent of the total.

In contrast, the result pertaining to the "Founder Sex" variable goes against pre-analysis expectations. The fact that male founders amounted to about 85 percent of the total number of startups in the observed sample had created an expectation that the variable would take at least positive values. Thus, despite the relatively low weight of women present among the founders of the observed startups (15 percent), the coefficient estimates instead show the tendency of CVC members to invest in startups in which at least one woman is a founder.

The results on the "Patents" variable mirror the pre-analysis expectations (-0,62). This certainly reflects the difficulty in patenting by young companies that is somewhat acknowledged by potential partners.

The estimated results for the "Amount Raised" variable also reflect expectations. In fact, the discourse related to the amount of capital received in the form of investment is related in part to assessments of the value of the company. Each company has indeed a different potential value from the other, and it is not possible to establish a priori the goodness of one over the other by taking the amounts received as a reference. Moreover, the variability in the data observed on the "Amount Raised" variable is undoubtedly related to the different years of establishment of the startups in the sample.

Finally, the results regarding the "Industry" (Ateco 2008) of the startups in the observed sample show interesting results.

This confirms the propensity of CVC members to enter the capital of startups belonging to the "Information and communication services", "Health and social care" and "Finance and Insurance services" sectors. The

results certainly reflect pre-analysis expectations as the above sectors are those in which CVC members generally invest the most. This trend was confirmed by the sectoral distribution of the analyzed sample.

The most statistically significant correlation is represented by the "Energy" industry. This result also underlines the aspects as it is one of the sectors where there has been the most space for research in recent years for the energetic transition to renewable sources. The same applies to the "Automotive" industry, which has an estimated coefficient of 1,45.

5.Conclusion

This study aimed to fill gaps in the literature on corporate venture capital. Indeed, there has been considerable discussion about corporate venturing strategies and, specifically, corporate venture capital. Most of the authors referenced in the course of the literature review have carried out qualitative and strategic studies. Relevant are in fact the studies pertaining, first and foremost, to the definition of corporate venture capital – a topic often misinterpreted - and its forms. The literature about objectives pursued with CVC strategies is also undoubtedly substantial. Indeed, multiple objectives are highlighted, not only financial, but above all strategic. The most important ones exhibited pertain to the possibility of knowledge and technology transfer, the exploitation of complementary skills and entry into new markets. In addition, multiple quantitative studies pertaining to the acquisition of technological value have been proposed. Finally, no studies have been proposed in recent years pertaining specifically to the Italian case.

In the first analysis of Model A, the CAGR was shown to be higher on average in startups participated by CVC members than in those in which there are none. The model was shown to be reliable, despite the fact that the sub-sample used was not too large. However, by analyzing the Cook's distance of the model residuals, it was possible to identify one observation (No. 101) that had significant weight on the outcome of the analysis.

Given the high heterogeneity of the observed data in the sub-sample variables used in Model A, it was decided to conduct a second analysis on the same. The second analysis of Model A focuses on the same regression between CAGR and the presence of CVCs but takes as reference only the sub-sample startups belonging to the ICT sector. In addition to the need to limit the heterogeneity of the observed data, it was decided to analyze this sector because ICT represents the one in which Italian CVC members are most present. Therefore, the second analysis of Model A, despite the lower numerosity of the sub-sample, assumes great relevance since it is explanatory of the relationship between CVC and the growth of Italian startups in the sector in which it is most present and most developing in the past years.

The second analysis of Model A confirms the results of the first analysis and undoubtedly poses interesting outcomes. Indeed, the data show the statistical significance of the CVC variables. This demonstrates the relevance of the presence of CVC partners to the growth of startups operating in the ICT sectors. In fact, the average CAGR in these companies is 100 percent, compared to those without CVC partners, which have an average CAGR of 6 percent.

However, the possible limitations of the model can be identified in the numerosity of the observed variables. it is, therefore, possible to say that there is a trade-off between comparability and the number of observations.

Model B also showed very interesting results. As expected, again the most important results pertaining to the estimation of the coefficients themselves and their interpretation.

First of all, the results confirmed a greater propensity of CVC members to enter the capital of startups operating in Northern Italy. These results echo the data shown in Chapter 2 when analyzing the territorial distribution of innovative startups and SMEs.

The results show some preference toward startups where is a CEO older than 40 and male. The fact that the coefficient on the "CEO Age" variable (1, Male; 0, Female) is undoubtedly influenced by the fact that the absolute majority of startups in the sample have a male CEO.

Regarding the age of the founders, equally distributed in the sample between Under and Over 40, it is shown that there are more CVC members in startups that have young founders. Moreover, despite the low percentage of at least one woman present among the founders of the observed startups, the result showing that in fact the probability of there being CVC partners in startups with male founders is even negative is significant.

The estimated coefficient on the variable "Patents" meets expectations. In fact, the fact that this variable was not significant was put into account since obtaining and registering patents is still a very onerous practice.

The results also show little significance of the amount raised by startups in the choice of CVC partners to enter their capital.

Finally, the results observed on the "industry" variable also show interesting data. CVC partners are confirmed to be very strong and present in the industries of "Information and Communication services," "Health and Social care," and "Finance and Insurance services."

Other industries in the sample where CVC members are shown to be present are "Automotive" and "Energy." One possible explanation for these results relates to changes in the respective industries in recent years toward more sustainable economies. indeed, the potential to explore new resources and technological expertise through CVC strategies was demonstrated in the literature review.

The results obtained from this study hope to fill the void in the literature pertaining to the study of the relationship between CVC and business performance and essential characteristics that lead to its realization in Italian startups. Despite the lack and fragmentation of accessible data on startups, the models appear reliable. There is certainly opportunity and need to examine the phenomenon in more detail. This indeed should include analyses on larger samples and the analysis of historical data based on longer time horizons.

Table 4: Summary of Model A results

R-squared		**0,01**
Adjusted R-squared		**0,001**
No. of observations		**126**
Coefficients:	**coef.est**	**coef.se**
(Intercept)	1,06	0,59
CVC	1,18	1,10
Coefficients:	**Estimate**	**Pr(>|t|)**
(Intercept)	1,0551	0,076
CVC	1,1847	0,285

*Statistical significance: * $p \leq 0.10$ (10 %); ** $p \leq 0.05$ (5 %); *** $p \leq 0.01$ (1 %)*

Table 5: Summary of Model A results (without observation No. 101)

	Estimation	**Standard error**	**Pr(>|t|)**
Intercept	0,06	0,22	0,7747
CVC	0,94	0,35	0,0116*
n		35	
R squared		0,18	
Adjusted R squared		0,1529	

*Statistical significance: * p ≤ 0.10 (10 %); ** p ≤ 0.05 (5 %); *** p ≤ 0.01 (1 %)*

Table 6: Summary of Model B results

Dependent variable	CVC	R - squared	0,1129
Indipendent variables	**coef.est**	**coef.se**	**Pr(>|z|)**
(Intercept)	-2,38	1,17	0,0431 *
Headquarters location - North	0,79	0,52	0,13
Headquarters location - South	0,13	0,96	0,89
CEO Age	-1,39	0,91	0,13
CEO Sex	0,57	0,86	0,51
Founder Age	0,91	0,93	0,33
Founder Sex	-0,55	0,58	0,34
Patents	-0,62	0,58	0,29
Amount Raised	-0,50	0,72	0,49
Industry - Agriculture	1,22	1,48	0,41
Industry - Arts, sports, entertainment and recreation activities	0,59	1,37	0,67
Industry - Automotive	1,45	1,10	0,19
Industry - Education	0,78	1,51	0,60
Industry - Energy	3,29	1,60	0,0401 *
Industry - Finance and Insurance services	1,43	0,89	0,11
Industry - Health and social care	1,43	1,02	0,16
Industry - Information and communication services	1,33	0,84	0,11
Industry - Manufacturing	0,21	1,02	0,83
Industry - Other services	0,55	0,92	0,55
Industry - Professional, scientific and technical activities	-0,45	1,33	0,73
Industry - Real Estate	-14,66	969,58	0,99
Industry - Rental, travel agencies and business support services	0,16	1,34	0,91
Industry - Transaportation and storage	-13,77	2399,54	1,00

*Statistical significance: * $p \leq 0.10$ (10 %); ** $p \leq 0.05$ (5 %); *** $p \leq 0.01$ (1 %)*