

**THE ESSENCE OF SUSTAINABLE CORPORATE VENTURE  
CAPITAL PERFORMANCE - ESSAYS ON CVC SUCCESS**

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## **Kurzfassung**

Unter corporate venture capital (CVC) versteht man eigenkapitalfinanzierte Investitionen in junge, nicht börsennotierte Unternehmen. CVC ist ein rapide wachsendes Phänomen, welches sich nicht nur in der Praxis, sondern auch in der akademischen Forschung steigender Beliebtheit und Anerkennung erfreut. Mit zunehmendem Innovationsdruck können Unternehmen durch die Gründung von CVC-Programmen positive Auswirkungen auf ihre strategische (z.B. Innovationsfähigkeit) sowie finanzielle Leistungsfähigkeit entfalten. CVC-Programme bestehen aus drei Parteien, dem Mutterunternehmen, einer CVC-Einheit sowie den durch Eigenkapital finanzierten Portfolio-Unternehmen. Aufgrund dieses einzigartigen Aufbaus weisen CVC-Programme intra- sowie interorganisationale Beziehungen auf. Der CVC-Einheit kommt hierbei eine besondere Bedeutung zu, denn sie fungiert mit ihren Investmentmanagern innerhalb dieser Dreierkonstellation als ein Vermittler und Weichensteller zwischen dem Mutterunternehmen und dem Portfolio-Unternehmen.

Die historische Entwicklung von CVC-Programmen vollzog sich in mehreren Wellen, die jeweils mit einem starken Aufschwung und einem ebenso starken Abschwung einhergingen. Die Phasen des Abschwungs waren mit einer weitläufigen Einstellung von CVC-Programmen sowie hohen Abschreibungen auf das Investitionskapital verbunden. Verantwortlich für diese gravierenden Phasen des Abschwungs waren neben Entwicklungen auf den Finanz- und Technologiemärkten auch Hürden im organisatorischen Aufbau von CVC-Programmen. Das Ergebnis dieser Kombination von Einflussfaktoren auf den Erfolg von CVC-Programmen war bemerkenswert, so lag die durchschnittliche Überlebensdauer von CVC-Einheiten mitunter nur bei 2,2 Jahren (Dushnitsky, 2012). Ein nachhaltiger d.h. andauernder Erfolg von CVC-Programmen ist zurückzuführen auf kontextuelle sowie organisatorische Faktoren. Kontextuelle Faktoren sind nur geringfügig beeinflussbar wohingegen organisatorische Faktoren beeinflusst wer-

den können. Letztere Einflussfaktoren liegen im Fokus dieser Dissertation, deren Ziel die Identifikation wesentlicher Einflussfaktoren und das Aufzeigen deren Wirkung auf den Erfolg von CVC-Programmen ist. Aufgrund der einzigartigen Struktur dieser CVC-Programme werden dabei die wesentlichen Einflussfaktoren separat für das Mutterunternehmen, die CVC-Einheit, sowie die Portfolio-Unternehmen betrachtet. Hiermit soll ein Beitrag geleistet werden zur Aufklärung des bestehenden uneinheitlichen Meinungsbilds sowie der langanhaltenden Diskussion zu diesem Themenfeld. Darüber hinaus wird der Dialog im CVC-Kontext bereichert, indem die Leistungsfähigkeit der drei CVC-Parteien separat betrachtet und auf deren Wechselwirkungen hingewiesen wird. Der erste Beitrag untersucht anhand einer systematischen Literaturanalyse, welches in der CVC-Forschung die vorherrschenden Strömungen sind. Die Identifikation dieser Strömungen erfolgt auf Basis qualitativer und quantitativer Studien. Neben den Einflussfaktoren auf die Leistungsfähigkeit von CVC-Programmen werden zwei weitere Literaturstränge identifiziert und analysiert, die Ursachen und Motive von CVC sowie die Praktiken und Typologien von CVC-Einheiten. Im Ergebnis bildet der erste Beitrag einen übergreifenden und konsistenten Bezugsrahmen der CVC-Forschung. Der systematische Literaturüberblick umfasst insgesamt 102 Quellen und deckt einen Zeitraum von 36 Jahren ab, von 1984 bis Juni 2020.

Der zweite Beitrag setzt auf den Ergebnissen des ersten Beitrags auf. Im Detail befasst sich der zweite Beitrag mit der Wirkung von explorativen bzw. verwertenden (exploitative) Einflussfaktoren auf den Erfolg von CVC-Programmen. Auf Grundlage von 43 quantitativen Primärstudien (2005-2019) wird unter methodischer Anwendung einer bivariaten Meta-Analyse die folgende Forschungsfrage beantwortet: *Was sind die Hauptmerkmale einer explorativen und exploitativen Orientierung externer CVC-Programme und wie wirken sich diese Hauptmerkmale auf die Leistung von CVC-Programmen aus?* Auf Basis bestehender Forschungsergebnisse werden Hypothesen über die Wirkrichtung von Einflussfaktoren auf die Leistungs-

higkeit der einzelnen CVC-Parteien aufgestellt. Die Zuordnung bzw. Kategorisierung von Einflussfaktoren zu einer eher explorativen bzw. einer eher exploitativen Orientierung von CVC-Programmen geschieht auf Grundlage des Modells von Parmigiani und Rivera-Santos (2011), es dient dabei der Unterscheidung der beiden Ursprungsformen von inter-organisatorischen Beziehungen. Der zweite Beitrag trägt damit zu einem besseren und nuancierten Verständnis des explorativen und exploitativen Charakters von CVC-Programmen bei. Daneben stützt sich der Beitrag allein auf quantitative Primärstudien und kann durch die Berechnung einer aggregierten Effektstärke zur Auflösung gegensätzlicher Forschungsergebnisse über die Leistungsfähigkeit der CVC-Triade beitragen. Durch die differenzierte Betrachtung der CVC-Triade regt der Beitrag die Diskussion von Wechselwirkungen zwischen Mutterunternehmen, CVC-Einheit und Portfolio-Unternehmen an.

Der dritte Beitrag wechselt die Perspektive, von Einflussfaktoren auf Ebene des Unternehmens zur Ebene von Individuen, welche einen Einfluss auf das Überleben von CVC-Einheiten ausüben. Genauer gesagt, untersucht der Beitrag das Zusammenspiel zwischen Top-Management Teams (TMT) und CVC-Managern. Der Beitrag trägt damit bei zu einem besseren Verständnis dieser weitgehend unerforschten Beziehung im CVC-Kontext. Aus der Perspektive der Prinzipal-Agenten-Theorie analysiert der Beitrag, welchen Einfluss Konflikte zwischen den beiden Gruppen auf das Überleben oder Sterben von CVC-Einheiten haben. Dabei werden aus Agenten-Theorie Thesen aufgestellt, welche aufgrund der fortschreitenden Erkenntnisse auf diesem Gebiet heute teils kritisch betrachtet werden müssen. Auf Grundlage eines Datensatzes von 64 CVC-Einheiten, der über einen Zeitraum von 12 Jahren (2000-2012) erhoben wurde, wird methodisch ein konfiguraler vergleichender Ansatz (fsQCA) gewählt.

*Stichwörter: Corporate Venture Capital, Leistung, Ergebnisse, Erfolgsfaktoren, Überlebensfähigkeit*

## **Short summary**

Corporate venture capital (CVC) is understood as equity-financed investments in young, unlisted companies. CVC is a rapidly growing phenomenon that is enjoying increasing popularity and recognition, not only in practice but also in academic research. In times of increasing pressure to innovate, companies can create CVC programs that positively impact their strategic (e.g., innovation capability) and financial performance. CVC programs consist of three parties, the parent company, a CVC unit and the equity based portfolio companies. In this unique structure, CVC programs have intra- and interorganizational relationships. The CVC unit is of particular importance acting as a broker between the parent company and the portfolio company.

The historical development of CVC programs took place in several waves, each of which was accompanied by a strong upswing and an equally strong downturn. The phases of the downturn were associated with a widespread discontinuation of CVC programs as well as high write-offs on investment capital. In addition to developments in the financial and technology markets, these serious times were also due to hurdles in the structural development of CVC programs. The result of the combination of influencing factors on the survival of CVC programs was remarkable, with the average survival of CVC units sometimes being only 2.2 years (Dushnitsky, 2012). A sustainable success of CVC programs is therefore due to contextual and organizational factors. Contextual factors can be influenced to a limited extent, whereas organizational factors can be influenced easily. These organizational factors are in the focus of this dissertation. The aim of this dissertation is to identify and evaluate the interplay of key factors influencing the success of CVC programs. Due to the unique structure of these programs, the key factors are considered separately for the parent company, the CVC unit, and the portfolio companies. This is intended to contribute to the existing inconsistent view in this area. Furthermore,



the above-mentioned ongoing discussion is enriched by looking at the performance of the three CVC parties separately to point out their interactions.

The first article is a systematic literature review to identify which factors have an influence on the strategic and financial performance of parent companies, CVC units, and portfolio companies. The identification of the influencing factors is based on qualitative and quantitative research results. In addition to the factors influencing the performance of CVC programs, two further strands of literature are identified and analyzed, the causes and antecedents of CVC and the practices and typologies of CVC units. As a result, the first article provides a comprehensive and consistent framework of CVC research. The systematic literature review comprises a total of 102 sources and covers a period of 36 years, from 1984 to June 2020.

The second article builds on the results of the first article. In detail, the second article deals with the effect of explorative or exploitative factors on the performance of the CVC triad. Based on 43 quantitative primary studies (2005-2019), the following research question is answered using a bivariate meta-analysis: *What are the main characteristics of explorative and exploitative orientation of external CVC programs and how do these main characteristics affect the performance of CVC programs?*

On the basis of existing research results, hypotheses about the direction of influence of factors on the performance of individual CVC parties are developed. The assignment or categorization of influencing factors to a more explorative or rather exploitative orientation of CVC programs is based on the model of Parmigiani and Rivera-Santos (2011), it serves to distinguish the two origins of interorganizational relationships. The second contribution thus contributes to a better and nuanced understanding of the explorative and exploitative character of CVC programs. In addition, the contribution is based solely on quantitative primary studies and, by calculating an aggregated effect size, can contribute to the resolution of conflicting research results on the performance of the CVC triad. By taking a differentiated view of the CVC triad, the article

stimulates discussion of interactions between the parent company, the CVC unit and the portfolio companies.

The third article changes the perspective from possible factors at the company level to factors at the individual level that influence the survival of CVC units. The paper examines the interaction between top management teams (TMT) and CVC managers. It thus contributes to a better understanding of this largely unexplored relationship in the CVC context. From the perspective of the agency theory, the paper analyzes the influence of conflicts between the two separate groups on the survival or death of CVC units. Thereby, several propositions are developed from the agency theory perspective (only), which must be viewed critically today due to the advancing knowledge in this field. Based on a data set of 64 CVC units over a period of 12 years (2000-2012), a configurational approach (fsQCA) is methodically chosen.

*Keywords: corporate venture capital, performance, outcomes, success factors, survival*

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### **III. LIST OF ABBREVIATIONS**

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| <b>Abbreviation</b> | <b>Meaning</b>                                  |
|---------------------|---|
| BU                  | Business Unit                                   |
| c.f.                | confer  |
| CI                  | Confidence Interval                             |
| CVC                 | Corporate Venture Capital                       |
| e.g.                | Exempli gratia (for example)                    |
| EBSCO               | Elton B. Stephens Company (literature database) |
| et al.              | Et alii (and other)                             |
| fsQCA               | Fuzzi set Qualitative Comparative Analysis      |
| HR                  | Human Resources                                 |
| i.e.                | id est  |
| ICT                 | Information and Communication Technology        |
| IOR                 | Interorganizational Relationship                |
| IP                  | Intellectual property                           |
| IPO                 | Initial Public Offering                         |
| IRR                 | Internal Rate of Return                         |
| IVC                 | Internal Venture Capital                        |
| M&A                 | Mergers & Acquisitions                          |
| n/a                 | Not applicable                                  |



## List of abbreviations

---

|      |                                  |
|------|----------------------------------|
| No.  | Numero (number)                  |
| p.   | Page                             |
| PC   | Portfolio company                |
| QCA  | Qualitative Comparative Analysis |
| R&D  | Research and Development         |
| ROA  | Return on Assets                 |
| ROI  | Return on Investment             |
| TMT  | Top Management Teams             |
| U.S. | United States (of America)       |
| USD  | US-Dollar                        |
| VC   | Venture Capital (independent)    |

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## CHAPTER 1: INTRODUCTION

Corporate venture capital (CVC) is minor equity investment in entrepreneurial ventures made by established companies (Maula, 2007; Drover et al., 2017). The venture capital (VC) model was founded within the cotton industry. A group of close-knit partnerships developed several practices to support their investment in companies. These practices—such as syndication, monitoring, and mentoring—helped the close-knit partners to scale and grow their investments until they could sell them to stock market investors (Gaba and Meyer, 2008). From that time onward, these practices helped the (corporate) VC industry to become a major global player in the funding of new ventures. In recent years, CVC activity increased dramatically. From 2018 to 2019 the number of global CVC transactions tracked by Global Corporate Venturing grew by 8%. Likewise, the total financial value of these deals increased by 3%. In 2019 global CVC activity hit an all-time high of 3,234 CVC-backed deals and USD 57.1 billion in funding. In view of the last five years (2015–2019), this means an increase of 89% in deals and 77% in total funding (CB Insights, 2019). Since 2015, the participation of CVC in VC-backed deals rose from 19% to 25% in 2019, which indicates that CVC defends its meaningful position in the global venture ecosystem (CB Insights, 2019) by co-investing in many of the big investment rounds in a wide range of industries (KPMG Enterprise, 2019). Today, CVC is the second largest source of funding for new ventures. On the same scale, the development of corporate venture activities in Europe has accelerated. By the end of 2019, CVC-backed deals—as well as CVC-backed funding—were marking a new all-time high.

As CVC activity has grown in the recent years, so has academic attention to the phenomenon (Röhm, 2018). The phenomenon of CVC is now clearly established in the context of rigorous academic discussion, thus cementing the importance of CVC vehicles in the overall VC industry. Along with its practical importance in providing both financial and strategic benefits, CVC

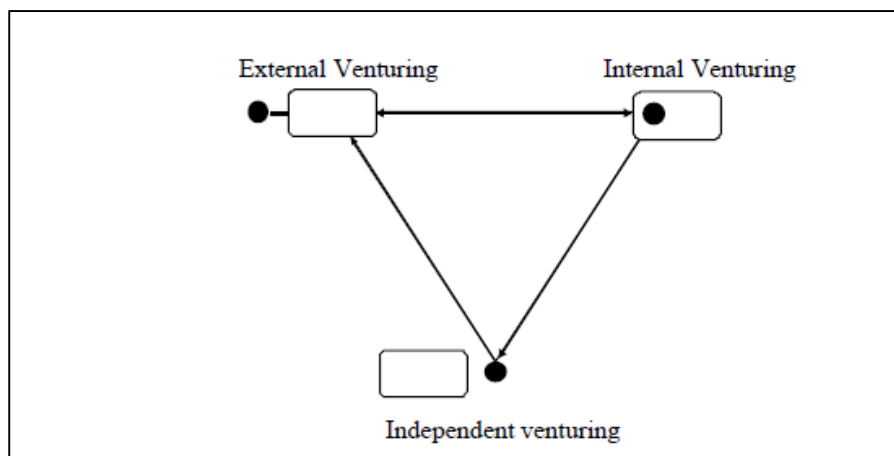
has increasingly become a focus of academic interest, generating a large number of studies on its motivations, antecedents, management, and outcomes. Since its first appearance in the 1970s, the attention of corporations to CVC activity tends to fluctuate and is characterized by four different waves of cyclical ebb and flow (Gompers and Lerner, 1998; Dushnitsky, 2006; Bielesch *et al.*, 2012; Dushnitsky, 2012). CVC units are also susceptible to failure. CVC programs tend to suffer premature closure (Gompers and Lerner, 1998; Campbell *et al.*, 2003; Burgelman and Välikangas, 2005; Garrett, 2010). Consequently, the question arises: which factors influence the sustainable success of CVC programs?

## **1.1 Understanding corporate venture capital**

### **1.1.1 Definition and differentiation**

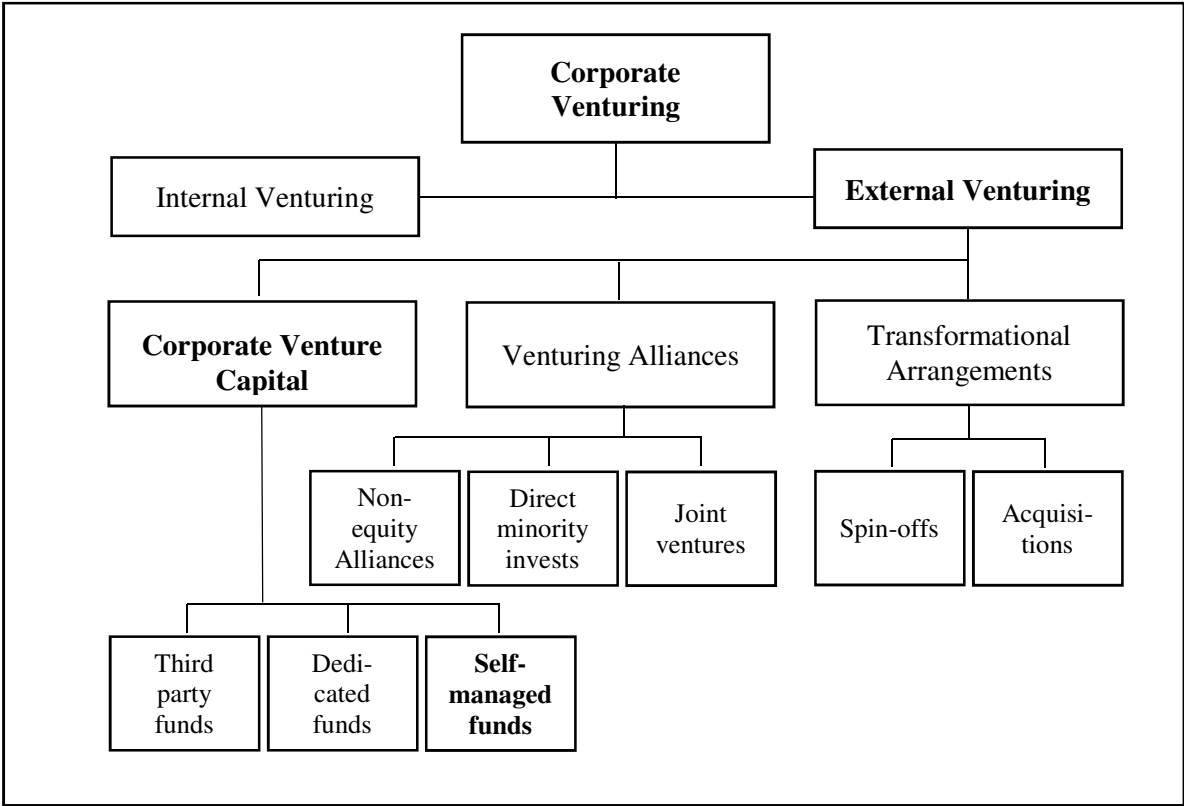
The term “corporate venturing” serves as an umbrella for the general pursuit of establishing new businesses (e.g., new markets, technologies, products, and services) in already existing corporations (Keil, 2000). Block and MacMillan (1993) suggest generally differentiating between business development and corporate venturing. The former is associated with incremental further development of present product, service, and technology categories, whereas the latter refers to new categories and is therefore associated with non-incremental developments. When considering corporate venturing activities, a distinction has to be made between internal venturing, external venturing, and independent venturing (MacMillan, Block, and Narasimha, 1986). The following *figure* shows the interrelationship of the three alternatives (adapted from Keil, 2000):

**Figure 1: Internal venturing, external venturing, and independent venturing**



A venture may be founded within an established organization (internal venturing), outside an established organization (external venturing), or even independent from an established organization (independent venturing). Independent venturing means founding a new business outside the organization's boundaries without further support for the new venture. External venturing, such as CVCs, strategic alliances, joint ventures, or acquisitions of entrepreneurial ventures (Schildt, Maula, and Keil, 2005), refers to the creation of (semi-) autonomous ventures that remain outside the founding organization (Sharma and Chrisman, 1999; Keil, 2000), but still benefit from an ongoing and supporting connection with the founding organizations. Internal venturing relates to the foundation of new ventures that remain within the organization's boundaries (Hippel, 1977; Burgelman, 1980; Sweeting, 1981; Sharma and Chrisman, 1999). Keil (2004) suggests that internal and external venturing should not be viewed separately, but rather considered as complementary. CVC can be categorized within external venturing (Dushnitsky and Lenox, 2006), and Keil (2000) provides a helpful classification for three different external venturing modes (cf. *Figure 2*): CVC, venturing alliances, and transformational arrangements.

Figure 2: Modes of external corporate venturing <sup>1</sup>



CVC operations can be further segmented into third party funds, dedicated funds, or self-managed funds. All funds share the process of founding a relationship with an independent venture through an investment mechanism (Keil, 2000). For the purpose of this dissertation, the focus is on CVC through direct investments (self-managed funds). Accordingly, CVC is defined as “equity or equity-linked investments in young, privately held companies, where the investor is a financial intermediary of a non-financial corporation” (Maula, 2007: p. 371). These young, privately held companies are legally independent and highly innovative in terms of tech-

<sup>1</sup> Keil (2000: 109)

nology, a characteristic that typically exhibits high growth potential. CVC is therefore understood as an effective tool to achieve corporate growth and innovation (Maula, 2001, 2007; Basu, Phelps, and Kotha, 2011).

Research on CVC has largely progressed in various disciplines and is therefore situated in more than one literature stream, including economics, finance, management, entrepreneurship, and innovation. The economics and finance literature stream focuses on analyzing the CVC performance outcomes from different perspectives (e.g. Gompers and Lerner, 2000b), the antecedents of CVC (e.g. Chemmanur, Loutskina, and Tian, 2014), and the comparison between CVC and internal venture capital (IVC) (e.g. Chemmanur *et al.*, 2014). The literature stream in the fields of management, entrepreneurship and innovation focuses on analyzing strategic and financial outcomes (e.g. Maula, Autio, and Murray, 2009), CVC unit practices (e.g. Dushnitsky and Shapira, 2010), and motives (e.g. Dushnitsky and Lenox, 2006). This stream is the most relevant in terms of number of publications. Because the focus of journals is not always distinct in the categories above, differentiation needs to be considered for a rough classification. For instance, the *Journal of Business Venturing* encloses both of these major categories. The journal is considered multi-disciplinary and provides a scholarly forum for interesting theories, interpretations of the antecedents, mechanisms, and/or consequences of entrepreneurship.

CVC is a corporate systematic practice to invest in entrepreneurial ventures that do not necessarily have to lie in their primary core business focus (Drover *et al.*, 2017). CVC is therefore different from traditional VCs and serves as tool for corporations to achieve high growth and high innovativeness (Maula, 2007; Basu *et al.*, 2011). CVC is typically part of the corporate open innovation strategy (Chesbrough, 2003) and is useful for identifying innovative ideas and technologies and leveraging synergies between entrepreneurial ventures and the incumbent firm (Gompers, 2002; Birkinshaw and Hill, 2005; Dushnitsky, 2011). The CVC construct creates

privileged access to the venture's specific knowledge and the occasion to learn from this inter-organizational relationship (Dushnitsky and Lenox, 2005b). It also helps to handle rapid technological dynamics, as well as the limitations of internally developed innovations (Gompers and Lerner, 1999, 2001).

A CVC program involves a parent company (incumbent firm, mother company), a CVC unit, and the portfolio of entrepreneurial ventures (portfolio company, startup) (cf. *Figure 9*). Each party in this CVC triad benefits differently from collaborative interactions (Röhm, 2018). Entrepreneurial ventures benefit from access to capital as an alternative funding source (Gompers and Lerner, 1998; Maula, 2001; Maula and Murray, 2017), as well as complementary assets, access to customers, or specific industry knowledge and technical support (Maula, Autio, and Murray, 2005; MacMillan *et al.*, 2008; Drover *et al.*, 2017). The CVC unit represents a separate unit legally controlled by the corporate firm (Hill and Birkinshaw, 2014); this unit takes an essential role in the CVC program and serves as an intermediary between the parent company and entrepreneurial ventures (Chesbrough, 2002) and is responsible for investments in new ventures and their further development (Block and MacMillan, 1993; Hill and Birkinshaw, 2014). Through the identification and evolution of innovative businesses, CVC units support their parent companies to gain access to new, complementary, and/or disruptive technologies (Uzuegbunam, Ofem, and Nambisan, 2017), and to adapt innovation strategies (Birkinshaw and Hill, 2005; Drover *et al.*, 2017).

Corporate firms with CVC initiatives can benefit from higher innovativeness and increased firm value (Dushnitsky and Lenox, 2005b, 2006). In recent years, a growing number of established corporations implemented CVC programs for this very reason (Röhm *et al.*, 2018). In the past five years, the Global CVC report revealed 1,000 new CVC firms that invested for the first time, while 259 CVC firms invested in 2019 alone (CB Insights, 2019).

### 1.1.2 Motivation and objectives

Scholars have examined the motivations and objectives for setting up CVC programs in detail. Corporate firms tend to pursue a mix of financial returns and strategic objectives (Kann, 2000; Keil, 2000; Dushnitsky and Lenox, 2006; Dushnitsky, 2012; Alvarez-Garrido and Dushnitsky, 2016; Maula and Murray, 2017), although these objectives do not substitute for one another (Keil, 2000). While financial returns are necessary to prevent CVC activities from failure and to ensure the survival of the CVC program (Siegel, Siegel, and MacMillan, 1988; Allen and Hevert, 2007; Basu and Wadhwa, 2011), strategic objectives—such as a window on new technological opportunities (Hill and Birkinshaw, 2014) or nurturing an entrepreneurial culture (e.g. Wadhwa and Kotha, 2006)—are considered to represent the main motivation (Basu and Wadhwa, 2011). The literature describes several objectives for engaging in CVC. *Table 1* adapted from Kann (2000) and Jeon (2017), lists the financial and strategic motivations of corporate firms separately:

**Table 1: CVC objectives of the corporate firm**

| Objectives           | Examples  |
|----------------------|---|
| Financial Objectives | <ul style="list-style-type: none"><li>Financial return (Siegel <i>et al.</i>, 1988)</li></ul>   |
| Strategic Objectives | <ul style="list-style-type: none"><li>Gap filling of technology portfolio (Kann, 2000)</li><li>Window on technology (Dushnitsky and Lenox, 2006)</li><li>Investing and acquisition capability development (Benson and Ziedonis, 2009; Yang, Narayanan, and Zahra, 2009)</li><li>Ecosystem building (Kann, 2000)</li><li>Building options to ally, license (Benson and Ziedonis, 2010; Wadhwa and Phelps, 2011; van de Vrande and Vanhaverbeke, 2013; Ceccagnoli, Higgins, and Kang, 2018)</li><li>Building options to (accelerate) new markets/businesses entry (Kann, 2000; Keil, 2000; Maula, 2001; Lee and Kang, 2015)</li><li>Networking with ventures and VC community (Hill <i>et al.</i>, 2009; Dushnitsky and Shapira, 2010; Keil, Maula, and Wilson, 2010)</li><li>Leveraging underutilized resources (Chesbrough, 2002; Campbell <i>et al.</i>, 2003)</li></ul> |



Scholars have also analyzed the motivations of entrepreneurial ventures for entering an investment relationship with incumbent firms. One main motive is the financial backing of corporations or investment syndicates. Corporations usually invest in long-term relationships and provide financial resources in multiple investments rounds (Chesbrough, 2002). Ventures can also benefit from access to complementary resources such as a customer base, distribution channels, manufacturing base, and marketing (Katila, Rosenberger, and Eisenhardt, 2008). Moreover, Maula (2001) has emphasized the signaling effect that comes with an investment relationship between corporate firms and ventures. Engaging with an established investor implies that the corporation expects the venture to grow and be successful in the future (e.g., based on the combination of complementary resources), sending a positive signal to customers and partners (Pahnke, Katila, and Eisenhardt, 2015).

*Table 2* provides a list of venture motives for engaging in CVC programs (Kelly, Schaan, and Joncas, 2000):

**Table 2: CVC objectives of the entrepreneurial venture**

| <b>Objectives</b>        | <b>Examples</b>  |
|--------------------------|--|
| Financing                | <ul style="list-style-type: none"><li>▪ Access financial resources: equity, royalties, R&amp;D funding, etc.</li><li>▪ Cost reduction</li></ul>  |
| R&D/ Product development | <ul style="list-style-type: none"><li>▪ Utilize market intelligence</li><li>▪ Access to extensive publications library</li><li>▪ Obtain technological insights</li><li>▪ Leverage core competencies</li><li>▪ Access to complementary technologies</li><li>▪ Access to labs and test facilities</li></ul>  |
| Manufacturing            | <ul style="list-style-type: none"><li>▪ Receive manufacturing knowledge &amp; capabilities</li><li>▪ Capitalize on component purchasing power</li><li>▪ Access quality assurance capabilities</li></ul>  |
| Marketing/Distribution   | <ul style="list-style-type: none"><li>▪ Improve market access (distribution channels, global networks)</li><li>▪ Access and establish loyal customer base</li><li>▪ Acquire market research and personal insights</li><li>▪ Reduce cycle time</li><li>▪ Increase credibility</li><li>▪ Ties to a partner capable of driving industry standards</li></ul> |
| Legal/Regulatory         | <ul style="list-style-type: none"><li>▪ Advise on regulatory or patent approvals</li></ul>   |
| Service/Support          | <ul style="list-style-type: none"><li>▪ Establish warranty, service, and customer support procedures</li></ul>   |
| Reputation               | <ul style="list-style-type: none"><li>▪ Exploit “Halo effect”, large company’s endorsement to clients, within industry and during financing</li></ul>  |

## **1.2 Corporate venture capital success**

The success of CVC programs has interested researchers from the beginning of the CVC research stream. Early researchers of CVC examined strategies for CVC success and effects on CVC performance (Siegel et al., 1988; Sykes, 1990). A look at the present literature shows that the question is still relevant. For instance, Belderbos, Jacob, and Lokshin (2018) have examined the effect of geographic diversity in CVC portfolios on the incumbent’s technological performance, while Huang and Madhavan (2020) have analyzed the impact of CVC investing on

corporate performance and the performance of the portfolio companies. Why is the question of CVC success so hard to answer? A first response lies in the fact that CVC is still a relatively underexplored area of VC research (Dushnitsky, 2006; Ivanov and Xie, 2010a; Basu *et al.*, 2011; Titus and Anderson, 2018). Furthermore, many CVC funds pursue a dual strategy of achieving both financial and strategic objectives. The CVC construct is also complex: it contains numerous parties—the corporate firm and its business units, the CVC unit, and the portfolio of ventures. CVC involves intra- and interorganizational relationships with different requirements and therefore different perceptions of success. In addition, the historical development of CVC has been characterized by a cyclical appearance (Gompers and Lerner, 1998; Dushnitsky, 2006; Bielesch *et al.*, 2012; Dushnitsky, 2012) that needs to be considered when approaching the question of CVC success. The following chapter gives an overview of CVC success considering the historical development of the CVC construct.

### **1.2.1 Historical background of CVC**

CVC investment activities can be traced back to at least the 1960s (Dushnitsky, 2011). Since that time, CVC activity has cyclically ebbed and flowed in four distinct “waves” (Gompers and Lerner, 1998; Dushnitsky, 2006, 2011; Bielesch *et al.*, 2012; Dushnitsky, 2012; Maula and Murray, 2017). The first wave of CVC activity was characterized by some givens, which encouraged the beginning of CVC flows. In the 1960s, firms followed an overall trend toward corporate diversification. Business was successful, and companies sought to dispose of excess cash flow (Fast, 1978). The pioneering VC industry also had exceptional financial achievements with their investment portfolios (Gompers and Lerner, 1998). These three factors inspired many companies to establish CVC funds to back internal or external ventures (or both) to complement or extend the corporation’s requirements. The stake in internal and external ventures was more or less 50% (Sykes, 1986). At that time, almost 25% of the fortune 500 firms

in the U.S.—including American Standard, Boeing, Heinz, and Monsanto—had venture programs. An outstanding example of CVC activity during the 1970s is Exxon Enterprises, which funded 37 high-tech ventures on its own (Dushnitsky, 2012). The end of the first wave was triggered by a breakdown of the market for IPO in 1973 (Gompers and Lerner, 1998). In combination with the oil shock and related macroeconomic changes leading to poor financial and strategic performance, CVC programs were discontinued (Maula, 2007; Bielesch *et al.*, 2012; Dushnitsky, 2012). Beyond external influences, CVC programs also had to struggle with internal organizational and governance matters (Birkinshaw, van Basten Batenburg, and Murray, 2002; Dushnitsky, 2011).

The second wave of CVC efforts began in the early 1980s with a focus on areas such as high technology and biotech (British Privat Equity & Venture Capital Association, 2013). Again, contextual factors encouraged leading U.S. companies in the chemical and metal industry to launch CVC programs. First, due to legislation amendments, pension funds were able to invest in risky VC asset classes. Another change in legislation caused lower taxes related to capital gains (Gompers and Lerner, 1998; Dushnitsky, 2011; Bielesch *et al.*, 2012). Moreover, ongoing technological development also created outstanding business opportunities and finally led (by the stimulation of public markets) to remarkable growth in the larger VC market. The second wave came to an end with the stock market crash in 1987, which led to a heavy decline in the VC industry and the termination of most CVC programs shortly thereafter (Dushnitsky, 2006, 2012). Once more, at the end of the second wave, CVC programs had to struggle with internal organizational and governance matters, including adequate carried interests, conflicting goals, or corporate ownership (Birkinshaw *et al.*, 2002).

The third wave took place during the 1990s. This period was characterized by rapid and ongoing technological development, the formation of many new internet-related ventures, and an enormous rise in VC investing. The combination of these three factors led to more than 400

CVC programs and to the highest peak in CVC investments. Many multinational corporations founded CVC funds, including Dell, Texas Instruments, and Novell (Dushnitsky, 2012). The objective of CVC was not only financially driven: many corporations aimed to gain disruptive technologies (Bielesch *et al.*, 2012). At the peak of the IT bubble in 2000, 15% of total VC investments involved only CVC investors, reaching USD 20 billion in global corporate venturing investments (Maula, 2007). Some corporations with CVC programs thus became significant players in the VC industry (Dushnitsky, 2012). While in first and second waves the investments in entrepreneurial ventures were from the U.S., during the third wave American investment decreased to 84% (Kann, 2000; Birkinshaw *et al.*, 2002). This time, a substantial amount (16%) of investment money came from companies in Europe and emerging economies. The end of the third wave was caused by the stock market crash in 2000 and the bursting of the dot-com bubble, which led to the recession of 2001 and 2002. As a consequence to this crash, incumbents had to shut down CVC activity due to high losses and blocked opportunities to exit their investments. The situation was worsened through a risk-averse environment and high uncertainty about new guidelines on accounting and governance issues (Bielesch *et al.*, 2012). The effect on CVC activity was remarkable. One third of corporations actively investing in September 2000 had to fold their investment activities immediately. Twelve months later, the equity investments in ventures were diminished by 80%, and the amount of invested money dropped from about USD 17 billion to USD 0.848 billion (Chesbrough, 2002).

The fourth wave of CVC activity began in the year 2003 and is still ongoing. In 2019, the amount of CVC funding hit an all-time high at USD 57.1 billion (CB Insights, 2019), more than tripling the peak from the third wave. This recent wave shows similarities with the previous waves in terms of the financial markets and technological drivers. Novel technologies are attracting companies, which are looking for innovations. The companies provide financial and strategic resources to harness the technologies created by the ventures. In this way, financial

markets accelerate the metamorphosis from an innovative technology into a running business model with high financial returns (Dushnitsky, 2012). However, the current era of CVC initiatives is different. Corporations are rethinking how they manage their strategies on research and development (R&D). Previously, most firms had an internal R&D focus. Today, CVC is obtaining acceptance and is seen as a driver of innovation (Bielesch *et al.*, 2012). This new era of CVC has a positive impact on the lifespan. While, CVC units lasted for only 2.5 years in the past, lifespan increased to 3.8 years or longer (Dushnitsky, 2011).

In summary, this historical examination of CVC has shown the main reasons for its cyclical appearance at the contextual level and at the firm/organizational level. The context of a successful CVC boost must provide drivers for novel technology and favorable financial markets. At the firm level, we see an important variation between the first three waves and the current wave in terms of the ongoing integration of open innovation techniques (Chesbrough, 2003). CVC enables corporations to absorb ideas and technologies from external ventures, and CVC investments becomes “an integral part of a firm’s innovation toolkit” (Dushnitsky, 2012: 164). Studies on CVC programs at the firm and/or organizational level are part of the main research categories in the literature, and topics considered have included CVC unit structure, staffing, objectives, and salaries (Drover *et al.*, 2017).

### **1.2.2 Survival**

The survival of CVC programs has rarely been investigated in the existing CVC literature (Hill and Birkinshaw, 2008; Hill *et al.*, 2009; Teppo and Wustenhagen, 2009; Hill and Birkinshaw, 2014; Fischer *et al.*, 2019). In comparison with their independent VC counterparts, CVC funds seem to be more volatile (Gompers and Lerner, 1998). Previous studies have found different CVC lifespans, ranging from 2 to 6 years (Fast, 1981; Rind, 1981; Gompers and Lerner, 2001), with an average of 2.2 years (Dushnitsky, 2012) or 5 to 10 years in order to

achieve operational stability (Leten and van Dyck, 2012). These results are surprising given that the survival of CVC programs is considered a prerequisite to achieve the desired performance (Siegel *et al.*, 1988; Allen and Hevert, 2007; Hill and Birkinshaw, 2008, 2014). In many cases, CVC programs not only have to reach break-even, but even have to meet or exceed internal margin targets (Basu and Wadhwa, 2011). Although the survival of CVC programs is not tied solely to financial goals, in some cases the focus is on achieving strategic goals (Allen and Hevert, 2007). The reasons for the high failure rate are manifold and include incentives structures (Block and Ornati, 1987; Chesbrough, 2000), a lack of autonomy (Siegel *et al.*, 1988), insufficient financial dedication (Siegel *et al.*, 1988), internal political motives (Fast, 1978; Sykes, 1986), poor organizational culture (Teppo and Wustenhagen, 2009), or a change in economic conditions (Gompers and Lerner, 1998). Based on these studies, it appears that the causes for high failure rates are located at the organizational and market levels. Another perspective provides possible coherence for CVC survival at the individual level (Drover *et al.*, 2017; Fischer *et al.*, 2019), where an individual's behavior is responsible for the non-survival of CVC funds through bad decision-making or personal conflicts (Teppo and Wustenhagen, 2009).

### **1.2.3 Financial and strategic performance**

The roots of CVC are situated in the private VC industry, which is known to focus exclusively on financial performance (Sykes, 1990). Early studies have shown a financial orientation in CVC objectives (Block and MacMillan, 1993; Chesbrough, 2002). For example, Birkinshaw *et al.* (2002) and Siegel *et al.* (1988) found financial return to be the most prominent objective in their ranking about financial and strategic goals. In the late 1990s, some CVC programs tended to capitalize on highly profitable exits that were caused by overblown valuations during the stock market bubble (Gompers and Lerner, 2001). In this period of high uncertainty, venture valuations increased by 100% on the first day of the initial public offering (Ritter, 2001). This

focus on financial benefits has to be acknowledged (Dushnitsky and Lenox, 2005b); a financial benefit may arise from a direct return on an investment or from complementary assets, which increase the value of the corporation's investment portfolio (Dushnitsky and Lenox, 2006). However, the financial outcomes of CVC funds can fluctuate (Sykes, 1986; Siegel *et al.*, 1988; Gompers and Lerner, 1998; Chesbrough, 2000). In comparison to their independent counterparts, ventures backed by corporate funds benefit from better IPOs (Maula, 2001), and CVC programs have also been shown to be equally successful to independent VC programs (Gompers, 2002), depending on the strategic fit between the business of the venture and the incumbent firm (Gompers and Lerner, 1998). In comparison with VC funds, CVC programs tend to suffer more from instability (Gompers and Lerner, 1998). This instability comes with a certain pattern, from enthusiasm in the beginning, to implementation, to upcoming substantial complications, and ending with the closure of the CVC initiative (Chesbrough, 2000). Possible explanations for the instability of CVC programs that may cause failure can be found in a lack of autonomy concerning investment decisions, as well as a short-term investment focus (Siegel *et al.*, 1988; Gompers and Lerner, 1999; Chesbrough, 2000). Investment managers' incentives (Block and Ornati, 1987; Chesbrough, 2000), a lack in financial commitment (Siegel *et al.*, 1988), or internal politics (Sykes, 1986) can also harm CVC initiatives. The early literature also points to an over-emphasis on financial performance, which may cause failure (Rind, 1981), and will probably yield a venture-portfolio that provides little opportunities for strategic spillovers (Chesbrough, 2002).

The literature on CVC shows no consensus about the right balance between financial and strategic objectives. After all, "there is little evidence regarding whether they delivered attractive direct financial returns or valuable strategic benefits for their parent companies" (Allen and Hevert, 2007: 262). As mentioned above, the early literature also indicates a primary focus on financial returns (Siegel *et al.*, 1988). In today's view, CVC programs are usually known to



have a twofold mission—to achieve financial and strategic objectives, while an emphasis on the latter is more important (Rind, 1981; Block and MacMillan, 1993; Kann, 2000; Keil, 2000; Dushnitsky and Lenox, 2006; Narayanan, Yang, and Zahra, 2009; Baldi, Baglieri, and Corea, 2015; Drover *et al.*, 2017; Maula and Murray, 2017). There are various goals associated with strategic benefits, such as recognizing future products, services, or technologies, or providing a window on technology (Rind, 1981). While the focus lies on strategic goals, financial goals are of course necessary to ensure the program’s success and survival (Siegel *et al.*, 1988; Allen and Hevert, 2007). Therefore, “the financial goals typically serve as *sine qua non*, the baseline target which start-ups have to meet to qualify for an investment, as CVC programs typically have to meet or exceed the corporate hurdle rates to ensure their own long-term survival” (Bauke, 2014: 4).

Financial and strategic goals cannot serve as substitutes for each other (Maula, 2007). Both goals are very important for corporate firms (Keil, 2000). A focus on both goals reduces the chances for corporate investors to achieve total goal attainment compared to investors with only one goal (Weber and Weber, 2005). In fact, strategic objectives are usually the main motivation to establish a CVC program, while investments in new ventures are based on financial terms (Keil, 2000). The CVC programs pursuing financial and strategic goals may strive not only for direct financial gains, but for indirect strategic gains as well. Strategic gains can compensate for poor financial success or losses (Dushnitsky, 2004), and in this way, CVC programs can survive even if they fail to achieve financial returns (Allen and Hevert, 2007). Overall, the orientation of a CVC program cannot be considered permanent; it is dynamic and can be adjusted over time, and a financial focus can shift to a strategic focus over time (McNally, 1997; Kann, 2000).

### 1.3 Synthesis and overriding research question

Organizational performance is one of the most important research focuses in the strategic management literature (Bettis *et al.*, 2016). This high significance is also reflected in CVC research. According to the previous explanations (sections 1.2.1 to 1.2.3), there is long-lasting debate on CVC program success, or more precisely on program survival and the correct balance between financial and strategic performance. The question of how to achieve sustainable CVC success is not trivial to answer and plays a significant role in CVC research (Siegel, Siegel, and MacMillan, 1988). The reason for this complexity lies partly in the fact that CVC investments are intended to pursue financial and strategic objectives simultaneously (Huang and Madhavan, 2020). The debate is still ongoing. Scholars point to a lack of systematic evidence (Dushnitsky, 2006; Rossi *et al.*, 2019), and they are still skeptical about whether CVC programs create any value for the corporate firm (Titus and Anderson, 2018). Considering CVC programs' unique structures, the different parties underlie a variety of goal orientations. For instance, corporate investors pursue a mixed strategy to achieve financial and strategic returns, while new ventures strive for options focused on growth and increasing their firm value (Ivanov and Xie, 2010b; Dushnitsky, 2012; Park and Steensma, 2012). Another example of this can be seen in CVC unit autonomy. Higher autonomy has a positive impact on the strategic performance of CVC investments (Lee *et al.*, 2018), but can lead to investment decisions being made in favor of individual investment managers and against the corporate interests (Siegel *et al.*, 1988; Chesbrough, 2002; Yang, Chen, and Zhang, 2016). Therefore, higher autonomy might lead to conflicting interests between the CVC unit and the corporate firm. Thus, the differing interests between the parties cause numerous and possibly contradictory goals (Huang and Madhavan, 2020). The prior literature has examined the impact of manifold factors on the performance outcomes of the incumbent, the CVC unit, and the venture portfolio (Dushnitsky, 2012). However, the literature

is not evenly distributed across the three unique CVC parties (cf. 3.5). The recent literature emphasizes the unexplored nature of the distinctive performance outcomes and how they are interconnected (Huang and Madhavan, 2020), but the literature falls short in considering equal and opposite effects on the parties' individual success. It is therefore important to distinguish between the outcomes for the three parties involved in a CVC program, because those outcomes may vary and "an entrepreneurial venture or a CVC program may benefit at the expense of the parent firm (or vice versa)" (Dushnitsky, 2012: 193). Following this identification of research gaps related to the success factors of the three CVC parties, the overriding research question of this dissertation is as follows: *Which (combinations of) factors are crucial for corporate venture capital success and what is their respective impact?* In addition to this overarching research gap, there are other gaps that are also addressed in this dissertation, namely the little-noticed (a) individual level, (b) inconsistent findings, and (c) insufficient methods.

(a) CVC research can broadly be divided into research on the individual level (e.g., investment manager's career background), the organizational or firm level (e.g., antecedents, CVC unit, outcomes, venture performance), and the market level (e.g., R&D expenditures within an industry). While studies on the organizational level dominate, studies on the individual level are scarce, partially due to lack of data (Drover *et al.*, 2017). The individual level thus represents a research gap.

(b) The growing number of empirical CVC studies shows inconsistent findings. For instance, Schildt *et al.* (2005) found a positive impact between CVC investments in related industries and the incumbent's performance, while Dushnitsky and Lenox (2005a) found a negative relationship. Another example from Benson and Ziedonis (2010) found corporate investors overpaid for investments in new ventures in the IT sector, while Allen and Hevert (2007) found that 39% of CVC programs in the IT sector do not achieve the corporate firm's cost of capital.

(c) Given the multifaceted studies on performance implications and the description of inconsistent results, research on CVC still does not provide sophisticated methods to resolve such discrepancies and explain those contradictions. The bulk of the existing empirical studies profoundly analyze one specific outcome, while most CVC studies are quantitative, using standard regression methods (cf. *Table 5*). Consequently, extant studies are inconclusive regarding the value distribution across different research areas (Huang and Madhavan, 2020). They are also limited and unable to depict equifinality (Fischer *et al.*, 2019), which refers to a situation in which two or more configurations are similarly effective in accomplishing high performance (Fiss, 2007).

#### **1.4 Structure of the dissertation**

To address the research gaps mentioned above, each article is concerned with a different aspect of the factors or combinations of factors influencing the success of CVC programs. This thesis consists of three articles. In the first article, my co-authors and I conducted a systemic literature review. To ensure methodological robustness, we built on a commonly applied systematic procedure (c.f. Crossan and Apaydin, 2010) by Tranfield, Denyer, and Smart (2003). The use of a systematic approach in CVC literature is rare, which seems surprising given that non-systematic approaches tend to biases (Newbert, 2007). Drawing on this comprehensive review, we identified those research clusters that have dominated the CVC discourse so far: the antecedents, the CVC unit itself, and, most importantly, the performance implications of differentiating between the outcome levels of the three parties involved in CVC programs. As a partial result, we developed a multi-dimensional framework that outlines central aspects of CVC research. The review covers the literature from 1984 to June 2020. The paper provides a full descriptive analysis of the field, followed by a comprehensive synthesis and discussion of im-

lications and future research for academics and practitioners alike. Today, the growing academic interest in this field has resulted in a handful of (non-systematic) literature reviews that provide summaries and organizational frameworks (Maula, 2007; Narayanan *et al.*, 2009; Dushnitsky, 2012; Basu, Wadhwa, and Kotha, 2016b; Drover *et al.*, 2017; Röhm, 2018). This paper makes several contributions for practice and theory. Beyond providing an integrative organizational framework that permits the aggregation of the various antecedents, internal processes, and outcomes of CVC, the article highlights important directions for future research. Thus, the article emphasizes four aspects for future research: the content of CVC, the use of additional theoretical lenses, and the use of data and methods. Furthermore, the first article provides the foundation for the other articles included in this dissertation that utilize the quantitative and qualitative CVC literature on success factors. This first article was accepted for presentation at the 77th Annual Meeting of the Academy of Management, Atlanta (2017) and at the Strategic Management Society Special Conference on Strategy Challenges in the 21st Century, Rome (2016).

In the second article, my co-authors and I focused on CVC as a form of interorganizational relationship (IOR). Based on 43 empirical CVC studies, we conducted bivariate meta-analysis to answer the following research question: *What are the key characteristics of an explorative and an exploitative orientation of external CVC programs and how do these key characteristics impact the performance of such CVC programs?* The chosen methodological approach allowed us to identify the key characteristics of these orientations in external CVC programs and empirically examine how the respective key characteristics affected the three distinct performance perspectives of such CVC programs—the corporate firm, the CVC-unit, and the new venture. In this way, we contributed to the literature by consolidating current knowledge, reconciling inconsistent findings (e.g., the influence of investment diversity, CVC experience, firm size,

and R&D expenditures on CVC performance), providing a more nuanced analysis of exploration and exploitation, and drawing robust conclusions about certain CVC characteristics that have not (yet) received sufficient empirical support. We also revealed under-researched CVC topics for future research and highlighted the importance of differentiating the distinct performance effects for all CVC parties. We contributed to the IOR literature through analysis of the similarities and differences of IOR modes by applying and adapting the holistic framework of Parmigiani and Rivera-Santos (2011) to the CVC context. This article was previously presented at several scientific conferences: the Annual Meeting of the Strategic Management Society in Paris (2018) and the 23rd Annual Interdisciplinary Conference on Entrepreneurship, Innovation and SMEs in Vienna (2019).

In the third article, my co-authors and I looked at the impact of individuals' behavior on the survival of CVC units. More precisely, we examined how the interplay between CVC unit managers' behavior and the corporate top management teams (TMT) affected the survival and non-survival of CVC units from a principal agency perspective. We employed a German proprietary dataset from three surveys of quantitative and qualitative data on 64 CVC units, which were collected between 2000 and 2012. This article contributed to the CVC literature in several ways. First, we revealed the largely unexplored relationship between CVC units' managers and corporate firms' TMT and the above-mentioned impact on the CVC units' (non-)survival. Second, we showed that the agency perspective is a proper theory to explain influences on CVC units' success at an individual level. Third, we showed the interrelatedness between several factors (i.e., strategic and financial goals, carried interests, decision-making autonomy, strategic fit, and strategic support) and their influence on CVC unit survival. By doing so, we presented the causal asymmetry and equifinality of these factors. This article has been published in the *International Journal of Entrepreneurial Venturing* (IJEV), volume 39, number 6, pages 568–597.

In addition, the paper was presented at the 21st Annual Interdisciplinary Conference on Entrepreneurship and Innovation in Wuppertal (2017), at the 37th Babson College Entrepreneurship Research Conference in Oklahoma (2017), and at the 7th International Leuphana Conference on Entrepreneurship in Lueneburg (2017).

The following *Table 3* summarizes the content of each article in this dissertation.

**Table 3: Overview of the three research articles in this dissertation**

|                          | <b>(1) Systematic review of corporate venture capital</b>  | <b>(2) A meta-analysis on CVC program performance</b>  | <b>(3) A configurational analysis of how agency conflicts affect the survival of CVC units</b>  |
|--------------------------|--|--|---|
| <b>Research Question</b> | <ul style="list-style-type: none"> <li>▪ What are comprehensive research streams that have dominated the discourse on CVC so far?</li> <li>▪ How can those interrelated streams be comprehensively systemized in a multi-dimensional framework?</li> </ul>   | What are the key characteristics that impact the explorative and which the exploitative orientation of external CVC programs?  | How does the interplay between TMT decisions and CVC managers' behavior and the agency conflicts between them influence the survival of CVC units?  |
| <b>Outcome</b>           | <ul style="list-style-type: none"> <li>▪ Venture outcomes</li> <li>▪ CVC unit outcomes</li> <li>▪ Corporate outcomes</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Venture performance</li> <li>▪ CVC unit performance</li> <li>▪ Corporate performance</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Survival</li> <li>▪ Non-survival</li> </ul>  |
| <b>Data</b>              | Literature review on 102 CVC studies   | Sample size: 43 empirical CVC studies  | Sample size: 64 CVC units, longitudinal approach  |
| <b>Method</b>            | Systematic literature review   | Bivariate Meta-analysis  | fsQCA   |
| <b>Theory/ Framework</b> | n/a  | Parmigiani and Rivera-Santos' (2011) holistic IOR framework  | Principal Agent Theory  |
| <b>Contribution</b>      | <ul style="list-style-type: none"> <li>▪ Summary and consolidation of the dominant CVC research streams</li> <li>▪ Providing an integrative multi-dimensional framework that permits the aggregation of the various antecedents, internal processes, and outcomes of CVC</li> <li>▪ Highlighting important directions for future research</li> </ul> | <ul style="list-style-type: none"> <li>▪ Providing a more nuanced examination of the explorative and exploitative nature of CVC</li> <li>▪ Reconciling inconsistent findings</li> <li>▪ CVC characteristics and their relation to CVC performance that have (not yet) received sufficient empirical support.</li> <li>▪ Complementing literature on IORs by applying Parmigiani and Rivera-Santos' (2011) holistic IOR framework to the CVC context</li> </ul> | <ul style="list-style-type: none"> <li>▪ How the relationship between corporates' TMT and CVC units' managers agency theory helps to explain (non-) survival of CVC units</li> <li>▪ Demonstrating the interrelatedness of factors influencing CVC unit survival</li> </ul> |



## **CHAPTER 2: SYSTEMATIC REVIEW OF CORPORATE VENTURE CAPITAL**

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### **2.1 Introduction**

Corporate venture capital (CVC), defined as direct equity investments made by established companies in privately held entrepreneurial ventures (Maula, 2007), is an increasingly important means by which large industrial organizations foster interorganizational learning and innovation and constitutes a growing source of capital for entrepreneurs. As CVC activity has grown recently, so has academic attention to the phenomenon. More than 60% of all articles published on this topic in leading academic journals have appeared since 2010. This interest stems from researchers' belief that CVC is an "integral part of firms' innovation toolkit" (Dushnitsky, 2012: 156) that helps firms build new capabilities, fosters strategic renewal, and enhances profits through expansions in domestic and international markets.

However, the intensifying focus on the CVC research stream and the number of publications it has generated obscure some of the limitations of these studies, raising questions about their contributions to theory and practice. First, CVC has surged in Europe and Asia even more than in the United States, yet most of the relevant studies have been conducted in North American settings whose institutional environment, level of business development, or strategic focus potentially differ from the rest of the world. Second, many scholars have examined only discrete elements of CVC activities rather than advancing a coherent framework that allows for cumulative progress in research on the field. Third, researchers' dissimilar operationalization of key

variables complicate the comparison of findings across studies. Fourth, large parts of the empirical studies on CVC lack theoretical grounding and close linkage with existing streams of literature on entrepreneurship, entrepreneurial finance, and strategic management.

These voids within the current CVC discourse are both limiting and challenging because CVC programs could be a major source of competitive advantage. Such shortcomings slow and even prevent development of robust theory-based conclusions about CVC. Furthermore, the consequences that CVC engagement has on value creation and value capture by investors and investees remain unclear. The lack of an organizational framework that permits aggregation of the various antecedents, internal processes, and outcomes of CVC also makes it difficult to provide sound guidance to practitioners (Narayanan *et al.*, 2009).

We address this research gap by developing such integrative CVC framework. To do so, we conduct the field's first systematic literature review on CVC, covering 36 years (April 1984 to June 2020). We categorize our findings as antecedents, organizational characteristics, and outcomes and distinguish between three levels of analysis: the parent company, the CVC unit, and the entrepreneurial venture. Our suggested framework offers scholars and practitioners a holistic overview of these categories and of various debates within this research stream. By highlighting specific gaps within the three research clusters and by pointing out overriding issues affecting CVC research as a whole, our approach also promotes cumulative progress in the field and helps identify promising areas of future research.

We begin by explaining how the systematic literature review was conducted and by presenting our first descriptive statistics on the predominant methods, major data sources, and underlying theories of research on CVC since 1984. We then outline our key findings at the three levels of analysis. In the final section of this article, we discuss the implications of our findings and conclude with suggestions for future research.

## **2.2 Methodological approach and current status**

Reviews of CVC literature have been published before (e.g., Maula, 2007; Dushnitsky, 2012; Basu, 2016). With the soaring number of CVC publications since 2007, however, the available reviews do not include the latest transformations in key perceptions. Furthermore, the literature selected in that body of work is based on subjective judgments and therefore lacks methodological robustness. To help close these research gaps, we conducted a systematic CVC literature review based on a commonly applied procedure (Tranfield *et al.*, 2003). Tranfield, Denyer, and Smart (2003) point out the difference between a systematic review and traditional narrative reviews “by adopting a replicable, scientific and transparent process” (p. 209). They suggest a three-stage one: planning, conducting, and reporting, which we adopted for a systematic database survey spanning the 36 years of CVC research from 1984 to June 2020. The procedure is common and has been applied in previous reviews before (e.g. Crossan and Apaydin, 2010).

### **2.2.1 Planning**

We defined our objectives, database, and keywords. Following Podsakoff, Mackenzie, Bachrach and Podsakoff (2005), we confined our sources to databases containing validated knowledge only. Therefore, we decided to use *EBSCO Business Source Premier*, which focuses on peer-reviewed journals. Our objective was to furnish an integrative framework that aggregates the magnitude and diversity of CVC literature.

### **2.2.2 Conducting**

To identify the publications that eventually informed this literature review, we began with a keyword search within *EBSCO Business Source Premier*, the widely used and reliable open-access database. The basic search used the expressions corporate venture capital and its abbreviation CVC as criteria for selecting titles, abstracts, or author keywords. The initial sample consisted of 5,207 publications. We refined the basic search by using common filters, including

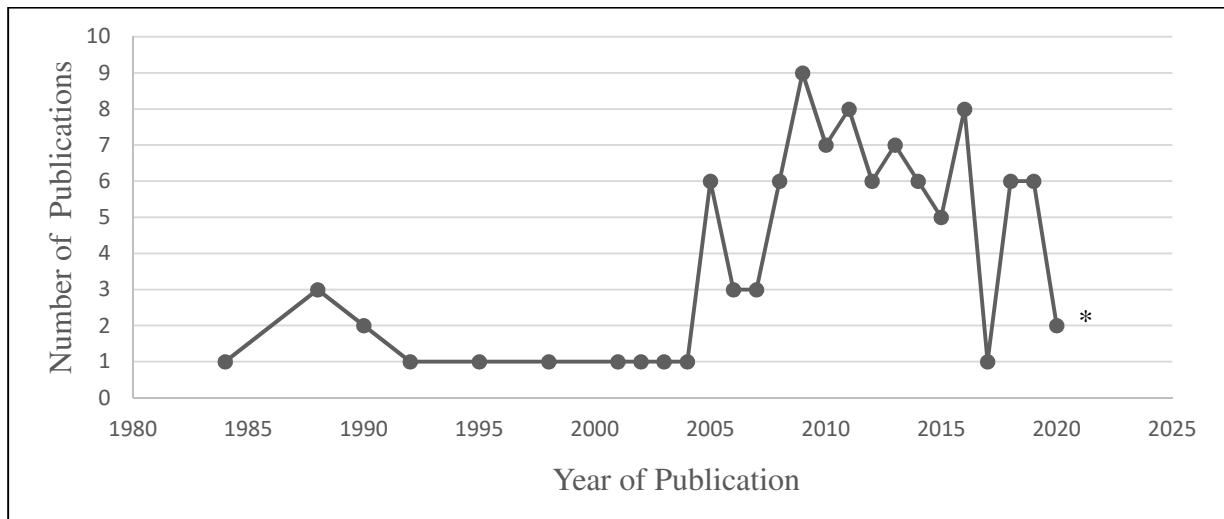
“English” as the language, document type “Article” and the research categories business, business finance, economics, and management. This revised sample consisted of 128 publications.

To encompass the key perceptions while keeping the amount of literature manageable, we continued as authors have in other literature reviews (e.g. Überbacher, 2014), focusing only on journals with an impact factor  $>1$ , which is widely regarded as a measure of quality. We then manually searched for relevant publications and in-press articles in specific journals (e.g., *Journal of Business Venturing*, *Strategic Management Journal*). Using Google Scholar, we then rounded off the process with an examination of the reference lists of all articles already in our sample. This step added 34 studies to our list. After reading the article titles and abstracts, we excluded another 135 items as being of little relevance, bringing it to 102 sources from the main body of CVC literature to review in our study (c.f. *Table A1 in the appendix*).

### **2.2.3 Reporting**

In line with Tranfield, Denyer, and Smart (2003), the third step of our systematic literature review gives a full descriptive analysis of the field. It is followed by a comprehensive synthesis and a discussion of implications and future research for academics and practitioners alike. The 102 papers we reviewed, 62 (61%) of which have appeared since 2010 (c.f. *Figure 3*), were published across 27 journals, with the *Journal of Business Venturing* containing the highest number of CVC-related papers (*Table 4*).

**Figure 3: Growth in the number of publications on CVC**



\*Value for 2020 includes publications up to June 2020.

**Table 4: Top 10 journals publishing CVC research**

| Title of journal                                | No. of papers | % of the most cited articles* |
|---|---------------|-------------------------------|
| <i>Journal of Business Venturing</i>            | 19            | 39.3%                         |
| <i>Strategic Entrepreneurship Journal</i>       | 10            | 5.5%                          |
| <i>Strategic Management Journal</i>             | 10            | 19.0%                         |
| <i>Academy of Management Journal</i>            | 4             | 8.7%                          |
| <i>Entrepreneurship: Theory &amp; Practice</i>  | 4             | 7.6%                          |
| <i>Journal of Business Research</i>             | 4             | 0.8%                          |
| <i>Journal of Product Innovation Management</i> | 3             | 1.8%                          |
| <i>Organization Science</i>                     | 3             | 5.5%                          |
| <i>Administrative Science Quarterly</i>         | 2             | 9.3%                          |
| <i>Entrepreneurship Research Journal</i>        | 2             | 2.6%                          |

\*According to Google Scholar (May 26, 2020).

Differentiating between conceptual and empirical publications, we ascertained that most (68, or 94%) of the 72 publications in our sample were empirical, with 54 (75%) being of a quantitative nature, 9 (12.5%) qualitative, and 5 (7%), mixed. Of the 59 quantitative and mixed publications, 40 (68% or 56% of the overall publications) were based entirely or partly on data from the VentureXpert database. In other words, most of the publications were limited to U.S. data. Regression analyses or types of regression were used as the method of choice in 47 of the 72 publications (66%) used (*Table 5*).

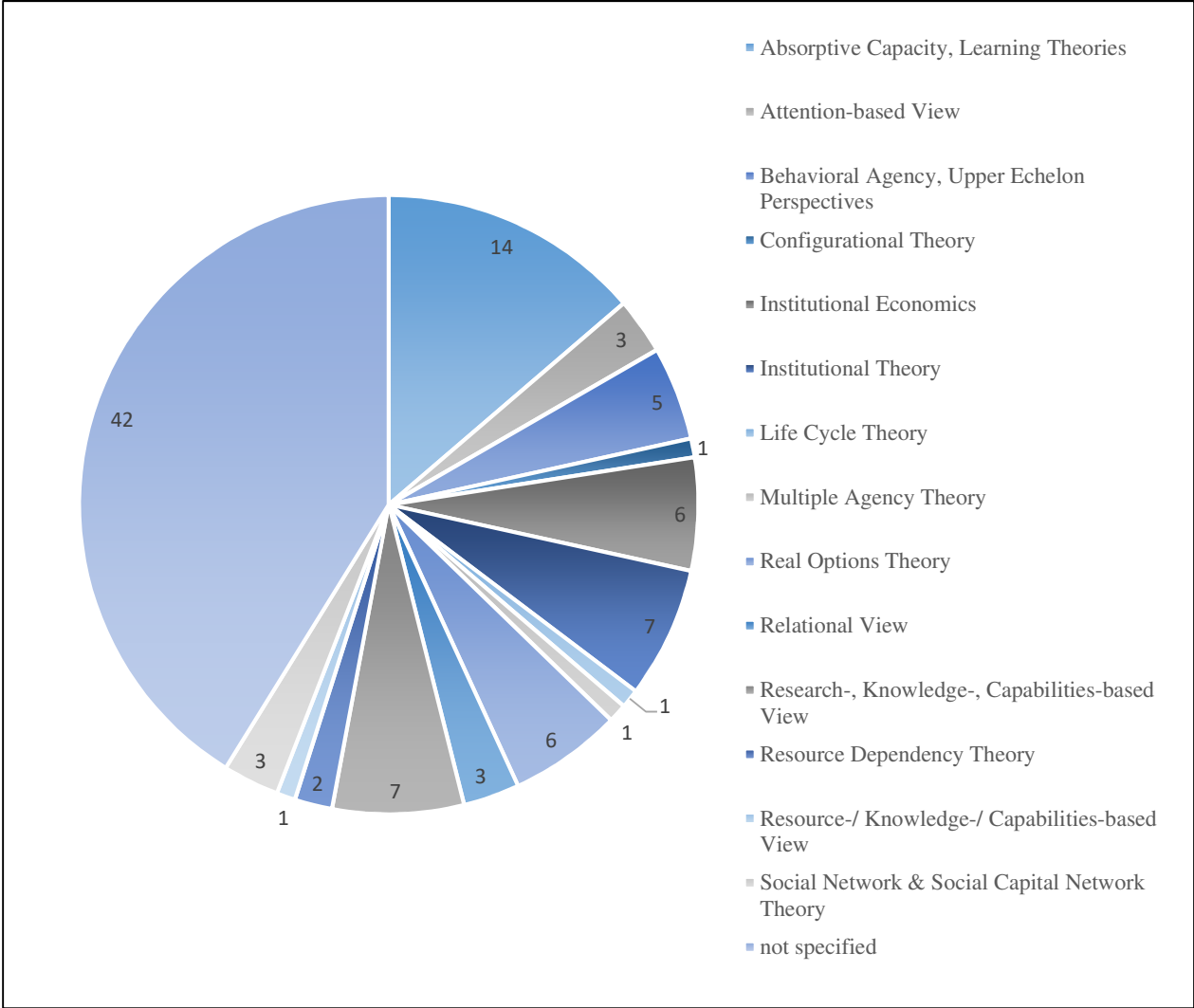
***Table 5: Overview of qualitative and quantitative items***

| Approach     | No. of papers | %    |
|--------------|---------------|------|
| Quantitative | 80            | 78.4 |
| Qualitative  | 12            | 11.8 |
| Conceptual   | 4             | 3.9  |
| Mixed        | 6             | 5.9  |

Next, our literature review yielded insights into the theoretical lenses used within CVC research. Altogether, there were 60 publications that contributed to theory (58.8 %). Our review disclosed a variety of theoretical perspectives. The most commonly applied lens in CVC literature have been learning theories. Specifically, interorganizational learning theories (Sapienza, Clercq, and Sandberg, 2005) and absorptive capacity (Cohen and Levinthal, 1990; Benson and Ziedonis, 2009; Yang *et al.*, 2009; Smith and Shah, 2013) figured prominently as theoretical underpinnings of CVC research. In addition, we found studies using institutional theory (Gaba and Meyer, 2008; Dokko and Gaba, 2012b), resource-, knowledge-, and capability-based views (Dushnitsky and Lavie, 2010; Basu *et al.*, 2011; Wang and Wan, 2013; Noyes *et al.*, 2014), social capital or social network theory (Weber, 2009; Weber and Weber, 2011), real-options

theory (van de Vrande, Vanhaverbeke, and Duysters, 2011b, 2009; Tong and Li, 2011; Basu and Wadhwa, 2013) and institutional economics (c.f. *Figure 4*). The remaining 41.2 % of our studies investigated did not consider any theoretical grounding. Particularly in the beginning of CVC research, most of the publications tended to merely describe the characteristics of CVC or the findings of different empirical geographic analyses.

**Figure 4: Theoretical perspectives on CVC**



Theoretical perspectives on corporate venture capital, by number of papers (N=102) in each category. Publications with more than one theoretical perspectives are counted once.

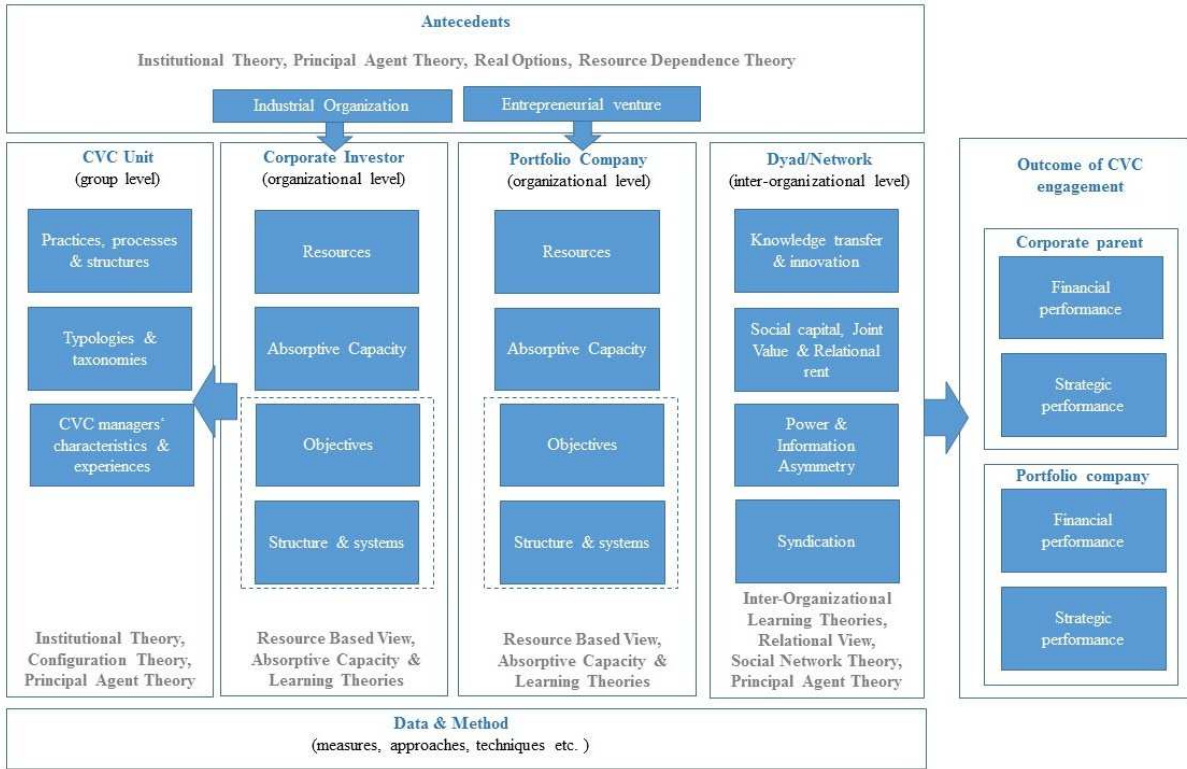
### 2.3 Synthesis

Research on CVC has received increasing attention and is currently on the rise again. Four clusters emerged from our literature review. In *figure 5* we aggregate the diverse topics and research questions discussed in those four clusters as well as the diverse management theories applied to those topics and questions:

1. A body of literature analyzing the antecedents of CVC at the company and industry level.
2. Studies analyzing the CVC firm itself for processes, practices, and structures that facilitate interorganizational knowledge transfer and innovation.
3. Articles investigating the relationship between CVC engagement and financial and/or strategic performance.
4. A rather old stream of research focusing on the objectives that large industrial corporations have in conducting CVC engagements. The studies in cluster 4 consist primarily of descriptive surveys or cross-sectional analyses, which do not allow one to draw conclusions about causal interference (Basu, Phelps, and Kotha, 2011). Because these publications have limited relevance in the current discourse, considering the historical development and the modern understanding of CVC to be “integral part of firms’ innovation toolkit” Dushnitsky (2012: 156), we eliminate them from the following discussion and focus on the subject matter in the first three clusters—antecedents, the CVC unit, and performance implications. (For an overview on corporations’ objectives behind CVC engagements, see Maula, 2007.)



Figure 5: Multidimensional-framework of CVC



2.3.1 Cluster 1 – Antecedents of CVC

The studies in this stream of CVC literature investigate how the competitive environment of corporate investors and start-ups effect their motivation and opportunities to form CVC relationships. Besides the differentiation between parent and portfolio company (PC), we distinguish between three levels of analysis: country, industry, and company (c.f. Table 6).

**Table 6: Antecedents of CVC**

|  | <b>Startup</b>   | <b>Corporate Investor</b>   |
|--|--|---|
| <b>Country Level</b>   |  | + development of market for early-stage investments <sup>4</sup><br>+ level of innovativeness <sup>4</sup><br>- personal bankruptcy costs <sup>4</sup>  |
| <b>Industry Level</b>  | + complementary distribution quality <sup>5</sup><br>+ high technological ferment <sup>5</sup><br>+ industry growth rate <sup>11</sup><br>- industry size <sup>11</sup><br>+ weak intellectual property regime <sup>5</sup><br>+ when trade secrets or patents provide intellectual property protection <sup>9</sup>   | + high competitive intensity <sup>1</sup><br>+ rapid technological change <sup>1</sup><br>+ relative availability of CVC versus IVC <sup>7</sup><br>weak appropriability <sup>1</sup>   |
| <b>Firm Level</b>  | - fixed assets <sup>9</sup><br>+ complementary resource needs <sup>9</sup><br>- demand uncertainty <sup>11</sup><br>+ earlier funding rounds, younger firms <sup>3</sup><br>+ financial resource needs <sup>3,9,11</sup><br>+ industry overlap <sup>6</sup><br>+ later funding rounds <sup>9</sup> , later-stage <sup>6</sup> , older ventures <sup>10,11</sup><br>+ mutually agreed defense mechanisms <sup>9</sup><br>+ number of investors <sup>11</sup><br>- profitability <sup>9</sup><br>- proximity to VC investors <sup>8</sup><br>+ R&D intensity <sup>3</sup><br>- high reputation of co-investors <sup>11</sup><br>+ R&D intensity <sup>3</sup><br>+ size of the corporate investor <sup>11</sup><br>+ social defenses <sup>8</sup><br>+ technical innovation <sup>10</sup> | + absorptive capacity <sup>7</sup><br>+ cash flow <sup>7</sup><br>+ CVC investments as antecedent for strategic alliances <sup>13</sup><br>+ CVC unit is structured as wholly owned subsidiary <sup>7</sup><br>- distance <sup>7</sup><br>+ firm cash flow <sup>5</sup><br>+ investment diversity <sup>1</sup><br>+ lower leverage <sup>12</sup><br>+ marketing resources <sup>1</sup><br>- negative interaction effect between firm's technological/marketing resources and investment diversity with appropriability, competitive intensity and technological change on CVC partnerships <sup>1</sup><br>+ performance <sup>12</sup><br>+ R&D <sup>2,12</sup><br>+ size <sup>4,12</sup><br>+ technological resources <sup>1</sup> |
| <b>Studies:</b>  |  |   |
| 1. Basu <i>et al.</i> (2011)<br>2. Benson and Ziedonis (2009)<br>3. Chemmanur <i>et al.</i> (2014)<br>4. Da Gbadji, Luc Armel G., Gailly, and Schwienbacher (2015)<br>5. Dushnitsky and Lenox (2005a)<br>6. Dushnitsky and Shapira (2010)<br>7. Dushnitsky and Shaver (2009) |  | 8. Hallen, Katila, and Rosenberger (2014)<br>9. Katila <i>et al.</i> (2008)<br>10. Pahnke <i>et al.</i> (2015)<br>11. Park and Steensma (2012)<br>12. Tong and Li (2011)<br>13. Wadhwa and Phelps (2010)  |

**Antecedents leading industrial organizations to engage in CVC.** Studies in this stream of literature suggest there is a set of “push-pull” incentives for large corporations to engage in CVC activities (Dushnitsky and Lenox, 2005a). External conditions at the country level—which have been analyzed little—or in a firm’s primary industry may put pressure on the corporate parent, or “push” it, to engage in CVC activities. At a country level, Da Gbadji, Gailly, and Schwienbacher (2015), have found that the innovation environment in which large industrial organizations are embedded substantially affects whether they engage in CVC activities. Firms are more likely to run a CVC program if they are located in countries with high levels of general innovation activities, R&D expenses, and personnel as early investments. Costly bankruptcy regulations, however, can adversely affect such programs, underscoring the view that these kinds of costs generally diminish entrepreneurial initiatives.

The discussion of antecedents predominantly centers on the company and industry levels, whereas research at the country level has long been neglected. Irrespective of country or sector, industrial organizations that operate in so called Schumpeterian environments seem to complement their efforts at internal innovation by tapping into the knowledge created by entrepreneurial ventures through a CVC program (Dushnitsky and Lenox, 2005a; Da Gbadji et al., 2015). Firms in industries characterized by rapid technological change, strong growth, and weak intellectual-property regimes, engage significantly more in CVC than do firms in environments without those characteristics (Basu et al., 2011; Dushnitsky and Lenox, 2005a; Dushnitsky and Shaver, 2009; Sahaym, Steensma, and Barden, 2010). Because these Schumpeterian conditions may enable CVC to achieve higher marginal innovation output than is the case with internal R&D or other modes of external knowledge sourcing, the attractiveness of promising start-ups seems to “pull” corporations toward investing in these enterprises (Basu et al., 2011). Findings at the industry level, too, show that, “entrepreneurial- or regulatory-” friendly industries with a

long venture capital history foster the establishment of CVC programs (Dushnitsky and Lenox, 2006).

Besides the competitive forces that launch CVC opportunities, another antecedent is the firm's resources. They seem to play a dominant role in exploiting these opportunities because such resources enhance the firm's absorptive capacity to recognize and integrate external knowledge (Cohen and Levinthal, 1990). Chemmanur *et al.* (2014), for instance, found that technology-rich firms profit from a "selection effect" (the fact that their existing stock of knowledge helps improve the accuracy of their evaluation of new ventures' technologies). Basu *et al.* (2011) demonstrated that a rich endowment of expertise and other resources made it easier for corporations to identify possibilities for integrating the new technology into their own products. This absorptive capacity, in turn, has been shown to raise the company's inclination to engage in CVC (Dushnitsky and Lenox, 2005a; Tong and Li, 2011). However, Basu *et al.* (2011) showed that this positive relationship between absorptive capacity and the firm's CVC activity appears to also hinge on the environment. Drawing on arguments from behavioral theory, Gaba and Bhattacharya (2012) suggest that the actual innovation performance of a firm relative to its aspiration is an important factor in its decisions on whether to engage in CVC activities. Additional aspects driving the formation of CVC programs at the company level seem to be complementary distribution capabilities (Dushnitsky and Lenox, 2005a), marketing resources (Basu *et al.*, 2011), firm size (Da Gbadji *et al.*, 2015; Tong and Li, 2011), and the organization's financial condition (Dushnitsky and Lenox, 2005a; Tong and Li, 2011).

Whereas the researchers cited in the previous paragraph investigated CVC engagement as a dependent variable, others have focused on CVC as an antecedent (i.e., as an independent variable) that affects acquisitions (Tong and Li, 2011) or alliances (Dushnitsky and Lavie, 2010; van de Vrande and Vanhaverbeke, 2013). Tong and Li (2011), for instance, explain that creating a CVC portfolio means building real options that allow the investing firm to become acquainted

with different technologies and business opportunities. These investments also allow the corporate parent to improve the precision of its assessment of a given venture's technology and trajectory. Various empirical studies have confirmed that, if the development of the venture is encouraging, the corporate parent may eventually even engage in a strategic alliance that greatly strengthens the integration of the venture's technology into its own stock of technology (Dushnitsky and Lavie, 2010; van de Vrande and Vanhaverbeke, 2013). Van de Vrande and Vanhaverbeke (2013) found that the maturity of the venture further influences the likelihood of subsequent alliance formation, with subsequent investments in start-ups reducing the uncertainty about markets and technology and thereby helping to deepen the relationship between the parent company and the venture.

**Antecedents leading entrepreneurial ventures to seek CVC.** Organizational absorptive capacity is also central from a new venture's perspective. Although corporate investors are more inclined to invest within their own industry than in a different one, entrepreneurial ventures face a dedicated trade-off when forming relationships with corporations from related industries, for those CVCs have greater capacities and capabilities to copy the venture's invention. If the protection of intellectual property is weak, the likelihood that an investment dyad will be formed declines when the start-up technology targets the same markets as those technologies serving the products of the would-be corporate parent (Dushnitsky and Shaver, 2009; Katila, Rosenberger, and Eisenhardt, 2008). This holds because investors are reluctant to commit their equity until the start-up reveals its invention, and the entrepreneur hesitates because of concerns about imitation. Earlier studies on the formation of corporate start-up relationships focused primarily on the corporation's perspective, with researchers assuming an egregious power imbalance between the resource-rich corporation and the new venture. However, authors of later studies have argued that this unilateral perspective does not capture the whole complexity of the investment relationship and that new ventures take a more active role in the process than what we have just

described. Gompers (2002) and Santos and Eisenhardt (2009) showed that CVCs frequently fail to win their preferred investment because promising ventures can often choose between various competing investors and thereby improve their bargaining position. Detailed case studies of a start-up's fund-raising processes further show that entrepreneurs are knowledgeable participants who anticipate the potential disadvantages of CVCs, such as bureaucratic obstacles to corporate resources, and misappropriation of intellectual property (Tyebjee and Bruno, 1986; Katila *et al.*, 2008; Katila and Cox, 2008) and are increasingly reluctant to confer special rights on corporate incumbents (Basu, Phelps, and Kotha, 2016). CVC units have thus been shown to pay a premium relative to other investors (Allen and Hevert, 2007) or in the event of acquisition later on (Benson and Ziedonis, 2005, 2010). Moreover, entrepreneurial ventures can also rely on defense mechanisms to mitigate the risk of misappropriation by corporate "sharks". A later entry of corporate investors has been shown to positively impact tie formation (Katila *et al.*, 2008). Pahnke, Katila, and Eisenhardt (2015) contended that early-stage board meetings center on technological issues, with later consultations tending to emphasize marketing and sales plans that diminish the risk of violating intellectual property and help curb excessive influence on product portfolio and competitive strategies. Findings that CVC units favor investments in older ventures are borne out by recent empirical evidence, which backs the assertion that ventures (Pahnke *et al.*, 2015; Park and Steensma, 2012) are more likely to close CVC deals in later than in earlier stages (Dushnitsky and Shapira, 2010) and rounds of funding (Katila *et al.*, 2008). By contrast, Chemmanur *et al.* (2014) found an increased likelihood that younger start-ups will pair with a corporate investor when they are in earlier funding rounds. Because Chemmanur *et al.*'s article appeared in a finance journal, not an entrepreneurship or strategic management journal, these disparities might be explained by dissimilar operationalization of key variables.

Given that strong trade regimes can be established only in certain industries (Levin *et al.*, 1987; Heeley, Matusik, and Jain, 2007) and that tactical defensive timing often delays sorely

needed access to resources, Hallen, Katila, and Rosenberger (2014) introduced “social defenses” as a favorable strategy for start-ups to ward off opportunistic partners when a power imbalance exists. In this challenging context well-trusted third parties such as top-tier independent venture capitalists have been shown to prevent large corporations from misappropriating the venture’s resources. After all, the corporate investor faces the risk that potential opportunistic behavior could become public and damage its reputation (Soda, Usai, and Zaheer, 2004) and that third parties could terminate current ties with the investor or avoid relationships in the future (Ahuja, 2000).

Further research dealing with antecedents that lead entrepreneurial ventures to seek CVC confirms the conceptual arguments that CVC seems to be especially suitable for start-ups working on highly innovative inventions for which the corporate investor’s nonmonetary support is critical. Accordingly, start-ups urgently seeking complementary resources (Katila et al., 2008), pursuing major technological innovations (Pahnke et al., 2015), squeezed by unusually great financial needs (Chemmanur et al., 2014; Katila et al., 2008; Park and Steensma, 2012), and characterized by high R&D intensity (Chemmanur et al., 2014) are more likely than other kinds of start-ups to seek CVC funding, preferably from large investors (Dushnitsky and Shaver, 2009).

### **2.3.2 Cluster 2 – CVC unit: practices, taxonomies, typologies, and influencing factors**

The benefits of CVC have increasingly stimulated research on the CVC units themselves. In view of the relatively short lifetime these units had around the turn of the millennium (Gompers and Lerner, 1998), one large body of this work addresses the practices and processes that improve efficiency and effectiveness of these organizations. A second stream of work, which owes to the great heterogeneity in observed practices and organizational structures, centers on CVC typologies or taxonomies. Scholars conducting that research try to conceptually categorize

seemingly myriad differences into a few types or clusters with common characteristics. Still other studies apply a social network perspective and regard the CVC managers as boundary-spanners (Thompson, 2003; Keil, Autio, and George, 2008a; Basu, Phelps, and Kotha, 2016a) with a bird's-eye view (Weber, 2009) mediating between the parent company's top management team, business-unit personnel, entrepreneurs, and venture capitalists. Scholars interested in this final cluster of studies also examine the influence of stakeholders on the design of the CVC unit and their role in explaining variances in the CVC units' organizational structures.

**Practices and processes.** When analyzing the practices adopted by the CVC unit, scholars have typically differentiated between those suitable for the preinvestment and those for the postinvestment phase (e.g., Basu et al., 2015; Weber and Weber, 2011). Preinvestment practices primarily have to do with the generation and selection of investment opportunities; postinvestment practices accentuate the interaction with the management of the venture (*cf. Table 7*).

Investigating practices early on in the investment process, Basu et al. (2016) found that reducing deal complexity, protecting venture interests, and committing oneself to ideas early are the key practices that distinguish high- from low-performing CVC units in the preinvestment phase. First, entrepreneurs can be reluctant to sign overly complex contracts, so CVC units benefit from lessening the complexity of investment processes and the number of terms, conditions, and privileged clauses such as the right to first refusal. Second, Katila et al. (2008) showed that rather successful CVC programs deliberately establish mechanisms that prevent the parent corporation from opportunistic behavior, a finding consistent with the decreasing power imbalance between start-ups and their investors. With the misappropriation of intellectual property being a serious concern for young ventures (Dushnitsky and Shaver, 2009), some units even expressly refer to external patent councils. Basu et al. (2016) also revealed that thriving CVC units intentionally avoid investments in start-ups that compete directly with existing PCs or internal projects of the parent.



A third practice that signals commitment to the new ventures and differentiates high-performing from less successful CVC units is funding in the early stages of the venture's life cycle. Although previous conceptual papers noted adverse effects that early investments can have for CVC investors—such as declining stock prices due to impaired financial ratios (Markham *et al.*, 2005)—Basu, Phelps, and Kotha (2016) suggested that “corporate investors can always benefit from investing in early-stage ideas once they have taken steps to protect venture interests” (p. 144). Like Keil *et al.* (2008), Basu *et al.* (2016) see early investments as options for “disembodied experimentation” with the opportunity to evaluate promising, but highly risky, endeavors cheaply and to remain engaged in the most auspicious ventures by making subsequent investment. Nevertheless, the participation of CVC units in early rounds of investment seems rare because the established incentive structures often encourage risk-averse behavior (Dushnitsky and Shapira, 2010) or because CVC units have little experience with early equity investments (Dokko and Gaba, 2012). Although the practices and processes discussed above help to increase the deal flow (Wright and Lockett, 2003) and to establish a CVC unit's reputation as a trustworthy and desirable partner among potential investment seekers, postinvestment practices focus on mechanisms that allow both the parent and the new venture to reap the desired value added from these investment ties. The CVC unit: practices and typologies

Table 7: The CVC unit: practices and typologies

|   |  |  |   |   |
|---|--|--|---|---|
| <b>Practices</b>  | <p><b>Pre-Investment</b></p> <ul style="list-style-type: none"> <li>- Anti-cyclical investments <sup>1</sup></li> <li>+ carried interest compensation <sup>16</sup></li> <li>+ commitment to early-stage ideas <sup>5</sup></li> <li>+ collaborative blueprints <sup>5</sup></li> <li>+ investment relatedness <sup>16</sup></li> <li>+ number of investment rounds <sup>12</sup></li> <li>+ protection of venture's interests <sup>5</sup></li> <li>+ reduction of venture's interests <sup>5</sup></li> <li>+ venturing ambidexterity <sup>15</sup></li> <li>+ vertical autonomy <sup>16</sup></li> </ul>  | <p><b>Post-Investment</b></p> <ul style="list-style-type: none"> <li>+ avoidance of competitive posture <sup>5</sup></li> <li>+ internal legitimacy <sup>21</sup></li> <li>+ knowledge sharing <sup>25</sup></li> <li>+ monitoring <sup>24</sup></li> <li>+ relationships to int. stakeholders <sup>3,15</sup></li> <li>- social liabilities <sup>25</sup></li> <li>- staging <sup>16</sup></li> </ul> |   |   |
| <b>Syndication Practice</b>   | <p><b>Benefits</b></p> <ul style="list-style-type: none"> <li>+ decision making <sup>13</sup></li> <li>+ patent output for <i>maximizing isolationists</i> and <i>minimizing centralists</i> <sup>2</sup></li> <li>+ deal flow <sup>26</sup></li> <li>+ learn good investment practices <sup>18</sup></li> <li>+ recognize discontinuous change <sup>11</sup></li> <li>+ superior returns when centrally positioned and large fund size <sup>16</sup></li> </ul>   | <p><b>Entry into IVC networks</b></p> <ul style="list-style-type: none"> <li>+ mimicking certain IVC-practices <sup>21</sup></li> <li>+ provision of complementary resources <sup>17,4</sup></li> <li>+ reputation as nurturing partner <sup>23</sup></li> </ul>   |   |   |
| <b>Types</b>  | <p><b>Taxonomies</b></p> <ul style="list-style-type: none"> <li>▪ internal / subsidiary <sup>10</sup></li> <li>▪ capabilities / investment objective <sup>7</sup></li> <li>▪ relatedness / strategic importance <sup>6</sup></li> </ul>  | <p><b>Typologies</b></p> <ul style="list-style-type: none"> <li>▪ ext. explorer / ext. exploiter <sup>14</sup></li> <li>▪ <i>integrated-</i> / <i>arm's-length</i> logic <sup>22</sup></li> </ul>  |   |   |
| <b>Influencing Factors</b>  | <ul style="list-style-type: none"> <li>▪ personnel with IVC experience fosters financial goal orientation <sup>8</sup></li> <li>▪ personnel with engineering background fosters strategic goal orientation <sup>8</sup></li> <li>▪ internal hires increase early investments and decrease investment diversity <sup>8</sup></li> <li>▪ inverted U-shape between TMT-heterogeneity and CVC activity <sup>19</sup></li> <li>▪ isomorphism to the parent followed an <i>integrated</i> investment logic <sup>22</sup></li> <li>▪ isomorphism to the VC world followed an <i>arm's-length</i> investment logic <sup>22</sup></li> <li>▪ high levels of experience with an investment practice makes firms immune to influences from industry or practice peers, whereat internal and IVC hires tend to go with industry peers <sup>12</sup></li> <li>▪ number of internal hires shorten the lifetime of a CVC unit <sup>12</sup></li> <li>▪ performance based compensation leads to a stronger financial goal orientation <sup>10</sup></li> <li>▪ organizations as autonomous subsidiaries attract managers with finance or private equity background <sup>14,20</sup></li> </ul> |  |   |   |
| <p><b>Studies:</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>1. Allen and Hevert (2007)</li> <li>2. Anokhin et al. (2011)</li> <li>3. Bassen <i>et al.</i> (2006)</li> <li>4. Basu et al. (2011)</li> <li>5. Basu et al. (2016)</li> <li>6. Burgelman (1984)</li> <li>7. Chesbrough (and</li> <li>8. Shapira (2010)</li> <li>9. Dushnitsky and Shaver (2009)</li> <li>10. Gaba and Dokko (2015)</li> <li>11. Gompers and Lerner (1999)</li> <li>12. Hill and Birkinshaw (2008)</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>13. Hill and Birkinshaw (2014)</li> <li>14. Hill et al. (2009)</li> <li>15. Keil et al. (2010)</li> <li>16. Maula et al. (2013)</li> <li>17. Sahayam et al. (2010)</li> <li>18. Siegel et al. (1988)</li> <li>19. Souitaris et al. (2012)</li> <li>20. Souitaris and Zerbinati (2014)</li> <li>21. Wadhwa and Basu (2013)</li> <li>22. Wadhwa and Kotha (2008)</li> <li>23. Weber and Weber (2011)</li> <li>24. Wright and Lockett (2003)</li> </ol> </td> </tr> </table> |  |  | <ol style="list-style-type: none"> <li>1. Allen and Hevert (2007)</li> <li>2. Anokhin et al. (2011)</li> <li>3. Bassen <i>et al.</i> (2006)</li> <li>4. Basu et al. (2011)</li> <li>5. Basu et al. (2016)</li> <li>6. Burgelman (1984)</li> <li>7. Chesbrough (and</li> <li>8. Shapira (2010)</li> <li>9. Dushnitsky and Shaver (2009)</li> <li>10. Gaba and Dokko (2015)</li> <li>11. Gompers and Lerner (1999)</li> <li>12. Hill and Birkinshaw (2008)</li> </ol> | <ol style="list-style-type: none"> <li>13. Hill and Birkinshaw (2014)</li> <li>14. Hill et al. (2009)</li> <li>15. Keil et al. (2010)</li> <li>16. Maula et al. (2013)</li> <li>17. Sahayam et al. (2010)</li> <li>18. Siegel et al. (1988)</li> <li>19. Souitaris et al. (2012)</li> <li>20. Souitaris and Zerbinati (2014)</li> <li>21. Wadhwa and Basu (2013)</li> <li>22. Wadhwa and Kotha (2008)</li> <li>23. Weber and Weber (2011)</li> <li>24. Wright and Lockett (2003)</li> </ol> |
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Because the CVC unit acts as a knowledge broker between the PCs and the relevant departments of the incumbent (Weber, 2009), trustworthy relationships and proven routines of sharing knowledge between the involved parties are crucial (Weber and Weber, 2011). In addition to such informal governance mechanisms and like traditional VCs, CVCs also establish formal governance mechanisms such as board seats (Anokhin, Peck, and Wincent 2016; Macmillan, Roberts, Livada, and Wang 2008). Further, Basu et al. (2016) empirically highlight the value of thoroughly planning the collaboration between all actors, including the assignment of concrete responsibilities and areas of mutual interest. As Weber and Weber (2011) demonstrate, such planning can, for instance, rely on precise additional written agreements between the CVC unit and the business units to ensure that business units engage with and support the new venture. Those practices and plans not only improve the cooperation between PC and business units but also prevent the emergence of social liabilities, such as personal or structural lock-ins, which hinder the interorganizational transfer of knowledge (Weber and Weber, 2011). Another practice with which to foster the interaction with PCs and prevent a hostile climate is to avoid competitive postures by aligning competitive moves (Basu et al., 2016). Still other studies investigate the applicability of VC practices to the CVC context (Dushnitsky and Shapira, 2010; Hill, Maula, Birkinshaw, and Murray, 2009; Maula, Autio, and Murray, 2005; Souitaris and Zerbinati, 2014). Hill et al. (2009), for instance, found that the utility of adopting practices from the VC context depends on the objectives of the CVC program, for most of the VC practices positively influence either financial or strategic performance, but not both. Their results of investigating 95 CVC units also suggest that CVC managers deliberately transfer practices from the traditional VC to the CVC context. Drawing on institutional theory, however, Souitaris and Zerbinati (2014) argue that each practice needs to be adapted to the specific characteristics of the corporate and industry context.

Still another important practice adopted by VCs is the syndication of investments with other investors. Syndication partnerships help moderate risk exposure (Lerner, 1994), increase the deal flow, improve decision-making by alleviating information asymmetries between the investors and potential investment targets (Lerner, 1994; Gompers and Lerner, 1999; Manigart *et al.*, 2006), help corporate investors learn sound investment practices from their independent counterparts (Maula, Keil, and Zahra, 2013), and help the top management team recognize discontinuous technological change (Maula *et al.*, 2013). Because traditional VCs are mainly interested in financial returns, CVCs often find it difficult to enter a syndicate in the first place, for they might hinder lucrative exit options (Breyer and Golden, 2001; Hallen *et al.*, 2014; Hill *et al.*, 2009). Moreover, centrally placed VCs seemingly try to hinder CVCs from occupying favorable positions and try to enter the current network structure by partnering predominantly with other highly central VCs (Hochberg, Ljungqvist, and Lu, 2007). Decentralized CVCs are thereby often excluded from attractive co-investment opportunities, imposing additional hurdles to acquiring central network positions (Piskorski and Anand, 2002; Hochberg, Ljungqvist, and Lu, 2010). To overcome these mobility barriers in investment networks, Keil, Maula, and Wilson (2010) underline the importance of the corporation's unique resources for entering rigid VC syndicates. Their analysis of 358 U.S. CVC units produced evidence suggesting that CVCs can quickly move into central positions in heterogeneous networks by providing valuable resources that are fundamentally different from and thus complementary to traditional VCs. Other studies also highlight the specific value add of corporations to build a reputation as a valuable partner that nurtures its PCs (Wadhwa and Basu, 2013). Examples are in-depth technological assistance (Dushnitsky and Lenox, 2005a; Maula, 2001; Wadhwa and Kotha, 2006), certification and legitimacy (Megginson and Weiss, 1991; Hsu, 2004; Knyphausen-Aufseß, 2005), access to global distribution systems (Maula, 2001; Maula and Murray, 2002), and brand equity (Basu *et al.*, 2011). Besides the resources that CVCs offer, they can also gain legitimacy from

VC peers by mimicking investment practices (Souitaris, Zerbini, and Liu, 2012). This rather positive picture of VC and CVC syndicates is complemented by a more nuanced image that emerges from the investigation by Anokhin *et al.* (2011) on syndicates that have additional corporate investors. These syndicates seemingly come with costs that outweigh their benefits given that each additional investment tie potentially leads to an outflow of knowledge about the incumbent's capabilities, knowledge, or processes.

**Typologies and taxonomies.** Researchers studying CVC have been quick to acknowledge the heterogeneity of CVC programs and arrangements and attesting that different internal and external conditions require different organizational structures and processes (Doty, Glick, and Huber, 1993). Consequently, there is no superior way to organize such programs. In recognition of that reality, earlier studies built taxonomies to cluster different types of CVC units. Despite significant overlaps, these taxonomies differ in the range of organizational variables and objectives they take into account. Nonetheless, the core of most frameworks consists of a general differentiation between strategic and financial goals (Burgelman, 1984; Chesbrough, 2002; Maula, 2007). Branching off from this core are considerations such as differences in the set-up structure (internal vs. subsidiary) (Dushnitsky, 2012) or an extension toward social effects (McNally, 1997). These studies are an important step toward comparing CVC units, but the work's lack of theoretical grounding prevents a traditional aim of scholars: to derive cause-effect relationships. Against this background, Hill and Birkinshaw (2008) show that configuration theory and the notion of typologies can be helpful in the effort to derive consistent archetypes. Drawing on organizational learning literature (March, 1991) and different variables at the activity-, management-, and network levels of analysis, the authors propose four generic approaches to corporate venturing. Two of them, the "external explorer" striving for strategic objectives and the "external exploiter," focusing on mere financial returns, constitute CVC types; the other two reflect internal corporate venture activities. After having established these

types with their different structures and processes, Hill and Birkinshaw (2008) then investigate the corresponding performance implications. The results not only reveal that exploration-oriented units slightly outperform exploitative ones but also reinforce earlier arguments from configuration theory: Each configurational type represents a coherent pattern of mutually supportive, interdependent elements that spur performance (Miller, 1986). Deviations from these ideal types typically result in performance deficits (van de Ven and Drazin, 1984; Doty *et al.*, 1993). Hill and Birkinshaw (2008) demonstrate that “the greater the alignment between elements of a unit’s organizational profile, the better the unit’s performance” (p. 438).

Souitaris, Zerbinati, and Liu (2012) introduce an institutional theoretical perspective in the discussion of typologies and how CVC units are organized. Relying on a cross-case analysis of 13 CVC programs, these scholars confirm earlier exploratory work by Siegel, Siegel, and MacMillan (1988) and distinguish between CVC programs that follow an integrated logic and those that pursue an arm’s-length logic. The former is characterized by a strong orientation to corporate investment practices (e.g., corporate referrals, involvement of business units for technical due diligence), whereas the latter is oriented to the structure and investment practices of independent VCs (e.g., syndication with other VCs, limited feedback to the corporate parent).

**Factors influencing practices, processes, taxonomies, and typologies.** In connection with these discussions, scholars are increasingly focusing on the conditions that help explain the adoption of certain CVC practices and the emergence of corresponding typologies. For instance, researchers increasingly acknowledge the web of diverse stakeholder relationships (the parent organization’s top management team, the personnel of the CVC unit and other business units, and investing partners) that influence the organizational design of the unit. Souitaris *et al.* (2012) point to the competing logics that stem from the existence of the CVC unit in two simultaneously present, uncoordinated environments (its parent’s and the VC industry) and the

process of isomorphism that explains the alignment of internal practices to fit with one of these environments. The authors find that the degree of professionalization of the CVC unit's top management team and the prioritization of legitimacy influence whether the CVC unit resembles a classical VC fund or is designed to fit the strategic needs of the parent.

In addition, both the experience of the personnel and the prevailing incentive mechanisms demonstrably shape the position of the CVC program (Masulis and Nahata, 2011). Dokko and Gaba (2012) show that the CVC managers' career experience influence the investment decisions of the CVC unit and the adaption of practices to the context of the focal firms. Applying their knowledge about early investments, CVC managers with a VC background tend to favor investments in early-stage funding rounds, whereas CVC managers with an engineering background are likely to opt for a more strategically and less financially oriented CVC unit. Besides the background of the managers, the compensation schemes in place further seem to influence the orientation of CVC programs (Block and Ornati, 1987; Dushnitsky and Shapira, 2010; Sykes, 1992). Compensation based on high-power performance was found to enlarge the proportion of early investments and to minimize the engagement in larger syndicates, both outcomes being indicators of a unit's financial orientation. Interestingly, CVC units that focused on performance pay, which is supposed to decrease strategic considerations, surpassed all other units in financial and strategic performance indicators (Dushnitsky and Shapira, 2010).

Whereas the studies above are attempts to explain the emergence of certain practices and typologies, Gaba and Dokko (2015) investigate the effects that lead firms to abandon certain practices. Their results suggest that firms that engage heavily in CVC are less likely to cease their CVC activities than their industry peers. Moreover, CVC units in which most of the personnel has a VC background tend to stop their engagement in case other VC firms withdraw their investments. Similarly, companies that staff CVC units with internal hires are inclined to follow exit decisions of industry peers. The composition of key personal seems to play a role

also when focusing on the parent's top management team. Sahaym, Cho, Kim and Mousa (2016) find an inverted U-shape relationship between top management team heterogeneity and CVC activity.

### **2.3.3 Cluster 3 – CVC engagement and its impact on different outcome levels**

Given the possible benefits of CVC for the incumbent and the PC, this research cluster centers on the linkage between CVC engagement and various outcome variables. We present these findings by differentiating between studies whose unit of analysis is either the CVC unit or the parent company or the PC. Moreover, we distinguish between financial and strategic performance measures (c.f. *Table 8*).

**Performance implications for the corporate parent.** Early CVC research has acknowledged various strategic benefits for large industrial organizations engaging in CVC, namely the identification of acquisition targets and the expansion into new markets (Siegel, Siegel, and MacMillan, 1988; Sykes, 1990). More recent studies focus on the role of CVC as a means of generating knowledge spillovers from innovative new ventures to the corporate parent. Maula et al. (2013), for example, demonstrate that CVC engagements allow established firms to recognize discontinuous technological changes in an industry more quickly than is possible for participants not engaged in CVC. To these scholars CVC represents a strategic option that mature firms can employ to avoid being surprised by disruptive change.



Table 8: CVC engagement and its impact on different outcome levels

|  |  |  |  |  |
|--|--|--|--|--|
| <b>Strategic Performance</b>   | <p><b>Startup</b></p> <ul style="list-style-type: none"> <li>+ compared to IVC backed ventures<sup>1</sup></li> <li>+ patent diversity<sup>6</sup></li> <li>+ post-funding rates of innovation<sup>21, 19</sup></li> <li>+ post-IPO patent output and citations<sup>6</sup></li> <li>+ pre-IPO patent output and citations<sup>6</sup></li> <li>- weak negative influence<sup>17</sup></li> <li>+ post-funding patent/copyright output<sup>24</sup></li> <li>- post-funding trademark output<sup>24</sup></li> <li>+ level of international intensity<sup>18</sup></li> </ul>      | <p><b>Corporate Investor</b></p> <ul style="list-style-type: none"> <li>+ Explorative/exploitative learning outcomes<sup>22</sup></li> <li>+ CVC unit's structural autonomy positively impacts the explorative innovation performance<sup>14</sup></li> <li>- CVC unit's structural autonomy negatively impacts the exploitative innovation performance<sup>14</sup></li> <li>+ learning from CVC investments has weaker efficacy than learning from acquisitions and joint ventures<sup>13</sup></li> <li>O no impact for low absorptive capacity firms<sup>7</sup></li> <li>+ recognition of technological discontinuities<sup>16</sup></li> <li>∩ ∩-shaped relationship<sup>25</sup></li> <li>+ learning from CVC influences investment decisions in building future capabilities<sup>13</sup></li> <li>+ geographic diversity in CVC portfolios<sup>4</sup></li> </ul> |  |  |
| <b>Moderators</b>  | <ul style="list-style-type: none"> <li>+ complementary assets and industry<sup>1</sup></li> <li>+ co-location<sup>1</sup></li> <li>+ number of alliances<sup>21</sup></li> <li>+ pre-funding innovative capabilities<sup>21</sup></li> <li>- relatedness<sup>17</sup></li> <li>+ reputation of corporate investor<sup>21</sup></li> <li>+ simultaneous CVC and IVC funding<sup>17</sup></li> <li>+ social capital<sup>28</sup></li> <li>+ social interaction<sup>15</sup></li> </ul>   | <ul style="list-style-type: none"> <li>+ absorptive capacity<sup>7</sup></li> <li>+ failure tolerance and technological fit<sup>6</sup></li> <li>+ involvement<sup>25</sup></li> <li>+ magnitude of investment<sup>7</sup> and <i>relational fit</i><sup>29</sup></li> <li>+ only in sectors with weak IP regime<sup>7</sup></li> <li>+ syndicate<sup>2</sup></li> <li>∩ ∩-shaped relationship where portfolio diversity, portfolio depths and number of portfolio companies serve as a moderator<sup>26</sup></li> <li>U U-shaped impact of venture proximity<sup>7</sup></li> </ul>  |  |  |
| <b>Financial Performance</b>   | <ul style="list-style-type: none"> <li>- IPO underpricing<sup>27</sup></li> <li>- less profitable<sup>12</sup></li> <li>+ more likely to go public<sup>10,11</sup></li> <li>O no influence<sup>17</sup></li> <li>+ valuation<sup>12</sup></li> </ul>   | <ul style="list-style-type: none"> <li>+ corporate investors that award performance pay experience the highest performance<sup>9</sup></li> <li>+ improved firm performance when corporate investors subsequently acquire the start-ups<sup>3</sup></li> <li>performance of a corporate investor (weakly) dominates that of independent VC funds, if the CVC does award performance pay<sup>9</sup></li> </ul>   |  |  |
| <b>Moderators</b>  | <ul style="list-style-type: none"> <li>+ fit<sup>12,23</sup></li> <li>+ uncertain environments<sup>5</sup></li> <li>O special incentives for managers do not affect venture performance<sup>20</sup></li> <li>+ venture requires specialized complementary assets<sup>20</sup></li> </ul>  | <ul style="list-style-type: none"> <li>+ diversification in case of financial constraints and relatedness<sup>30</sup></li> <li>U U-shape between CVC portfolio diversification and Tobin's Q only for related pairs<sup>30</sup></li> <li>staging practices partially mediate the association between incentives and performance<sup>9</sup></li> </ul>   |  |  |
| <p><b>Studies:</b></p> <table style="width: 100%; border: none;"> <tbody> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>1. Alvarez and Dushnitsky (2016)</li> <li>2. Anokhin et al. (2011)</li> <li>3. Benson and Ziedonis (2010)</li> <li>4. Belderbos et al. 2018</li> <li>5. Block and Ornati (1987)</li> <li>6. Chemmanur et al. (2015)</li> <li>7. Dushnitsky and Lenox (2005b)</li> <li>8. Dushnitsky and Lenox (2006)</li> <li>9. Dushnitsky and Shapira (2010)</li> <li>10. Gompers (2002)</li> <li>11. Gompers and Lerner (2000)</li> <li>12. Ivanov and Xie (2010)</li> <li>13. Keil et al. (2008)</li> <li>14. Lee et al. (2018)</li> <li>15. Maula et al. (2009)</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>16. Maula et al. (2013)</li> <li>17. Pahnke et al. (2015)</li> <li>18. Park and Li Puma (2020)</li> <li>19. Park and Bae (2018)</li> <li>20. Park and Steensma (2012)</li> <li>21. Park and Steensma (2013)</li> <li>22. Schild et al. (2005)</li> <li>23. Thornhill and Amit (2001)</li> <li>24. Uzuegbunam et al. (2017)</li> <li>25. Wadhwa and Kotha (2006)</li> <li>26. Wadhwa et al. (2016)</li> <li>27. Wang and Wan (2013)</li> <li>28. Weber (2009)</li> <li>29. Weber and Weber (2007)</li> <li>30. Yang et al. (2014)</li> </ol> </td> </tr> </tbody> </table> |  |  | <ol style="list-style-type: none"> <li>1. Alvarez and Dushnitsky (2016)</li> <li>2. Anokhin et al. (2011)</li> <li>3. Benson and Ziedonis (2010)</li> <li>4. Belderbos et al. 2018</li> <li>5. Block and Ornati (1987)</li> <li>6. Chemmanur et al. (2015)</li> <li>7. Dushnitsky and Lenox (2005b)</li> <li>8. Dushnitsky and Lenox (2006)</li> <li>9. Dushnitsky and Shapira (2010)</li> <li>10. Gompers (2002)</li> <li>11. Gompers and Lerner (2000)</li> <li>12. Ivanov and Xie (2010)</li> <li>13. Keil et al. (2008)</li> <li>14. Lee et al. (2018)</li> <li>15. Maula et al. (2009)</li> </ol> | <ol style="list-style-type: none"> <li>16. Maula et al. (2013)</li> <li>17. Pahnke et al. (2015)</li> <li>18. Park and Li Puma (2020)</li> <li>19. Park and Bae (2018)</li> <li>20. Park and Steensma (2012)</li> <li>21. Park and Steensma (2013)</li> <li>22. Schild et al. (2005)</li> <li>23. Thornhill and Amit (2001)</li> <li>24. Uzuegbunam et al. (2017)</li> <li>25. Wadhwa and Kotha (2006)</li> <li>26. Wadhwa et al. (2016)</li> <li>27. Wang and Wan (2013)</li> <li>28. Weber (2009)</li> <li>29. Weber and Weber (2007)</li> <li>30. Yang et al. (2014)</li> </ol> |
| <ol style="list-style-type: none"> <li>1. Alvarez and Dushnitsky (2016)</li> <li>2. Anokhin et al. (2011)</li> <li>3. Benson and Ziedonis (2010)</li> <li>4. Belderbos et al. 2018</li> <li>5. Block and Ornati (1987)</li> <li>6. Chemmanur et al. (2015)</li> <li>7. Dushnitsky and Lenox (2005b)</li> <li>8. Dushnitsky and Lenox (2006)</li> <li>9. Dushnitsky and Shapira (2010)</li> <li>10. Gompers (2002)</li> <li>11. Gompers and Lerner (2000)</li> <li>12. Ivanov and Xie (2010)</li> <li>13. Keil et al. (2008)</li> <li>14. Lee et al. (2018)</li> <li>15. Maula et al. (2009)</li> </ol>   | <ol style="list-style-type: none"> <li>16. Maula et al. (2013)</li> <li>17. Pahnke et al. (2015)</li> <li>18. Park and Li Puma (2020)</li> <li>19. Park and Bae (2018)</li> <li>20. Park and Steensma (2012)</li> <li>21. Park and Steensma (2013)</li> <li>22. Schild et al. (2005)</li> <li>23. Thornhill and Amit (2001)</li> <li>24. Uzuegbunam et al. (2017)</li> <li>25. Wadhwa and Kotha (2006)</li> <li>26. Wadhwa et al. (2016)</li> <li>27. Wang and Wan (2013)</li> <li>28. Weber (2009)</li> <li>29. Weber and Weber (2007)</li> <li>30. Yang et al. (2014)</li> </ol> |  |  |  |

A related line of inquiry consists of a large cluster of studies that examine the effects of CVC activities on the innovation output of firms (e.g., van de Vrande, Vanhaverbeke, and Duysters, 2011). Dushnitsky and Lenox (2005b) and Schildt, Maula, and Keil (2005) not only show a direct positive relationship between CVC engagement and the parent companies' innovation rates but also hint at corporate and industry factors that drive this relationship. For instance, Dushnitsky and Lenox (2005b) reveal that the association between CVC activities and innovation output rises when the backed start-up operates in external environments that allow the capitalization of the venture's knowledge. This relationship between CVC engagement and innovation also increases when the corporate parent is able to exploit the new venture's knowledge. CVC programs are thus particularly effective at stimulating patenting when the venture operates in industries with weak intellectual property regimes and the parent organization possesses high absorptive capacity (Dushnitsky and Lenox, 2005b).

Abandoning the assumption of a linear relationship between CVC activity and innovativeness, Wadhwa and Kotha (2006) explore the role of contextual factors, especially the potential costs of every additional CVC investment. Focusing on the telecommunications equipment manufacturing industry, the authors find an inverted U-shape relationship between the number of CVC investments and the corporate parents' innovation rates. Given the constraints of individuals and organizations to select, nurture, and integrate a multitude of investment relationships effectively, these findings suggest that, beyond a certain threshold, CVC investments are accompanied by declining and negative rates of knowledge transfer and creation (Keil, 2004). According to Wadhwa and Kotha (2006) these negative effects of increased CVC activity can be lessened by the moderating role of investor involvement through board seats or alliances. If involvement is great, the moderating effect is strong enough even to reverse the inverted U-shape relationship.

Additional evidence of diminishing returns and an optimal level of CVC engagement is provided by Wadhwa and Basu (2013). Building on real-options and interorganizational learning theory, they investigate the underlying trade-off that CVC investors face in terms of resource allocation within investment partnerships. On the one hand, the investor is advised to commit more resources in order to align incentives Santoro and McGill (2005), cultivate trust Young-Ybarra and Wiersema (1999), and signal commitment (Parkhe, 1993) to secure successful learning outcomes. On the other hand, reduced resource commitment would limit the risk exposure to innovative ventures of uncertain developmental trajectory. Indeed, Wadhwa and Basu (2013) find a U-shape relationship between the investor's resource commitment to a start-up and the corporation's degree of exploration. CVC-portfolio diversity and syndication with VCs served as moderators. Related to the explorative and exploitative view of CVC activity, Lee, Park, and Kang (2018) find the CVC unit's structural autonomy to have a positive influence on the explorative innovation performance but to have a negative influence on the exploitative innovation performance.

Another salient dilemma in the context of learning from entrepreneurial ventures is the issue of relatedness (e.g., Sorrentino and Williams, 1995). Organizational learning theory holds that knowledge absorption of the parent investor is promoted when its knowledge base at least partly relates to the knowledge base of the venture (Cohen and Levinthal, 1990). However, when the knowledge bases of the partners are too similar, the corporate parent has little to learn from the start-up (Sapienza, De Clercq and Sandberg, 2005) and, in turn, few innovations will occur (Ahuja and Katila, 2001). Correspondingly, Keil, Maula, Schildt and Zahra (2008) found that investments into new ventures from moderately related industries did positively affect the focal firm's patent output. In a similar vein, Weber and Weber (2007) likewise highlighted the positive relationship between relational fit and knowledge transfer. Chemmanur et al. (2014) found

a positive impact of technological fit on patent output. Given that CVC investors typically invest in more than one venture at a time and therefore have access to multiple stocks of knowledge, Wadhwa, Phelps, and Kotha (2016) investigated the relationship between portfolio diversity and patenting rate. Again, patenting output was highest for moderately related investment portfolios. Similarly, Belderbos *et al.* (2018) find a positive relationship between geographic diversity in CVC investment portfolios and the technology performance (patent applications). However, firms need to consider a knowledge base between the ventures that is too similar, managerial complexity, high costs of coordination, and resource constraints.

To summarize, most studies describe a positive picture of CVC engagement and the firm's innovation rates. Schildt *et al.* (2005), however, go one step further and compare CVC with other potential forms of knowledge-sourcing. They find that learning from CVC engagement is not as efficient as learning from acquisitions or joint ventures.

**Performance implications for the portfolio company.** For nearly 20 years scholars have shown that the financial performance of new ventures benefits from CVC funding, which opens access to valuable complementary resources (Gans and Stern, 2003) and signals endorsement of the quality of the founding team and the venture's technology in the eyes of other stakeholders (Stuart *et al.* 1999). CVC investors thereby demonstrably help young ventures to go public earlier than ventures backed merely by VC (Gompers, 2002; Gompers and Lerner, 2000), to be more likely to conduct an initial public offering (IPO) (Gompers and Lerner, 1998), or to increase their likelihood of being acquired (Santhanakrishnan, 2002). Recent studies have confirmed that financial markets regard CVC-backed ventures as superior to ventures backed by independent VCs, given the long-term strategic orientation of the corporate investor. Ivanov and Xie (2010), for instance, found that the valuation premium of CVC-backed ventures at the time of the IPO was sensitive to the strategic fit with the corporate parent. Accordingly, only

entrepreneurial ventures backed by strategically motivated investments profited from higher takeover premiums if the venture was acquired. Similar findings were reported by Park and Steensma (2012), who demonstrated that only those ventures requiring specialized complementary assets benefit from CVC-funding in terms of going public or preventing failure. Moreover, the benefits of CVC backing as a mechanism by which to profit from complementary resources proved to be especially important in uncertain environments. Focusing on the operating performance of CVCs, Chemmanur et al. (2014) supported the idea that CVCs incline the venture to focus on the bigger picture and long-term positioning. In terms of return on assets and profit margin, CVC-backed ventures underperformed VC-backed start-ups by 14.4% respectively 147.2% in the pre-IPO phase, before quickly catching up in the years after heavily focusing on R&D.

Whereas the financial benefits for CVC-backed PCs are well established, the strategic consequences are less clear. Studies finding a positive relationship between CVC-backing and the venture's innovation output (Park and Steensma, 2013; Chemmanur *et al.*, 2014; Alvarez-Garrido and Dushnitsky, 2016; Uzuegbunam *et al.*, 2017) refer to both the potentially superior ability of corporate investors to identify highly innovative ventures (selection effect) and to the superior ability to foster innovation (treatment effect). Chemmanur et al. (2014) and Park and Steensma (2013) found that corporate investors do in fact select ventures with superior innovation capability and are more able than independent VCs to nurture it further. The authors looked at the exact mechanisms by which CVCs can affect their PCs. The study furnished empirical evidence that the technical fit between incumbent and venture has a major influence. Corporate investors operating in the same sector as their start-ups possess superior industrial and technological knowledge that enables them to better develop the entrepreneurial ventures' technologies, products, and markets. Given the complexity and uncertainty of innovation endeavors, entrepreneurial firms profit from additional time to overcome obstacles during the innovation

process. For instance, Chemmanur et al. (2014) indicated that CVC investors' greater tolerance of failure positively impacts new venture performance. Uzuegbunam *et al.* (2017) find a positive impact on the patent/copyright output, while Alvarez-Garrido and Dushnitsky (2016) demonstrated that the PC's patenting output and number of publications critically hinge upon the venture's ability "to benefit from corporate complementary assets" (p. 830). They also revealed that ventures disproportionately profit from proximity to the CVC, for short distances facilitate access to the corporate R&D infrastructure. The new venture's rate of innovation is also accelerated if the CVC has a high reputation among VC coinvestors (Park and Steensma, 2013), a status that imbues the venture with additional legitimacy and improves its access to resources afforded by other partners. Recently, Park and LiPuma (2020) find ventures' to have higher international intensity if they received backing from foreign CVC funds.

However, the unique organizational structure of CVCs can also disadvantage new ventures, ultimately hampering their innovation output. First, corporate investors tend to focus on the value-added for the parent. There is reason to doubt that they behave like traditional VC funds, which are set up as limited partnerships with strong incentives to do their best when selecting and managing PCs (Gompers and Lerner, 1998). Second, CVCs are part of a larger organization. They enjoy less autonomy than VC funds do and often lack first-rate compensation schemes, a fact that frequently troubles recruiting and retaining skilled employees (Gompers and Lerner, 2000). This conundrum compounds the CVC's inability to select the right ventures and to subsequently grant value-added services to start-ups. Third, bureaucratic corporate processes and fragmented authority may restrict access to complementary resources (Weber and Weber, 2011). Fourth, industry relatedness escalates the chances of misappropriating intellectual property (Hallen et al., 2014; Katila et al., 2008) and may limit fruitful cooperation further. Fifth, CVCs often prevent or even forbid their PCs to form alliances with their parent's competitors even though such cooperation might bestow substantial benefit (Ivanov and Xie, 2010).

Weber and Weber (2011) showed that a valuable CVC relationship can even turn into social liability because of personal and structural lock-ins and can thereby thwart necessary strategic reorientations. Strong empirical evidence supporting these arguments was also offered by Pahnke et al. (2015) in their 22-year longitudinal study on the complete population of the minimally invasive surgical device industry. The authors confirmed the selection effect, for the CVCs preferred investments in ventures with strong technical capabilities, but these investment ties turned out to have an adverse effect on the venture's innovation output and no influence on commercialization. The findings thus partially contradict results outlined earlier (Park and Steensma, 2013). We return to these inconsistent findings when suggesting directions for further research and ways to resolve these contradictions.

## **2.4 Future Research**

Our systematic literature review on CVC allowed an overview of the various topics, research questions, methodological approaches and theories applied in this field. It also revealed several promising areas of future research—predominantly but not limited to management-related research—that either deepen and specify current first endeavors or open up entirely new topics. To emphasize the specific gaps and overriding subject matter relevant to that prospective work, we organize our conclusions into three categories—content, theories, and data and methods.

### **2.4.1 Content**

The benefits of the CVC unit itself have received a great deal of research attention. We see five encouraging topics of future research. First Hill and her colleagues reported initial empirical evidence that certain organizational factors lead to a CVC unit's survival (Hill and Birkinshaw, 2008; Hill et al., 2009; Hill and Birkinshaw, 2014). Over time CVC units endured a massive change in their average longevity, the nadir being 2.2 years in the 1990s (Dushnitsky,

2012). Gompers and Lerner (1998) indicated that CVC units are susceptible to closure especially in their early years of operation. Lacking valuable longitudinal data, we believe that the survival and failure of CVC units over the different stages in their life cycle has gone largely unresearched. It could be argued, that CVC units need different abilities, knowledge and practices depending on the age of the unit and their legitimacy within the organization and that these abilities and resources must change over time. We encourage scholars to analyze the interrelations of these aspects in detail.

It could further be argued that the longevity of CVC units is less dependent on organizational factors such as practices, processes and structures but rather on individual or collective top management decisions in the corporate parent. Accordingly, this would require investigations in the field of top management. Future scholars could, for instance, analyze whether the mere changes in the top management already result in opening or closure of CVC units. By applying upper echelon theory they could further examine whether certain top management characteristics lead to the opening, maintenance or termination of CVC activities (please see theory section below). Moreover, the interrelations between corporate parent's top management characteristics and CVC unit's practices, processes and structures could be investigated in more detail in upcoming work.

Second, according to the 2015 Crowdfunding Industry Report, global crowdfunding activities surged from \$2.7 billion in 2012 to \$34.4 billion in 2015 (Massolution, 2015). What impact will this development have on the VC industry, specifically CVC endeavors? It basically seems to be a question of substitutes or complements. Arguably, crowdfunding might supply the much-needed seed capital to bridge funding shortfalls in early finance and might even positively affect the probability of future (C)VC money, for previously financed start-ups have proven more likely to manage additional finance rounds. By contrast, a better informed and more trans-



parent market of crowdfunding could well make it possible to fund more and even better investment opportunities than the CVC investor can. Moreover, while investment syndicates consisting of VCs and CVCs are relatively well understood (Keil et al. 2010; Hallen et al. 2014), little is known about constellations in which CVCs have to coordinate with a crowd as a further investor. Future research could thus investigate whether and how CVCs could adapt to those changes in the investment industry.

The third possibly enlightening area in need of future research is the context in which CVC activities are embedded and which might affect the structures and processes of the CVC units as well as the likelihood of their success. For instance, the lack of CVC research at the country level has been noted since Dushnitsky (2012), but we were able to identify only one study that explicitly investigated specific country-related characteristics (Da Gbadji et al. 2015). Contradictory findings on the context of CVC activities also call for explanation. Dushnitsky (2012), for example, concluded that the U.S. CVC market has experienced four CVC waves; Soluk and Landau (2016) found evidence of only two waves for Germany. Is this difference caused by dissimilarities in business cycles, by the level of innovation activities in the country, or by other conditions in the local environment (e.g., Da Gbadji and Schwienbacher, 2015)?

Fourth, there is an interesting body of work by researchers who have analyzed CVC as a means of accelerated market entry (Kann, 2000) or as an option to expand present markets (Birkinshaw et al. 2002; Chesbrough, 2002; Kann, 2000; Keil, 2002; Sykes, 1986). We also note that big players such as General Electric are entering emerging markets. With those two observations in mind, we encourage scholars to investigate the potential of established corporations to accelerate their entry into emerging markets by means of CVC. Future scholars could investigate whether current CVC practices and mechanisms are successful or rather need adjusting in the often challenging institutional contexts in which they are applied.

Fifth, connected but not limited to these emerging markets is a new and rarely observed phenomenon: the use of CVC in the social sector. Given the world's pressing social needs, innovative solutions are sought for scaling social impact (Kröger and Weber, 2014). Like new commercial ventures, social enterprises seek financial and nonfinancial support to grow. To meet that demand, a market for corporate social venture capital could emerge in the near future. We encourage scholars to investigate the conditions under which established corporations could be willing and able to invest in social entrepreneurial ventures, particularly in underdeveloped markets.

Sixth, our literature review reveals a great deal of homogeneity regarding industry and corporate characteristics in the sense that CVC is typically affiliated with very large industrial companies. The authors of the studies covered in this article have reasonably analyzed empirical data limited to those kind of organizations (e.g., Alvarez-Garrido and Dushnitsky, 2016; Da Gbadji et al., 2015). Whereas small CVC programs might not exhibit internal credibility (Allen and Hevert, 2007), medium-size companies, like large corporations, suffer from building new capabilities, fostering strategic renewal, and increasing profits by expanding into domestic and international markets. Accordingly, we argue for studying the potential of medium-size organizations to establish a CVC program and for examining ways in which such programs could be integrated into these firms. Such research would make it possible to understand not only whether current CVC knowledge is transferable to various firm sizes but also whether and how often the different ownership structures (e.g., family business) influence CVC practices and performance.

### **2.4.2 Theories**

Recalling our descriptive findings from the beginning, in 58.8% of the CVC studies investigated there have been valuable theoretical lenses applied. The fact that learning theories were dominant reflect that knowledge transfer and other strategic goals are primary motivations for

corporations to engage in CVC activity (Winters and Murfin, 1988: e.g.). In 41.2% of the empirical studies in our systematic review no clear theoretical foundation could be found. The fact that the earliest CVC research consisted mainly of descriptive publications does not entirely account for this absence of attention to sound theory-building, for many publications after 2010 likewise lack clear theoretical foundations. This void complicates efforts to connect empirical findings on CVC to related disciplines such as strategic management and entrepreneurship. To overcome these shortcomings, we suggest the use of additional theories that may advance the understanding of the CVC phenomenon.

**Upper Echelon Theory.** Referring to the suggestions made in the content section, we see great potential to apply upper echelon theory (Hambrick and Mason, 1984) to the field of CVC research. Building on the theory's proven major assumption that top management's background characteristics such as values and cognitive bases impact strategic choices and behavior it can very well be argued that both the survival and failure of CVC units over time as well as the CVC unit's overriding positioning, legitimacy, and governance can be explained either by fluctuation in the top management team or by individual or collective top management decisions that, in turn, are impacted by the top managers' background characteristics. Our systematic literature review did not disclose any study in the field of CVC applying upper echelon theory and investigating these (inter-) relationships. We hence strongly urge future scholars to make this link in order to explain new CVC engagement, CVC maintenance (survival) or CVC termination (failure). Moreover upper echelon would allow new antecedents to enter into the current models trying to explain CVC units' overriding positioning (financial vs. strategic), governance (dependent vs. independent) etc..

**Configuration Theory.** A common approach to conceptualizing different CVC initiatives has been to develop typologies, this is to categorize what seem to be myriad different objectives

and processes into distinguishable patterns or archetypes. The idea of such archetypes or configurations stems—beside other advocates—from Miller and Mintzberg who argue that “commonly occurring clusters of attributes . . . are internally consistent, such that the presence of some attributes can lead to the reliable prediction of others.” (Miller and Mintzberg 1983: 57). To bring this idea of internal consistency into the CVC discourse, Hill and Birkinshaw (2008) were the first who empirically applied configuration theory to the CVC context thereby advancing previous conceptual work on this topic (Birkinshaw et al. 2002; Chesbrough, 2002; Weber and Weber, 2005). Hill and Birkinshaw (2008), Souitaris and Zerbinati (2014), and Souitaris et al. (2012) suggested the use of configuration theory to help systemizing the different types of CVC engagement as well as CVC units and to explain different performance outcomes and survival. Two central assumptions of configuration theory are that of equifinality and that of internal consistency. This means that “two or more organizational configurations can be equally effective in achieving high performance” (Fiss, 2007: 1181) and that each configuration consists of congruent, mutually supportive elements (Miller, 1992). Configuration theory significantly advanced the first explorations of this topic in the early 2000s (Birkinshaw, van Basten Batenburg, and Murray, 2002; Chesbrough, 2002; Weber and Weber, 2005) and laid a theoretical foundation for the various different types of CVC programs described so far. However, these appealing configuration theoretical ideas have not yet been well transferred to empirical models, and the subsequent typologies presented so far have suffered from a lack of complexity in their empirical methods. This holds as despite the valuable insights of existing empirical studies on the subject all adopted a standard regression method and are, hence, severely limited and not sufficiently complex because regression analysis is unable to depict equifinality (Drazin and van de Ven, 1985). Thus the appealing theoretical idea of equifinal and internally consistent archetypes that are more likely to succeed has not yet been satisfactorily implemented. We thus encourage CVC scholars to undertake more nuanced and more complex typological research in

this field to identify those highly context specific clusters, with an inherent consistent logic and well-defined relations between the variables that are particularly successful (Mintzberg, 1989). Such research would not only advance management theory but also and in particular contribute to CVC practitioners' knowledge. In addition, it is obvious that the results of a configuration theoretical study could be substantially advanced by applying more appropriate methods. We thus urge CVC scholars not only to increase their use of configuration theory to strengthen typological research but also to apply it more thoroughly than hitherto by employing new methods such as qualitative comparative analysis (QCA) (please see method section below).

**The Relational View of the Firm.** CVC researchers have argued in favor of regarding CVC investments as boundary-spanning activities or interfirm relationships (Weber and Weber, 2011) involving the incumbent with its CVC unit and its business units on the one hand and the young innovative venture into which the CVC unit is invested on the other hand. A promising theoretical approach that focuses on the analysis of such dyadic relationships is Dyer and Singh (1998) relational view. By making the dyad the unit of analysis, the relational view suggests that there are elements within this dyad (i.e., specific to the relationship, not to the individual parties) that result in jointly generated supernormal returns, or relational rents. CVC scholars have seldom investigated the relationship between CVC investor and PC from a dyadic perspective. Only a very few notable exceptions have aimed to deepen the understanding of the CVC-PC relationship by applying the relational view and providing empirical evidence (Weber, Bauke, and Raibulet, 2016a; Weber, Raibulet, and Bauke, 2016b; Maula, Autio, and Murray, 2003; Mesquita, Anand, and Brush, 2008). Future CVC research could complement knowledge about this particular interorganizational relationship by using this dyadic lens at an even higher power of resolution.

**Social Network Theory.** Noting that the CVC unit and the business units (both parts of the incumbent) represent independent actors with at least partly diverging interests, Weber and

Weber (2011) took the idea of a dyad further. They argued that the CVC constellation actually rather consists of a triad. However, Weber (2009) and Weber and Weber (2011) have been the only studies to investigate this small network configuration. Given the encouraging initial results of that work, we see potential in further research on such triads or small networks from the social network theory lens. Scholars exploring future avenues of investigation could, for instance, conduct a detailed cost-benefit analysis of the costs of building, maintaining, and coordinating those networks. This approach would hone precision in evaluating effective value added for both the PC and the corporation as a whole, including CVC unit and business units.

Moreover, social network theory seems extremely valuable to advance Anokhin et al.'s (2011) promising study on costs and benefits of syndicates and to further investigate CVC units' trade-off of being a good syndication partner that shares and receives relevant knowledge and resources on one hand and on the other hand to restrain the own corporation's knowledge thereby protecting its innovation potential and competitive advantage (Larsson et al., 1998).

**Business Models.** The peculiarities of the CVC context may be pivotal as a starting point for contributions to the discussion on business models (c.f. Zott, Amit, and Massa, 2011, 2011, for a comprehensive literature review). Amit and Zott (2001), one of the strategic management articles cited most in the last decade, categorized business models into four dominant design-related topics to explain organizational performance: lock-in, complementarities, novelty, and efficiency. Extending their work, some research has since focused on the empirical evidence of this framework's specific aspects (Zott and Amit, 2007, 2008; Brettel, Strese, and Flatten, 2012; Wei *et al.*, 2014). Because equity investments that large industrial organizations make in entrepreneurial ventures are often intended to foster synergies between the complementary corporate parent and the PC, it seems purposeful to continue investigating the CVC context to discern the impact of their potentially complementary business models.

### 2.4.3 Data and method

Initially, we encourage the use of new data sources in all directions of future CVC research. Although Dushnitsky (2012) and Maula (2007) have already mentioned the need for broader methodological approaches, we still found that nearly 61% of the 102 publications were based at least partly, if not entirely, on the VentureXpert database. Because data on PCs that do not go public are usually unpublished, heavy reliance on comprehensive datasets is a challenging shortcoming in academic research in this area. Haltiwanger *et al.* (2017), for instance, compared two long-standing databases—VentureXpert and Venture Source—and found major inconsistencies over the last decade. These discrepancies reflect the incomplete “reporting” of the investments in the funds, the relative lack of disclosure, the deterioration in data quality, and changes in the name of the firms. The authors also found that status coverage declined sharply over time, potentially because of an investment cutback. To overcome these weaknesses and facilitate comparative academic research, we encourage scholars to keep developing new data sets, including a greater heterogeneity of organizations in terms of country- and company-level characteristics (Haltiwanger *et al.*, 2017). Despite the potentially high costs, it is essential to capture a realistic picture of CVC worldwide.

Given the multifaceted studies on performance implications and the description of inconsistent results regarding major questions in the field of CVC research, we invite future research to untangle these findings. For example, Pahnke *et al.* (2015) reported a negative relationship between CVC investment and the patents taken out by start-ups, whereas Alvarez-Garrido and Dushnitsky (2016) reported a positive impact. This seeming contradiction is somewhat surprising because the two sets of authors operationalized their key variables almost identically. We suggest that scholars resolve such discrepancies by using—either quantitative meta-analyses in the field of CVC or investigation of the underlying mechanisms (e.g., mediation or moderation effects) explaining those contradictions. Such research could also fruitfully investigate how the

various potential influencing factors discussed in the field, such as CVC experience, investment strategy, and strategic fit (e.g., Thornhill and Amit, 2001), differently affect the different levels of investigation (parent, CVC unit, start-up). In other instances these inconsistent results are likely a result of measuring the same variable in different ways. For instance, the discussion of financial performance encompasses many indices, such as financial returns (Benson and Ziedonis, 2010), Tobin's Q (Yang, Narayanan, and De Carolis, 2014), and self-developed measurement scales (Hill and Birkinshaw, 2008). This heterogeneity of the measures makes it hard to reconcile the different results and thereby slows cumulative progress in the field. We thus encourage scholars to avoid introducing additional idiosyncratic measures and instead to build on established measures in order to ensure comparability of results and bring the field forward as a whole. This approach would also facilitate meta-analyses which depend on comparable measures and inconsistent findings in the field, either quantitative meta-analyses in the field of CVC or investigation of the underlying mechanisms explaining those contradictions.

In order to expand previous work such as that by Hill and Birkinshaw (2014), who focus on the corporate/CVC unit only, we ask for analysis of whether and, more important, under which circumstances CVC provide value to the three parties involved. Given the lack of deep comparative and contrastive examinations, we recommend that academics also apply new methods like QCA, according to which a given outcome is due not to a single condition but rather a set or bundle of conditions (Rihoux and Ragin, 2009) and that is therefore "uniquely suitable for testing typological and configurational theory" (Fiss, 2011: 401). Because antecedents, internal processes, and outcomes have been mainly investigated separately, QCA would enable new insights into and progress on CVC complexity. That is, QCA could, for instance, identify all possible distinct combinations, or configurations, of predictor variables (e.g., innovativeness, objectives, and regional context) that lead to the specific outcome (performance or survival).



## 2.5 Limitations

Despite the contributions by our systematic review of CVC literature, it has its limitations. First, we used only one database, so relevant papers might have been overlooked. We have tried to compensate for this possibility by manually scanning all CVC-relevant journals and incorporating all relevant articles listed in all the bibliographies of the papers in our initial sample. Second, our systematic literature review includes only publications with an impact factor higher than one so as to cover the key perceptions germane to the CVC discussion (c.f. *Table A1* for a summary of the publications included in the systematic literature review). The use of another impact-factor threshold would have yielded a different number of publications and might thereby have affected our contributions. Third, our sample is restricted to published work, so it is possible that this selection of publications have biased our findings.

## CHAPTER 3: A META-ANALYSIS ON CVC PROGRAM PERFORMANCE

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### 3.1 Introduction

Corporate venture capital (CVC) investments can be understood as minority investments in entrepreneurial ventures made by established companies (Maula, 2007; Drover *et al.*, 2017). CVC activities include three parties: (1) the corporate firm (also referred to as corporate parent, corporate investor and incumbent) and its business units, (2) the CVC unit acting as broker and facilitator between the relevant business units of the incumbent firm and the new ventures (Weber, 2009), and (3) the new venture. CVC gained importance as a way to promote interorganizational learning and innovation, and as representing a promising source for new ventures looking for investment. According to the 2019 global CVC report (CB Insights, 2019) the amount of CVC deals as well as the amount of financial resources invested reached an all-time high in 2019. 259 newly active CVC investors entered the market in 2019. With the increasing importance of CVC in business practice also the interest of researchers intensified, resulting in a continuously increasing number of empirical studies in this research area. CVC supports industrial entities to explore and exploit new knowledge and capabilities, and to strategically renew and achieve financial and, in particular, strategic objectives by tapping into new ventures knowledge bases. This triangular structure of external CVC activities lends CVC programs to an interorganizational relationship (IOR) perspective (Weber *et al.*, 2016a; Dushnitsky and Shaver, 2009; Weber and Weber, 2011). IORs refer to multifaceted relationships between one or more organizations (Parmigiani and Rivera-Santos, 2011). IORs are of central importance in

sharing and exchanging resources between different organizations, and are related to numerous benefits (Barringer and Harrison, 2000; Oliveira and Lumineau, 2019). Thus, the IOR perspective allows us to account for the specific nature of CVC programs and to examine the complex interrelations between the three parties involved and their economic outcomes (Dushnitsky and Shaver, 2009).

In their meta-review on IOR, Parmigiani and Rivera-Santos (2011) conclude that the main objective of any IOR is exploring and/or exploiting, regardless of its precise organizational form. Building on March's (1991) seminal framework, Parmigiani and Rivera-Santos (2011) provide a holistic framework with several pre-defined characteristics to suggest two pure forms of IORs: co-exploration and co-exploitation. Given that CVC investments represent one appearance of IOR, those two pure forms should also be applicable to the CVC context.

Investigating CVC literature, to date, some scholars focus on examining the exploratory role of CVC investing: How CVC can provide windows on technology (Dushnitsky and Lenox, 2006), build options for future licensing, alliances, acquisitions, new market entries (Wadhwa and Phelps, 2011), and/or promote entrepreneurial culture (Kanter, 1985). Corporate investors conduct explorative investments in new ventures when there is little or no strategic overlap and, thus, unfamiliar knowledge (Wadhwa and Basu, 2013). In contrast, exploitative investments are typically made in new ventures characterized by a strategic overlap with the corporate investor and, therefore, a high degree of familiar knowledge. In addition, we find literature investigating both the explorative and exploitative purposes of CVC investments (Tidd and Taurins, 1999; Schildt *et al.*, 2005; Hill and Birkinshaw, 2008; Keil *et al.*, 2008b; Hill and Birkinshaw, 2014).

With their CVC programs, corporations typically aim for both financial and strategic objectives (Keil, 2000; Dushnitsky and Lenox, 2006). In times of innovation pressure the strategic motivation typically represents the main motive for corporations to conduct CVC investments

(Birkinshaw *et al.*, 2002; Basu and Wadhwa, 2011). Because the specific explorative and/or exploitative orientations of corporate investors vary, the respective outcomes of their CVC investments also vary. Lee *et al.* (2018) conclude that, “in order to achieve the desired performance outcome of CVC programs more efficiently, corporate investors need to choose an appropriate method of structuring and operating their explorative or exploitative investment organization” (p. 142). Following this line of arguments, the capability to simultaneously maintaining explorative as well as exploitative activities, known as ambidexterity (Hill and Birkinshaw, 2014), represents an important driver of firm performance (Tushman and O'Reilly, 1996; Gibson and Birkinshaw, 2004). However, CVC research on exploration and exploitation is rare and still in its infancy (Hill and Birkinshaw, 2014; Jeon, 2017; Chang *et al.*, 2018; Rossi, Festa, Papa, Scorrano, 2019). Consequently, there is a research gap to investigate both the explorative and exploitative nature of CVC activities (Lee *et al.*, 2018; Hill and Birkinshaw, 2014).

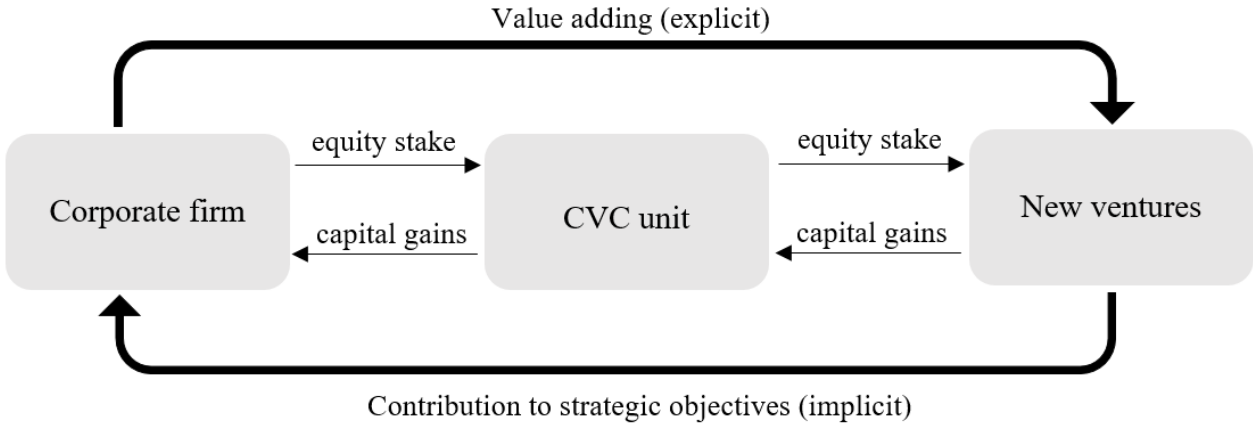
Given this research gap, the main objectives of this study are (1) to identify the key characteristics of an explorative and an exploitative orientation of external CVC programs and (2) to examine how these key characteristics affect the performance of CVC programs. Our study makes three contributions to the literature. First, we contribute to CVC research by providing a more nuanced examination of the explorative and exploitative nature of CVC, thereby answering various calls. Second, we contribute to the research on CVC performance by reconciling previous inconsistent findings regarding CVC performance. We do so by differentiating the performance of the different parties involved in CVC programs. Third, we contribute to the literature on interorganizational-relationships by applying Parmigiani and Rivera-Santos' (2011) holistic IOR framework to the CVC context.

### 3.2 Theoretical overview

#### 3.2.1 Performance outcomes of CVC activities

Organizational performance is the most essential outcome in strategic management research in general (Bettis *et al.*, 2016). The organizational performance of the involved CVC parties also plays an important role in CVC research (Siegel, Siegel, and MacMillan, 1988). In the last decades, researchers have examined the influence of manifold aspects on the various performance outcomes of the parties involved in CVC programs (Dushnitsky, 2012). However, it is important to distinguish between the performances outcomes of the three parties involved in a CVC program, because those performance outcomes may vary within that CVC program. *Figure 6* shows the general structure of a CVC program (Ernst, Witt, and Brachtendorf, 2005), followed by a brief overview of CVC performance outcomes for the parties involved.

*Figure 6: Typical structure of CVC programs*



*Performance outcomes of the corporate firm.* CVC engagement and its outcomes for the corporate firm have been examined in a relatively high number of CVC studies (when compared to the overall number of CVC studies that have examined CVC outcomes). The majority of

these studies have examined the influence of CVC activities on strategic and financial performance. While financial performance refers to a firm's efficiency, considering indicators such as sales growth, profitability, and costs, the strategic performance refers to a firm's market share and its competitive position (Zou and Cavusgil, 2002).

The studies dealing with strategic performance can be broadly summarized into four different categories: External relationships, strategic proximity, involvement with new ventures, and the investment portfolio structure. External relationships (i.e. with independent VCs) seem to be positively associated with CVC programs' success as they provide access to investment opportunities as well as to knowledge (Hill *et al.*, 2009; Souitaris and Zerbinati, 2014). The second category—strategic proximity—comprises the similarity of the knowledge base between the corporate firm and the new venture and has been argued to influence the incumbent's innovation output. When the knowledge bases are too similar, there is little knowledge that can be transferred to the incumbent, and innovation output slows down (Sapienza *et al.*, 2005). Likewise, investments in ventures with a moderately related knowledge base have a positive effect on the incumbent's innovation outcome (Keil *et al.*, 2008b). For the third category—involvement with the new ventures—previous studies point to a beneficial relationship between the involvement of the corporate firm with its new ventures and the strategic performance (Weber *et al.*, 2016a; Wadhwa and Kotha, 2006; Basu and Wadhwa, 2013).

The investment portfolio structure of CVC programs shows an inverted U-shaped relationship between the amount of ventures and the corporate's strategic performance (Wadhwa and Kotha, 2006), suggesting a maximum of CVC investments that can be managed effectively (Keil, 2004). Later, Wadhwa and Basu (2013) show that a higher involvement through alliances or board seats can decrease and even reverse the negative impact on the innovation outcome. More recent studies report an inverted U-shape impact of new venture portfolio diversity on the value

creation (innovation performance, financial performance) of corporate firms (Yang, Narayanan, and Carolis, 2014; Wadhwa, Phelps, and Kotha, 2016).

***Performance outcomes of the CVC unit.*** The CVC unit centers the activities of CVC programs. Previous studies have used various measures to assess CVC unit performance, such as internal rate of return (IRR) (Allen and Hevert, 2007; Hill and Birkinshaw, 2008; Hill *et al.*, 2009), return on investment (ROI) (Weber *et al.*, 2016a), the non-liquidation of investments (Gompers and Lerner, 1998; Maula and Murray, 2002), the number of investments or IPOs (Gaba and Meyer, 2008; Dokko and Gaba, 2012a; Gaba and Dokko, 2016), knowledge exchange and learning (Weber and Weber, 2011; Basu *et al.*, 2016a), and other proxies that combine some of the measures above (Weber *et al.*, 2016a; Hill and Birkinshaw, 2008; Hill *et al.*, 2009). In addition to these performance measures, the survival of CVC units represents a precondition for performance and can be seen as a proxy for long-term success (Hill and Birkinshaw, 2014; Fischer *et al.*, 2019).

Some CVC units pursue the strategic or financial objectives of their parent company by orienting themselves towards their independent VC counterparts. Doing so, CVC units can achieve strategic or financial objectives by various aspects, such as high-powered incentives, organizational autonomy, investment syndication, investment staging, and specialization (Hill *et al.*, 2009). As a precondition of CVC unit's performance, the CVC unit's survival can be positively influenced by fostering an ambidextrous orientation (Hill and Birkinshaw, 2014). Furthermore, on the individual level of top management teams, Fischer *et al.* (2019) report, that certain combinations of several agency related factors (carried interests, decision-making autonomy, strategic fit, and strategic support) have an impact on the survival of CVC units.

***Performance outcomes of the new venture.*** The new venture perspective is important to complete the picture and to fully understand the CVC context (Drover *et al.*, 2017). Therefore, a

stream of literature has examined the performance implications of CVC activities for the new ventures. This literature stream uses various performance dimensions, such as market share, sales, and return (Weber and Weber, 2007; Bertoni, Colombo, and Croce, 2010), venture valuation (Gompers, 2002; Ivanov and Xie, 2010b), the probability of going public (IPO), bankruptcy, or acquisition (Gompers and Lerner, 2000b; Park and Steensma, 2012), IPO underpricing (Ginsberg, Hasan, and Tucci, 2011; Wang and Wan, 2013), intellectual property outcomes (Pahnke *et al.*, 2015; Alvarez-Garrido and Dushnitsky, 2016), knowledge exchange and learning (Weber and Weber, 2011; Maula, Autio, and Murray, 2009), and the intensity to internationalize (LiPuma, 2007).

Research investigating financial benefits for new ventures that receive financial and non-financial resources from CVC has a history for 20 years (Gans and Stern, 2003). As with financially oriented VC investors, CVC backing has signaling effects on other stakeholders, such as the acknowledgement of the venture's technology and the team quality (Stuart, Hoang, and Hybels, 1999). Comparing the benefits of new ventures collaborating with CVCs and VCs, new ventures can clearly benefit more from CVCs. For instance, collaborating with CVCs leads to accelerated IPOs (Gompers and Lerner, 2000b; Gompers, 2002), and a higher likelihood to be acquired or to go public (Gompers and Lerner, 1998; Santhanakrishnan, 2002). However, the higher IPO probability seems to be more relevant for new ventures that require specialized complementary assets (Park and Steensma, 2012).

In addition, Park and Steensma (2013) show that corporate investors select ventures with superior innovation capability and are more able than independent VCs to nurture the venture further. This nurturing seems to be particularly powerful if there is a technical fit between the two partners because corporate investors operating in the same sector as their ventures possess superior industrial and technological knowledge, which enables them to better develop their entrepreneurial ventures' technologies, products, and markets. In the same vein, Weber and



Weber (2007) investigated knowledge transfer between the corporate firm and the venture. The authors examine the “relational fit” between the incumbent firm and the venture on their inter-organizational knowledge transfer, and its effect on the new ventures performance. The relational fit, referring to knowledge sharing routines, cooperation, emotional fit, and trust, increases the interorganizational knowledge transfer between the parent and the venture, leading to higher venture performance in terms of sales, sales growth return, and market share.

In terms of strategic benefits, the patenting output of a new venture seems to profit from the venture’s ability to exploit the corporate entity’s assets. Moreover, new ventures benefit from geographic proximity facilitating the access to R&D resources Alvarez-Garrido and Dushnitsky (2016). In terms of the right timing of CVC investments, startups profit from higher innovativeness, if CVC investments immediately follows initial VC funding (Park and Bae, 2018).

Besides the positive effects, some findings suggest negative effects on new ventures’ performance. For instance, CVC programs come with a unique organizational structure and often limited decision-making autonomy. Therefore, bureaucratic corporate processes can inhibit ventures’ access to the corporate’s valuable resources, thus restraining or reducing the speed of innovation (Weber and Weber, 2011). The same formal governance processes can prevent ventures from collaborating with external partners that compete with the incumbent’s products or services (Ivanov and Xie, 2010b), leading to different types of undesirable lock-in effects (Weber and Weber, 2011). Summarizing, empirical evidence of CVC activities on venture performance shows no consensus and has led to inconclusive findings. For instance, there are confounding results in different industries regarding the relationship between CVC investments and the innovation performance of start-ups. Pahnke *et al.* (2015) report a negative relationship within the minimally invasive surgical device industry, whereas Alvarez-Garrido and Dushnitsky (2016) found a positive association within the biotechnology industry.

### 3.2.2 Exploration and exploitation in the CVC context

In his seminal work, March (1991) has suggested to distinguish between the exploration of new possibilities and the exploitation of old certainties as they represent two pure and distinctive activities of organizational learning. According to March (1991) exploration is understood as "...search, variation, risk taking, experimentation, play, flexibility, discovery, innovation," whereas exploitation is related to "...refinement, choice, production, efficiency, selection, implementation, execution." (p. 71). Both exploration and exploitation are important strategies that affect the survival and prosperity of (March, 1991).

The search for new knowledge and learning about novel technologies and opportunities, as in CVC, lies at the core of venturing activities (Dushnitsky and Lenox, 2005b). Accordingly, March's framework has gained scholarly attention in CVC research (Keil, 2001; Hill and Birkinshaw, 2008; Wadhwa and Basu, 2013; Hill and Birkinshaw, 2014; Basu *et al.*, 2016a; Jeon, 2017; Titus, House, and Covin, 2017) and a growing number of CVC studies empirically investigate the effects of explorative and exploitative CVC investment activities (Keil, 2001; Dushnitsky, 2004; Birkinshaw and Hill, 2005; Schildt *et al.*, 2005; Dushnitsky and Lenox, 2006; Benson and Ziedonis, 2009; Yang, 2012). This research has examined the notion of exploration and exploitation from four different perspectives: First, prior studies on exploration and exploitation contrast and compare CVC with other forms of IOR. For instance, Schildt *et al.* (2005) analyze the antecedents of explorative and exploitative learning and compare lower integrated modes of IORs (e.g., CVC, alliance, and joint venture) with higher modes (e.g., acquisition). They found that lower integrated modes influence exploration-oriented learning stronger than do higher integrated modes. In industries with higher levels of technological dynamism that are characterized by higher levels of R&D intensity, lower integrated modes are preferred (Titus *et al.*, 2017).

Second, other studies examine the notion of exploration and exploitation as an independent variable respectively as an antecedent of CVC investing (Hill and Birkinshaw, 2008; Wadhwa and Basu, 2013; Titus *et al.*, 2017). Wadhwa and Basu (2013), for instance, found an inverted U-shape between the degree of exploration and the amount of CVC investing.

Third, still other studies examine exploration/exploitation as an outcome. For instance, Lee *et al.* (2018) investigate the relationship between the level of structural autonomy and the exploration and exploitation performance (outcome) of the corporate incumbent. They refer to a positive relationship with the explorative innovation performance but a negative relationship with the exploitative innovation performance.

Finally, a limited number of CVC studies has focused on ambidexterity—the “right” balance between explorative and exploitative behavior—and how it affects the performance and survival of corporate venturing (Hill and Birkinshaw, 2008, 2014; Jeon, 2017; Chang *et al.*, 2018; Rossi, Festa, Papa, Scorrano, 2019). For instance, Hill *et al.* (2014) show for the extant corporate venturing context (internal and external CVC) that fostering an ambidextrous orientation (high exploration and high exploitation) positively impacts a CVC unit’s survival. This finding is in line with the general literature on ambidexterity stating that the a balance between exploitation and exploration is crucial for the firm performance and firm’s survival (March, 1991; Levinthal and March, 1993)

In summary, research on exploration and exploitation in the CVC context is still in its infancy. Accordingly, some authors allude the lack of knowledge in this field, as “CVC research provides little insight into the outcomes of taking exploitation and exploration initiatives in CVC investing” (Jeon, 2017: 21). They suggest continuing to investigate the explorative and exploitative nature of CVC activities (Lee *et al.*, 2018), and to “more directly examine actual levels of exploration and exploitation demonstrated by CV units” (Hill and Birkinshaw, 2014: 1925). Rossi, Festa, Papa, and Scorrano (2019) even state that right balance between exploration and

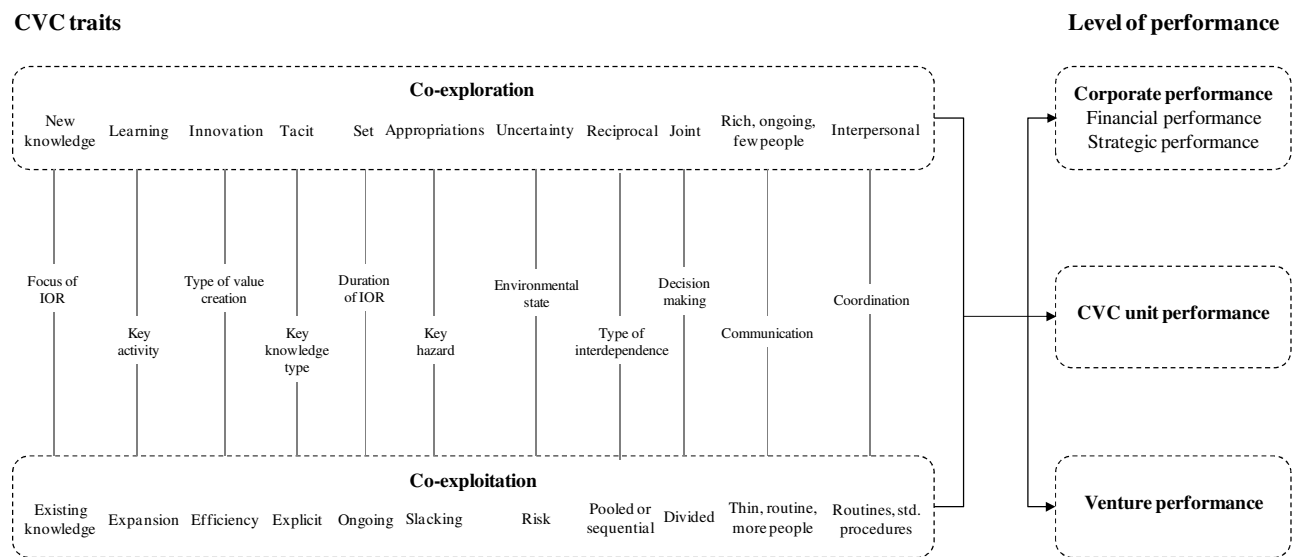
exploitation (ambidexterity) “has so far attracted little research, even though [...], this is an interesting topic that requires particular attention because there is not a systematic comprehensive theory, and overarching comprehensive models have rarely been proposed.” (p. 3).

### 3.3 Theoretical framework and hypotheses

Building on March’s (1991) seminal framework and to identify two “pure forms” of IORs: co-exploration and co-exploitation, Parmigiani and Rivera-Santos (2011) provide a holistic IOR framework with eleven pre-defined characteristics, namely *focus of IOR, key activity, type of value creation, key knowledge type, duration of IOR, key hazard, environmental state, type of interdependence, decision making, communication, and coordination*. We evaluated those traits and their characteristics in the context of CVC to allocate suitable variables. Based on the specifics of CVC programs and the three parties involved (parent corporation, CVC unit, ventures), we slightly adjusted Parmigiani and Rivera-Santos’ (2011) framework which provides a depth of details that allows us to allocate all the numerous CVC characteristics that have been examined to date (e.g., industry overlap, firm size, CVC experience, and syndication). We removed one distinctive trait (“duration of IOR”) from the framework that seems not applicable.

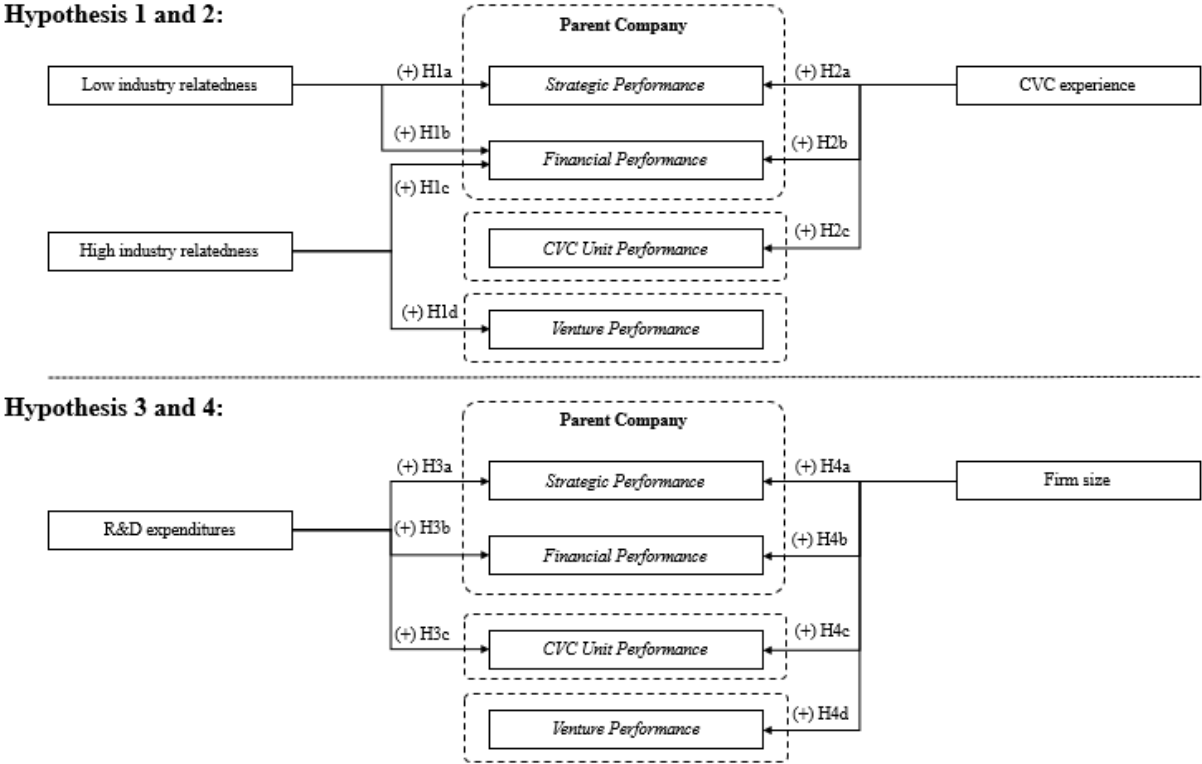
By transferring March’s framework into the context of CVC, we not only structure but also advance the work of former studies on exploration and exploitation (Schildt *et al.*, 2005; Hill and Birkinshaw, 2008, 2014; Jeon, 2017; Chang *et al.*, 2018; Rossi, Festa, Papa, Scorrano, 2019). Doing so allows us to draw more robust conclusions on whether related explorative and exploitative traits result in favorable economic outcomes for some, all, or none of the parties involved in CVC programs.

**Figure 7: Conceptual framework**



One objective of this study is to dissolve inconsistent findings. Thus, we focus on those variables and their mixed findings in the CVC literature that seem to be particularly essential. We declare variables as “essential” if they represent common and highly used variables in CVC research, namely *industry relatedness*, *CVC experience*, *R&D expenditures*, and *firm size*. In the following, we theoretical deduced four hypotheses considering several effects on the distinct performance level of the corporate firm, CVC unit, and the venture. *Figure 8* shows the conception model and gives an overview of all hypotheses:

Figure 8: Conceptual model



*Industry relatedness* refers to the degree to which ventures and corporates operate in the same, in related or in entirely different industries (Schildt *et al.*, 2005; Hill *et al.*, 2009). It is a common variable in the interorganizational learning literature (Schildt *et al.*, 2005). When studying the relationship of CVC investments with industry relatedness and corporate performance, CVC literature indicates inconsistent findings. Some studies find a positive impact (Schildt *et al.*, 2005), while others do not find any significant or even a negative relationship (Dushnitsky and Lenox, 2005a). Literature on external corporate venturing modes, such as mergers and acquisitions, exposes the creation of synergies as a crucial component to create value (Larsson and Finkelstein, 1999). Those synergies can be derived from related as well as unrelated parties (Seth, 1990). While relatedness facilitates the transfer of resources between the partners, resource transfer in unrelated relationships is complicated and provides specific benefits to only those partners capable of accessing the resources (Cohen and Levinthal, 1990; Harrison *et al.*,

1991). Partners in related industries have similar and therefore familiar knowledge. They increase their exploitative potential by enhancing efficiency and productivity (Lee *et al.*, 2018). In spite of that, a knowledge base that is too much alike will only extend and refine the current knowledge base (Schildt *et al.*, 2005; Wadhwa and Basu, 2013), limit the learning outcome between the partners (Sapienza *et al.*, 2005) and lead to less innovation outcome (Ahuja and Katila, 2001). Thus, the performance outcome of partners with highly related resources is poorly associated with high innovation performance (March, 1991; Levinthal and March, 1993; Tushman and O'Reilly, 1996). In contrast, partners with unrelated and, therefore, unfamiliar knowledge increase their explorative potential that is characterized by high uncertainty and less effective learning (Lee *et al.*, 2018). Those partners can create value by accessing novel ideas and nurturing innovative capabilities (Cefis, Marsili, and Rigamonti, 2020). In the long run, unrelated partnerships will lead to radical innovation and higher innovation performance (Shenkar and Li, 1999; Ahuja, 2000; Rosenkopf and Nerkar, 2001). Consequently, we expect a positive corporate's performance for exploitative investments in new ventures with a high industry relatedness and therefore predominantly familiar knowledge, and a positive corporate's performance for explorative investments in new ventures with little or no industry relatedness:

*Hypothesis 1a: Corporate firms' explorative investments in new ventures with low industry relatedness are positively associated with strategic performance.*

*Hypothesis 1b: Corporate firms' explorative investments in new ventures with low industry overlap are positively associated with financial performance.*

*Hypothesis 1c: Corporate firms' exploitative investments in new ventures with high industry relatedness are positively associated with financial performance.*

Aside from the benefits for the corporate firms, new ventures and how they benefit from relatedness has been examined by several studies (e.g., Alvarez–Garrido and Dushnitsky, 2015; Keil et al. 2008, Park and Steemsa, 2005). Considering the benefits stemming from industry relatedness, Park and Steensma (2018) found that a close relationship between corporate firm and venture helps the latter to get access to specialized assets. Weber and Weber (2011) found that industry relatedness enables the new venture to access industry-specific networks; this is to tap into the parent firms' social capital. This accessibility leads to higher innovation outcomes (Alvarez and Dushnitsky, 2016). Consequently, we derive a fourth hypothesis from the venture perspective:

*Hypothesis 1d: High industry relatedness between a corporate firm and a new venture is positively associated with high venture performance.*

*CVC experience* refers to a firm's experience in CVC activities, this is in one form of IOR that can help organizations to transfer and exchange knowledge. The benefits that go along with the CVC experience have been examined in several studies. CVC experience has been treated as dependent variable (Gaba and Meyer, 2008; Yang *et al.*, 2009; Dushnitsky and Lavie, 2010; Dokko and Gaba, 2012b; Wadhwa and Basu, 2013) and as independent variable, for it represents a common control proxy (Dushnitsky and Lavie, 2010) for time-variant influence on CVC engagement (Dushnitsky and Lenox, 2005a; Wadhwa and Kotha, 2006). Furthermore, CVC experience has been applied as a moderator (e.g. Dushnitsky and Lavie, 2010). CVC experience is usually considered to financially and strategically benefit CVC programs, as it leads to a strengthened position in the CVC market (Dushnitsky and Lavie, 2010), higher attractiveness for ventures (Dushnitsky and Lavie, 2010; Basu *et al.*, 2011), more CVC relationships (Basu *et al.*, 2011), higher proficiency (Keil, 2004), increased efficiency in management of investments (Dushnitsky and Lavie, 2010), better selection of new investment opportunities (Yang *et al.*,



2009), and higher visibility (Dushnitsky and Lavie, 2010). Hence, we posit a positive impact of CVC experience on the corporate firm's performance and on the CVC unit's performance, since CVC units closely work together with the business units to achieve the above mentioned benefits. Moreover, CVC units are generally accepted as knowledge broker that facilitate or enable the knowledge transfer between new ventures and the parent firm's business units (Weber and Weber, 2011) rather than benefiting themselves from the respective knowledge.

*Hypothesis 2a: CVC experience is positively associated with the strategic performance of the corporate firm.*

*Hypothesis 2b: CVC experience is positively associated with the financial performance of the corporate firm.*

*Hypothesis 2c: CVC experience is positively associated with CVC unit performance.*

*Internal R&D investments* refer to the amount of R&D expenditures. Internal R&D and CVC are both ways to generate new competences for the corporation. While internal R&D is a way to develop new technologies internally, CVC is a way to access new technologies through external investments in new ventures (Sahaym, Steensma, and Barden, 2010). Although, CVC investments may complement or substitute internal R&D activities, literature comes to a certain agreement that internal R&D has a positive effect on external IOR activity. This is, because R&D activity leads to higher awareness of beneficial and unfamiliar technology and increases the ability to utilize those technologies (Dushnitsky and Lenox, 2005a; Gompers and Lerner, 2001; Keil, 2002). The R&D budget can therefore be understood as one driver of the companies' absorptive capacity (Ceccagnoli *et al.*, 2018) that complements IOR (Kamien and Zang, 2000; Cassiman and Veugelers, 2002). Empirical findings in IOR and the related CVC literature support this notion of a complementary relationship (Dushnitsky and Lenox, 2005a; Keil *et al.*,

2008b; Sahaym *et al.*, 2010). More precisely, former research finds out, that the combination of internal knowledge creation (R&D) and external knowledge creation (CVC) leads to higher innovation performance (Dushnitsky and Lenox, 2005b). Consequently, we expect to see an effect not only on the corporate firm's financial and strategic performance but also on the CVC unit performance as complementary. Thus, we posit:

*Hypothesis 3a: R&D expenditures are positively associated with the strategic performance of the corporate firm.*

*Hypothesis 3b: R&D expenditures are positively associated with the financial performance of the corporate firm.*

*Hypothesis 3c: R&D expenditures are positively associated with the CVC unit performance.*

*Firm size* refers to how small or large a firm is – often measured by different firm characteristics, such as number of employees in the organization, market value, sales asset, profit, or market capitalization and, therewith, often referring to the total assets of a firm. By their very nature, larger firms have more strategic and financial resources that can be invested in CVC programs. Accordingly, authors emphasize beneficial arguments from firm size, such as higher patenting (Dushnitsky and Lenox, 2005b; Anokhin, Peck, and Wincent, 2016), higher (investment) resources (Dushnitsky and Lenox, 2005b; Basu *et al.*, 2011; Basu and Wadhwa, 2013), facilitated strategic change (Gaba and Meyer, 2008), and higher attractiveness as an investor (Dushnitsky and Shaver, 2009; Kim, Steensma, and Park, 2019). Grounded in these findings, we expect the firm size to positively affect the financial and strategic performance of the corporate firm.

CVC units are usually set up as wholly owned subsidiaries, they can either operate independently or tightly controlled by the corporate parent (Siegel *et al.*, 1988; Gompers and Lerner, 2001). Either-way, larger corporate firms with more, and more diverse resources can endow their CVC units respectively with higher investment funds, more staff, and higher compensation etc., and provide their CVC unit managers with access to the larger corporate resources (e.g., skilled experts, technical knowledge). We expect these effects to have a positive impact on the CVC unit performance. In accordance with Dushnitsky and Shaver (2009) we further assume that larger corporate firms that possess more resources, can also provide higher levels of support to their ventures, which will positively affect the ventures' performance. In addition, if the corporate firm can provide the precise support that is required by the new venture, both parties will benefit from higher performance (Weber *et al.*, 2016a). Therefore, we derive the following hypothesis:

*Hypothesis 4a: Firm size is positively associated with the strategic performance of the corporate firm.*

*Hypothesis 4b: Firm size is positively associated with the financial performance of the corporate firm.*

*Hypothesis 4c: Firm size is positively associated with the CVC unit performance.*

*Hypothesis 4d: Firm size is positively associated with the new venture performance.*

### 3.4 Methodology

#### 3.4.1 Literature search

Following best practice recommendations (Kepes *et al.*, 2013), we applied a five-step procedure to systematically search the literature and identify empirical studies that have examined the determinants of the economic outcomes of CVC. First, we consulted the reference sections of extant CVC literature reviews as well as of articles that included a detailed overview of existing CVC studies (Narayanan *et al.*, 2009; Dushnitsky, 2012; Leten and van Dyck, 2012; Basu *et al.*, 2016b; Drover *et al.*, 2017; Jeon, 2017; Röhm *et al.*, 2018; Röhm, 2018). Second, we searched several electronic databases (Ebscohost, Business Source Premier, Google Scholar, Proquest, Jstor, and Web of Science) and used variations and combinations of different keywords (e.g., “CVC” and “corporate venture capital”) to identify relevant CVC research. We complemented the database search with a search of Google and Bing using the same keywords to identify, for example, studies included in working paper series of universities (Cooper, 1998). Third, we conducted an issue-by-issue search and examined in-press and online first articles of a set of journals that have published CVC studies (*Academy of Management Journal*, *Entrepreneurship Theory and Practice*, *Journal of Business Research*, *Journal of Business Venturing*, *Strategic Entrepreneurship Journal*). Moreover, we also searched conference proceedings (annual meetings of the Academy of Management and the Strategic Management Society as well as the Babson College Entrepreneurship Research Conference) to identify relevant studies. We searched the databases, journals, and proceedings from inception up to March 2019. Fourth, we contacted researchers working in this research area, asking for relevant unpublished papers and datasets, to elicit publicly untraceable research. We also contacted authors in the case of missing information in identified studies (e.g., missing correlation tables, etc.). Finally, we used Google

Scholar, Scopus, and Web of Science to search for appropriate studies citing the articles identified in the previous steps and also searched the reference lists of all identified articles to find pertinent articles (Cooper, 1998). We repeated the last step until no more relevant articles could be identified.

### **3.4.2 Inclusion criteria and coding procedure**

We evaluated the identified article for inclusion in the meta-analyses based on four selection criteria. First, in our meta-analysis we synthesize quantitative empirical findings of the studies that reported effect sizes and a samples size. When correlation coefficients were not available we used information that could be converted, such as *t*-statistics and beta coefficients (Lipsey and Wilson, 2001; Peterson and Brown, 2005). Hence, we excluded all studies based on a qualitative approach, e.g. studies based on case studies (e.g. Keil, 2004; Souitaris, Zerbinati, and Liu, 2012; Basu *et al.*, 2016a). Second, we only included studies in the meta-analysis that reported data for CVC and excluded all studies that reported inconsistent data, for example, data sets that include both CVC and internal venture capital, etc. (e.g. Hill and Birkinshaw, 2008; Dushnitsky and Shapira, 2010; Wang and Wan, 2013; Hill and Birkinshaw, 2014; Sahaym *et al.*, 2016; Titus *et al.*, 2017; Ceccagnoli *et al.*, 2018). Third, to ensure independence of samples included in the meta-analysis, we applied detection heuristics (Wood, 2008), to identify studies that are based on the same dataset. If several studies used the same dataset, we only included the article that reported most information or only included information for variables not reported in the other study. If a study was based on multiple samples (e.g., results are reported individually for samples from different countries), we used the respective correlation coefficients as if coming from separate studies. These criteria resulted in a sample of 43 studies that met our inclusion criteria and that contained sufficient information for analysis. These studies provide data from 43 samples and a total of 263,478 firms. The samples come from the time

range of 1969 to 2017. *Table B2* in the appendix presents a summary of all studies included in our meta-analysis.

Most of the studies focused on the U.S. (34 studies). The majority of studies have examined mixed industry samples (18 studies). Some of the studies focused on information and communication technology (ICT) firms (12 studies) and telecommunication (4 studies). Researchers have used various theoretical frameworks to examine the relationships between different determinants and CVC-related outcomes, such as the real options approach (6 studies), an organizational learning perspective (5 studies), and social networks theory (4 studies). 41 of the 43 studies used a sample time frame covering more than one year.

We followed the procedures recommended in the literature (Lipsey and Wilson, 2001; Kepes *et al.*, 2013) and coded the data based on a structured and standardized coding scheme. Based on this coding scheme two of the authors independently coded the studies for all dependent variables, all independent variables, the respective measures, effect size, sample size, geographic focus of the sample, publication status, year of data collection/sample period, industry focus, theoretical background, and the source of secondary data. Given the ambiguity of terminology in the CVC literature, instead of the original variable names used in the studies, we coded each study based on the definitions and measures of the variables provided in the measures section of the respective study. Any inconsistencies throughout the coding were resolved through discussion among the author team. We assessed intercoder agreement (Orwin and Vevea, 2009) using Cohen's kappa. The intercoder reliability across the different coding categories was .87, indicating a high intercoder agreement and exceeding the threshold of .80 (Perreault and Leigh, 1989).

### 3.4.3 Measures

**Dependent variables.** *Financial performance of the corporate firm.* In the CVC literature financial performance of the corporate firm is measured in various ways, such as financial returns (Benson and Ziedonis, 2010), Tobin's Q (Yang *et al.*, 2014), and self-developed measurement scales (Hill and Birkinshaw, 2008). Since financial performance is multidimensional we follow recent meta-studies (O'Boyle, Pollack, and Rutherford, 2012) and include a variety of different measures that are related to accounting returns and growth (Combs, Crook, and Shook, 2005). This includes but is not limited to: Return on assets, liquidity, firm cash, income, sales growth, or Tobin's Q. Considering the high correlation of self-reported measures with objective criteria (Dess and Robinson, 1984), we also integrated subjective measures, such as the extent, to that a financial goal has been accomplished in the last financial year (Weber *et al.*, 2016a).

Regarding the *strategic performance*, the strategic motivations for organizations to establish CVC programs vary. Literature states various strategic interests like providing a window on new technologies, creating growth opportunities or nurturing an entrepreneurial culture (Dushnitsky, 2012). Since current studies predominantly rely on various measures, we included all of them in our analysis (c.f. *Table B1* in the appendix). Summarizing, for *strategic performance* measures we included patent counts, patent citations, patents/sales and further subjective measures (c.f. *Table B1* in the appendix). Our *CVC unit performance* measures include for example ROI, IRR, the number of IPOs, or similar measures. We measured *new venture performance* using IPO, patent citations, patent count, or sales (c.f. *Table B1* in the appendix).

**Independent variables.** We apply Parmigiani and Rivera-Santos' (2010) framework to the CVC context. We evaluated those traits and their characteristics in the context of CVC to allocate suitable variables. We included 34 independent variables that suited the traits of the framework. *Table B1* in the appendix provides a list of these variables and how they are measured.

### 3.4.4 Meta-analytic procedures

We analyzed the associations between determinants and outcomes using bivariate meta-analysis. We used Hunter and Schmidt (2004) approach to quantitatively synthesize the correlations reported in the identified primary studies. For each relationship we report the number of samples ( $k$ ), the total number of firms in the sample ( $N$ ), the sample size weighted average correlation ( $\bar{r}$ ), and the 95% confidence interval (CI). Confidence intervals that did not include zero indicate a significant average correlation. To assess the heterogeneity of effect sizes we calculated the  $Q$ -statistic and used the  $I$ -squared ( $I^2$ ) statistic to interpret heterogeneity (Huedo-Medina *et al.*, 2006).

Given the ongoing discussion whether and to what degree publication bias influences meta-analytic findings (e.g. Kepes *et al.*, 2012; Kepes *et al.*, 2013; Paterson *et al.*, 2016), we followed the recommendations in the literature (Harrison *et al.*, 2017) and used the trim-and-fill procedure (Duval and Tweedie, 2000) to assess potential publication bias for all relationships that are based on at least ten studies. Following the recommendations in the literature, we performed the trim and fill analysis with the fixed-effects model (Sutton, 2005; Kepes *et al.*, 2012). Outliers may influence meta-analytic findings and results grounded in distributions without outliers tend to be more robust and credible (Viechtbauer and Cheung, 2010; Field *et al.*, 2018; Kepes and Thomas, 2018). Consequently, we conducted an outlier analysis based on Viechtbauer and Cheung (2010) battery of outlier and influence diagnostics for all relationships with at least ten samples. We explored the influence of potential moderators (e.g., firm size, industry, study year, study country, etc.) on the different relationships if we were able to code the respective moderator aspects for at least five CVC studies for each moderator variable sub-group (Card, 2011).



### 3.5 Results

Table 9 presents the results of bivariate meta-analysis for the hypothesized relationships:

**Table 9: Summary of results of the bivariate meta-analysis and test of hypotheses**

| Relationships (hypotheses)   | <i>k</i> | <i>N</i> | <i>r</i> | CI        | <i>Q</i>  | <i>I</i> <sup>2</sup> |
|--|----------|----------|----------|-----------|-----------|-----------------------|
| <i>Industry relatedness</i>  |          |          |          |           |           |                       |
| Investment diversity – Corporate firm strategic performance (H1a+)         | 10       | 14,354   | 0.27     | 0.10/0.43 | 355.97    | 97                    |
| Investment diversity – Corporate firm financial performance (H1b+)         | 6        | 15,599   | -0.03    | -         | 39.64     | 87                    |
|  |          |          |          | 0.16/0.11 |           |                       |
| Industry overlapping investment – Corporate firm financial perform. (H1c+) | 3        | 549      | 0.10     | -         | 0.94      | 0                     |
|  |          |          |          | 0.02/0.23 |           |                       |
| Industry overlapping investment – New venture performance (H1d+)           | 3        | 58,011   | -0.17    | -         | 2,057.3   | 99.9                  |
|  |          |          |          | 0.78/0.61 |           |                       |
| <i>CVC experience</i>  |          |          |          |           |           |                       |
| CVC experience – Corporate firm strategic performance (H2a+)               | 20       | 124,233  | 0.16     | 0.03/0.28 | 1679.49   | 99                    |
| CVC experience – Corporate firm financial performance (H2b+)               | 17       | 79,122   | 0.02     | -         | 432.20    | 96                    |
|  |          |          |          | 0.05/0.10 |           |                       |
| CVC experience – CVC unit performance (H2c+)                               | 7        | 3,044    | 0.07     | -         | 30.23     | 80.15                 |
|  |          |          |          | 0.05/0.20 |           |                       |
| <i>R&amp;D expenditures</i>  |          |          |          |           |           |                       |
| R&D expenditures – Corporate firm strategic performance (H3a+)             | 14       | 123,222  | 0.27     | 0.10/0.43 | 6,898.97  | 100                   |
| R&D expenditures – Corporate firm financial performance (H3b+)             | 13       | 77,772   | 0.32     | -         | 8,376.80  | 100                   |
|  |          |          |          | 0.03/0.44 |           |                       |
| R&D expenditures – CVC unit performance (H3c+)                             |          |          |          |           |           |                       |
| <i>Firm size</i>   |          |          |          |           |           |                       |
| Firm size – Corporate firm strategic performance (H4a+)                    | 18       | 178,937  | 0.36     | 0.22/0.49 | 5,284.06  | 100                   |
| Firm size – Corporate firm financial performance (H4b+)                    | 15       | 76,706   | 0.23     | 0.01/0.44 | 15,412.83 | 100                   |
| Firm size – CVC unit performance (H4c+)                                    | 3        | 2,505    | 0.06     | 0.04/0.08 | 0.08      | 0                     |
| Firm size – New venture performance (H4d+)                                 | 6        | 60,449   | 0.11     | -         | 645.25    | 99.23                 |
|  |          |          |          | 0.13/0.43 |           |                       |

Note: *k* = number of independent samples cumulated, *N* = cumulative sample size, *r* = sample-size weighted correlation, CI = 95% confidence interval.

Hypothesis 1a stated that parent firms' explorative investments in new ventures with low industry relatedness are positively associated with strategic performance. While the results support this hypothesis (0.27; 0.10/0.43), the results of the robustness checks (c.f. Table B3) for publication bias indicate that these results are biased and that the trim-and-fill adjusted meta-analytic correlation is lower and that the confidence interval includes zero (0.06; -0.05/0.17). Therefore, Hypothesis 1a is not supported. Hypothesis 1b stated that parent firms' explorative investments in new ventures with low industry overlap are positively associated with financial performance. The results do not support this hypothesis (-0.03; -0.16/0.11). Hypothesis 1c posited that industry overlapping investments of parent firms are positively associated with their

financial performance. We found no support for this hypothesis (0.10; -0.02/0.23). Hypothesis 1d stated that high industry relatedness between a parent firm and a new venture is positively associated with high venture performance. The results do not support this hypothesis (-0.17; -0.78/0.61).

Hypothesis 2a stated that CVC experience is positively associated with the strategic performance of the parent firm. The results support Hypothesis 2a (0.16; 0.03/0.28). While the results of the robustness checks (c.f. *Table B3*) for publication bias and outliers showed a slightly lower correlation, the confidence interval remains positive (0.14; 0.09/0.20). Hypothesis 2b posited that CVC experience is positively associated with the financial performance of the parent firm. While the results do not support this hypothesis (0.02; -0.05/0.10), the results of the robustness checks (c.f. *Table B3*) show that after the exclusion of outliers and the trim-and-fill adjustment for publication bias, Hypothesis 2b is supported (0.06; 0.01/0.10). Hypothesis 2c stated that CVC experience is positively associated with CVC unit performance. The results do not support this hypothesis (0.07; -0.03/0.44).

Hypothesis 3a posits that R&D expenditures are positively associated with the strategic performance of the parent firm. The results support this hypothesis (0.27; 0.10/0.43). The robustness checks also confirm this finding (0.54; 0.42/0.63). Hypothesis 3b stated that R&D expenditures are positively associated with the financial performance of the corporate firm. While the results do not support this hypothesis (0.32/-0.03/0.44), the results of the robustness checks indicate that after the adjustment for publication bias the meta-analytic correlation is 0.41 and the confidence interval does not include zero (0.19/0.58). Therefore, Hypothesis 3b is supported. Hypothesis 3c stated that R&D expenditures are positively associated with the CVC unit performance. As the number of primary studies that have examined this relationship was not sufficiently large to conduct a meta-analysis, we could not test

this hypothesis. However, the one available study shows a positive relationship between the amount of R&D expenditures and the CVC unit performance (Weber and Weber, 2011).

Hypothesis 4a stated that firm size is positively associated with the strategic performance of the parent firm. The results support this hypothesis (0.36; 0.22/0.49). Hypothesis 4b stated that firm size is positively associated with the financial performance of the parent firm. The results support this hypothesis (0.23; 0.01/0.44). The results of the robustness checks confirm this finding (0.67; 0.47/0.81). Hypothesis 4c posited that firm size is positively associated with the CVC unit performance. The results support this hypothesis (0.06; 0.04/0.08). Hypothesis 4d stated that firm size is positively associated with the new venture performance. The results do not support this hypothesis (0.11; -0.13/0.43).

In addition to the hypothesized relationships we also examined other determinants of the different performance outcomes. More specifically, based on our coding of more than 600 determinants reported in the studies included in our meta-analysis, we identified those determinants of the economic outcomes of CVC activities that have been examined by at least two studies.

*Table 10* presents the results of bivariate meta-analysis for the strategic performance of the parent company (k = number of independent samples cumulated, N = cumulative sample size, r = sample-size weighted correlation, CI = 95% confidence interval):

**Table 10: Results of bivariate meta-analysis (parent company strategic performance)**

| Determinants  | <i>k</i> | <i>N</i> | <i>r</i> | CI         | <i>Q</i> | <i>I</i> <sup>2</sup> |
|---|----------|----------|----------|------------|----------|-----------------------|
| <b>Co-exploration</b>                               |          |          |          |            |          |                       |
| <i>Focus of IOR (new knowledge)</i>                 |          |          |          |            |          |                       |
| Investment diversity                                | 10       | 14,354   | 0.27     | 0.10/0.43  | 355.97   | 97                    |
| <i>Key activity (Learning)</i>                      |          |          |          |            |          |                       |
| Access to new technologies                          | 2        | 48       | 0.52     | -0.69/0.88 | 5.32     | 81                    |
| Involvement in ventures (operative)                 | 2        | 46       | -0.02    | -1.0/1.0   | 6.20     | 84                    |
| Involvement in ventures (strategic)                 | 2        | 46       | -0.08    | -0.99/0.99 | 1.61     | 38                    |
| Venture involvement                                 | 3        | 2,044    | 0.02     | -0.17/0.21 | 5.32     | 62                    |
| <i>Type of value creation (Innovation)</i>          |          |          |          |            |          |                       |
| Investments in radical innovation                   | 2        | 46       | 0.50     | -0.94/0.99 | 1.28     | 22                    |
| <i>Key knowledge type (Tacit)</i>                   |          |          |          |            |          |                       |
| CVC experience                                      | 20       | 124,233  | 0.16     | 0.03/0.28  | 1679.49  | 99                    |
| Prior venturing experience                          | 3        | 1,995    | 0.23     | -0.08/0.57 | 719.47   | 99                    |
| <i>Key hazard (Appropriation)</i>                   |          |          |          |            |          |                       |
| Unabsorbed slack                                    | 4        | 12,197   | -0.08    | -0.26/0.11 | 27.64    | 89                    |
| Portfolio size                                      | 5        | 52,851   | 0.19     | 0.05/0.33  | 12.94    | 69                    |
| <i>Environmental state (Uncertainty)</i>            |          |          |          |            |          |                       |
| Later stage investments                             | 5        | 322      | -0.04    | -0.32/0.25 | 6.38     | 37                    |
| Acquisitions and alliances experience               | 4        | 2753     | 0.13     | -0.38/0.58 | 144.24   | 98                    |
| Syndication   | 5        | 5660     | 0.23     | -0.18/0.57 | 719.47   | 99                    |
| <i>Type of interdependence (Reciprocal)</i>         |          |          |          |            |          |                       |
| CVC unit acting as a broker                         | 2        | 48       | 0.25     | -0.33/0.69 | 0.09     | 0                     |
| <i>Decision making (joint)</i>                      |          |          |          |            |          |                       |
| Initiate partnerships (parent and PC)               | 2        | 26       | 0.10     | -0.97/0.98 | 0.57     | 0                     |
| <i>Communication (Rich, ongoing, few people)</i>    |          |          |          |            |          |                       |
| High effort to foster collaboration (parent and PC) | 2        | 29       | 0.11     | -0.99/0.99 | 0.96     | 0                     |
| <i>Coordination (Interpersonal)</i>                 |          |          |          |            |          |                       |
| Working together in teams (parent and PC)           | 2        | 10       | -0.17    | -1.0/1.0   | 4.88     | 80                    |
| Financial incentives for collaboration (BU)         | 2        | 13       | 0.33     | -0.89/0.97 | 0        | 0                     |
| <b>Co-exploitation</b>                              |          |          |          |            |          |                       |
| <i>Focus of IOR (existing knowledge)</i>            |          |          |          |            |          |                       |
| Industry overlapping investments                    | 10       | 120,765  | .03      | -0.13/0.18 | 3,883.98 | 100                   |
| <i>Key activity (expansion)</i>                     |          |          |          |            |          |                       |
| Growth rate   | 3        | 14,221   | .03      | -0.11/0.16 | 29.67    | 93                    |
| Firm size   | 18       | 178,937  | .36      | 0.22/0.49  | 5,284.06 | 100                   |
| Contribution to revenue growth                      | 2        | 45       | .47      | -0.40/0.90 | 0        | 0                     |
| Identifying acquisition targets                     | 2        | 46       | .63      | 0.60/0.67  | 0        | 0                     |
| Acquiring new employees                             | 2        | 46       | .45      | -0.99/1.0  | 56.00    | 56                    |
| <i>Type of value creation (Efficiency)</i>          |          |          |          |            |          |                       |
| R&D expenditures                                    | 14       | 123,222  | .27      | 0.10/0.43  | 6,898.97 | 100                   |
| Strengthen existing business                        | 2        | 47       | .49      | -1.0/1.0   | 4.80     | 79                    |
| <i>Key knowledge type (Explicit)</i>                |          |          |          |            |          |                       |
| Systematic investment evaluation                    | 2        | 48       | .09      | -0.75/0.81 | 0.29     | 0                     |
| <i>Key hazard (Slacking)</i>                        |          |          |          |            |          |                       |
| Better use of existing resources                    | 2        | 45       | .41      | -0.60/0.91 | 0.31     | 0                     |
| <i>Environmental state (Risk)</i>                   |          |          |          |            |          |                       |
| Early stage investments                             | 3        | 277      | .14      | -0.02/0.31 | 0.85     | 0                     |
| Quality of investment portfolio                     | 2        | 701      | .11      | -0.97/0.98 | 21.52    | 95                    |
| <i>Type of interdependence (Pooled, sequential)</i> |          |          |          |            |          |                       |
| Providing access to pooled functional areas         | 2        | 257      | .31      | -0.43/0.80 | 0.96     | 0                     |
| <i>Decision making (divided)</i>                    |          |          |          |            |          |                       |
| No initiating of partnerships (parent and PC)       | 2        | 12       | -.46     | -0.82/0.16 | 0.02     | 0                     |
| <i>Communication (Thin, routine, more people)</i>   |          |          |          |            |          |                       |
| Regular exchange meetings                           | 2        | 32       | -.53     | -1.0/1.0   | 3.56     | 72                    |
| Low effort to foster collaboration (parent and PC)  | 2        | 20       | -.12     | -1.0/1.0   | 8.33     | 88                    |
| <i>Coordination (Routines, std. procedures)</i>     |          |          |          |            |          |                       |
| Geographic diversity                                | 5        | 56,962   | .18      | -0.03/0.38 | 386.99   | 90                    |
| No working in teams (parent and PC)                 | 2        | 39       | .01      | -1.0/1.0   | 1.77     | 44                    |
| No financial incentives for collaboration (BU)      | 2        | 39       | .20      | -0.30/0.61 | 0        | 0                     |

For a total of 37 determinants we identified at least two studies to accumulate their findings for the strategic performance of the parent company. We found significant associations for the portfolio size (0.19; 0.05/0.33), and the identification of acquisition targets (0.63; 0.60/0.67) and the strategic performance of the parent firm. Given the limited number of studies and the small number of firms they have included, the findings for the identification of acquisition targets should be interpreted with caution and viewed as suggestive rather than definitive. A larger number of studies and replication with larger samples is necessary to fully explore this association. In total, only six of the 37 determinants, which we identified for the strategic performance of the parent company, showed confidence intervals not including zero, which is indicative for the sparse of quantitative empirical studies as well as the inconsistent findings of extant studies in this research area.

*Table 11* presents the results for the financial performance of the parent company:

**Table 11: Results of bivariate meta-analysis (parent company financial performance)**

| Determinants  | <i>k</i> | <i>N</i> | <i>r</i> | CI         | <i>Q</i>  | <i>I</i> <sup>2</sup> |
|---|----------|----------|----------|------------|-----------|-----------------------|
| <b>Co-exploration</b>                               |          |          |          |            |           |                       |
| <i>Focus of IOR (new knowledge)</i>                 |          |          |          |            |           |                       |
| Investment diversity                                | 6        | 15,599   | -0.03    | -0.16/0.11 | 39.64     | 87                    |
| <i>Key activity (Learning)</i>                      |          |          |          |            |           |                       |
| Access to new technologies                          | 2        | 45       | 0.11     | 0.11/0.11  | 0.00      | 0                     |
| Involvement in ventures (operative)                 | 2        | 43       | 0.28     | -0.92/0.97 | 0.80      | 0                     |
| Involvement in ventures (strategic)                 | 2        | 43       | 0.18     | -1/1       | 2.58      | 61                    |
| <i>Type of value creation (Innovation)</i>          |          |          |          |            |           |                       |
| Investments in radical innovation                   | 2        | 44       | 0.17     | -0.71/0.84 | 0.27      | 0                     |
| <i>Key knowledge type (Tacit)</i>                   |          |          |          |            |           |                       |
| CVC experience                                      | 17       | 79,122   | 0.02     | -0.05/0.10 | 432.20    | 96                    |
| <i>Key hazard (Appropriation)</i>                   |          |          |          |            |           |                       |
| Unabsorbed slack                                    | 7        | 21,487   | -0.05    | -0.17/0.07 | 68.81     | 91                    |
| <i>Environmental state (Uncertainty)</i>            |          |          |          |            |           |                       |
| Later stage investments                             | 2        | 42       | 0.30     | -0.21/0.68 | 0.06      | 0                     |
| <i>Type of interdependence (Reciprocal)</i>         |          |          |          |            |           |                       |
| CVC unit acting as a broker                         | 2        | 45       | 0.02     | -0.92/0.93 | 0.65      | 0                     |
| <i>Decision making (joint)</i>                      |          |          |          |            |           |                       |
| Initiate partnerships (parent and PC)               | 2        | 12       | 0.11     | -0.76/0.84 | 0.15      | 0                     |
| <i>Communication (Rich, ongoing, few people)</i>    |          |          |          |            |           |                       |
| High effort to foster collaboration (parent and PC) | 2        | 28       | -0.05    | -0.71/0.66 | 0.10      | 0                     |
| <b>Co-exploitation</b>                              |          |          |          |            |           |                       |
| <i>Focus of IOR (existing knowledge)</i>            |          |          |          |            |           |                       |
| Industry overlapping investments                    | 3        | 549      | 0.10     | -0.02/0.23 | 0.94      | 0                     |
| <i>Key activity (expansion)</i>                     |          |          |          |            |           |                       |
| Growth rate   | 5        | 16,805   | 0.11     | -0.05/0.25 | 94.67     | 96                    |
| Firm size   | 15       | 76,706   | 0.23     | 0.0/0.44   | 15,412.83 | 100                   |
| Contribution to revenue growth                      | 2        | 45       | 0.67     | -0.26/0.96 | 0.29      | 0                     |
| Identifying acquisition targets                     | 2        | 44       | 0.23     | -0.20/0.59 | 0.05      | 0                     |
| Acquiring new employees                             | 2        | 44       | 0.11     | -0.90/0.94 | 0.61      | 0                     |
| <i>Type of value creation (Efficiency)</i>          |          |          |          |            |           |                       |
| R&D expenditures                                    | 13       | 77,772   | 0.32     | -0.03/0.44 | 8,376.80  | 100                   |
| Strengthen existing business                        | 2        | 46       | 0.23     | -0.06/0.49 | 0.02      | 0                     |
| <i>Key knowledge type (Explicit)</i>                |          |          |          |            |           |                       |
| Systematic investment evaluation                    | 2        | 45       | -0.09    | -0.74/0.64 | 0.17      | 0                     |
| <i>Key hazard (Slacking)</i>                        |          |          |          |            |           |                       |
| Better use of existing resources                    | 2        | 43       | 0.09     | -0.33/0.49 | 0.04      | 0                     |
| <i>Environmental state (Risk)</i>                   |          |          |          |            |           |                       |
| Early stage investments                             | 3        | 417      | 0.09     | 0.02/0.15  | 0.21      | 0                     |
| <i>Decision making (divided)</i>                    |          |          |          |            |           |                       |
| No initiating of partnerships (parent and PC)       | 2        | 12       | -0.47    | -0.90/0.40 | 0.03      | 0                     |
| <i>Communication (Thin, routine, more people)</i>   |          |          |          |            |           |                       |
| Regular exchange meetings                           | 2        | 48       | -0.25    | -0.99/0.98 | 1.61      | 37.78                 |
| Low effort to foster collaboration (parent and PC)  | 2        | 19       | -0.27    | -1.0/1.0   | 0.89      | 0                     |
| <i>Coordination (Routines, std. procedures)</i>     |          |          |          |            |           |                       |
| Geographic diversity                                | 2        | 1,479    | 0.07     | 0.07/0.07  | 0         | 0                     |
| No working in teams (parent and PC)                 | 2        | 37       | 0.01     | -1.0/1.0   | 1.77      | 43.54                 |
| No financial incentives for collaboration (BU)      | 2        | 37       | -0.11    | 0-.83/0.76 | 0.23      | 0                     |

Note: *k* = number of independent samples cumulated, *N* = cumulative sample size, *r* = sample-size weighted correlation, CI = 95% confidence interval.

For 36 determinants we identified at least two studies, which have examined the relation between the respective determinant and financial performance of the parent company. In addition

to the hypothesized relationships we found significant associations for access to new technologies (0.11; 0.11/0.41), early stage investments (0.09; 0.02/0.15), as well as geographic diversity (0.07; 0.07/0.07) and financial performance of the parent firm. In summary, for only four of the 36 determinants for financial performance of the parent firm we found confidence interval not including zero. The findings are again grounded in the scarcity of quantitative empirical studies (the low number of studies that examined relevant determinants) and the inconsistent findings in the few existing studies. Compared to studies focusing on the parent company much less research has been conducted examining the CVC unit performance.

*Table 12* presents the results for CVC unit performance:

**Table 12: Results of bivariate meta-analysis (CVC unit performance)**

| Determinants                                      | <i>k</i> | <i>n</i> | <i>r</i> | CI         | <i>Q</i> | <i>I</i> <sup>2</sup> |
|---|----------|----------|----------|------------|----------|-----------------------|
| <b>Co-Exploration</b>                             |          |          |          |            |          |                       |
| <i>Key activity (Learning)</i>                    |          |          |          |            |          |                       |
| Access to new technologies                        | 3        | 409      | 0.04     | -0.14/0.23 | 1.53     | 0                     |
| <i>Type of value creation (Innovation)</i>        |          |          |          |            |          |                       |
| Investments in radical innovation                 | 2        | 32       | 0.22     | -0.88/0.95 | 0.41     | 0                     |
| <i>Key knowledge type (Tacit)</i>                 |          |          |          |            |          |                       |
| CVC experience                                    | 7        | 3,044    | 0.07     | -0.05/0.20 | 30.23    | 80.15                 |
| Prior venturing experience                        | 2        | 376      | 0.25     | 0.19/0.30  | 0.01     | 0                     |
| <i>Environmental state (Uncertainty)</i>          |          |          |          |            |          |                       |
| Later stage investments                           | 2        | 31       | 0.10     | 0.05/0.15  | 0        | 0                     |
| Acquisitions and alliances experience             |          |          |          |            |          |                       |
| Syndication                                       | 2        | 180      | 0.19     | -0.88/0.95 | 2.88     | 65.34                 |
| <i>Type of interdependence (Reciprocal)</i>       |          |          |          |            |          |                       |
| CVC unit acting as a broker                       | 2        | 31       | 0.14     | -0.65/0.78 | 0.13     | 0                     |
| <i>Decision making (joint)</i>                    |          |          |          |            |          |                       |
| Initiate partnerships (parent and PC)             | 2        | 15       | 0.45     | -0.93/0.99 | 0.26     | 0                     |
| <i>Communication (Rich, ongoing, few people)</i>  |          |          |          |            |          |                       |
| High effort to foster collaboration (parent & PC) | 2        | 23       | 0.25     | -1.0/1.0   | 1.54     | 35.62                 |
| <b>Co-exploitation</b>                            |          |          |          |            |          |                       |
| <i>Key activity (expansion)</i>                   |          |          |          |            |          |                       |
| Firm size   | 3        | 2,505    | 0.06     | 0.04/0.08  | 0.08     | 0                     |
| Contribution to revenue growth                    | 2        | 31       | 0.53     | 0.10/0.79  | 0.04     | 0                     |
| Identifying acquisition targets                   | 2        | 32       | 0.17     | -0.93/0.96 | 0.54     | 0                     |
| Acquiring new employees                           | 2        | 31       | 0.07     | -0.78/0.83 | 0.19     | 0                     |
| <i>Type of value creation (Efficiency)</i>        |          |          |          |            |          |                       |
| Strengthen existing business                      | 2        | 33       | 0.45     | -0.63/0.94 | 0.25     | 0                     |
| <i>Key knowledge type (Explicit)</i>              |          |          |          |            |          |                       |
| Systematic investment evaluation                  | 2        | 31       | -0.54    | -1.0/1.0   | 1.84     | 45.54                 |
| <i>Key hazard (Slacking)</i>                      |          |          |          |            |          |                       |
| Better use of existing resources                  | 2        | 31       | 0.24     | -0.97/0.99 | 0.81     | 0                     |
| <i>Environmental state (Risk)</i>                 |          |          |          |            |          |                       |
| Early stage investments                           | 3        | 406      | -0.10    | -0.13/0.07 | 0.04     | 0                     |
| <i>Communication (Thin, routine, more people)</i> |          |          |          |            |          |                       |
| Regular exchange meetings                         | 2        | 44       | -0.01    | -1.0/1.0   | 5.91     | 83.09                 |
| <i>Coordination (Routines, std. procedures)</i>   |          |          |          |            |          |                       |
| Geographic diversity                              | 2        | 2130     | 0.07     | -0.64/0.71 | 5.58     | 82.07                 |
| No working in teams (parent and PC)               | 2        | 23       | -0.51    | -1.0/1.0   | 1.48     | 32.40                 |
| No financial incentives for collaboration (BU)    | 2        | 24       | -0.20    | -0.91/0.81 | 0.19     | 0                     |

Note: *k* = number of independent samples cumulated, *N* = cumulative sample size, *r* = sample-size weighted correlation, CI = 95% confidence interval.

For CVC unit performance we identified 22 determinants that have been examined in at least two studies. We found significant relationships for prior venturing experience (0.25; 0.19/0.30), later stage investments (0.10; 0.05/0.15), firm size (0.06; 0.04/0.08), as well as contribution to revenue growth (0.53; 0.10/0.79) and financial performance of the parent firm. In light of the low number of studies and of firms included in the studies, the findings for the contribution to revenue growth should be considered as preliminary and further studies and replication in larger samples would be required. Overall, out of 22 determinants for CVC unit performance, we



found only four statistically significant determinants. For new venture performance, we were able to identify ten determinants that have been examined by at least two studies. *Table 13* presents the results for new venture performance:

**Table 13: Results of bivariate meta-analysis (venture performance)**

| Determinants  | <i>k</i> | <i>n</i> | <i>r</i> | CI         | <i>Q</i> | <i>I</i> <sup>2</sup> |
|---|----------|----------|----------|------------|----------|-----------------------|
| <b>Co-exploration</b>                               |          |          |          |            |          |                       |
| <i>Focus of IOR (new knowledge)</i>                 |          |          |          |            |          |                       |
| Investment diversity                                | 4        | 2,801    | -0.03    | -0.45/0.39 | 67.62    | 96.08                 |
| <i>Key knowledge type (Tacit)</i>                   |          |          |          |            |          |                       |
| Prior venturing experience                          | 9        | 61,336   | 0.14     | 0.05/0.22  | 159.01   | 94.97                 |
| <i>Key hazard (Appropriation)</i>                   |          |          |          |            |          |                       |
| Portfolio size                                      | 2        | 257      | 0.18     | -0.23/0.54 | 0.28     | 0                     |
| <i>Environmental state (Uncertainty)</i>            |          |          |          |            |          |                       |
| Syndication   | 4        | 1,505    | 0.02     | -0.27/0.31 | 35.08    | 91.45                 |
| <b>Co-exploitation</b>                              |          |          |          |            |          |                       |
| <i>Focus of IOR (existing knowledge)</i>            |          |          |          |            |          |                       |
| Industry overlapping investments                    | 3        | 58,011   | -0.17    | -0.78/0.61 | 2,057.3  | 99.9                  |
| <i>Key activity (expansion)</i>                     |          |          |          |            |          |                       |
| Growth rate   | 2        | 519      | 0.05     | -0.95/0.96 | 10.79    | 90.73                 |
| Firm size   | 6        | 60,449   | 0.11     | -0.13/0.43 | 645.25   | 99.23                 |
| <i>Type of value creation (Efficiency)</i>          |          |          |          |            |          |                       |
| R&D expenditures                                    | 4        | 8,095    | 0.15     | -0.12/0.40 | 156.49   | 98.08                 |
| <i>Type of interdependence (Pooled, sequential)</i> |          |          |          |            |          |                       |
| Providing access to pooled functional areas         | 3        | 318      | 0.23     | 0.01/0.43  | 1.63     | 0                     |
| <i>Coordination (Routines, std. procedures)</i>     |          |          |          |            |          |                       |
| Geographic diversity                                | 2        | 57,442   | 0        | -0.12/0.11 | 1.93     | 48.19                 |

Note: *k* = number of independent samples cumulated, *N* = cumulative sample size, *r* = sample-size weighted correlation, CI = 95% confidence interval.

We found a significant relationship between prior venturing experience (0.14; 0.05/0.22) and providing access to pooled functional areas (0.23; 0.01/0.43) and venture performance. Overall, for only two of ten determinants we found statistically significant associations with venture performance. Our findings highlight the scarcity of studies examining the drivers of venture performance in the CVC literature.

Summarizing we find both, significant findings on the explorative side as well as on the exploitative side. Reflecting on the performance perspective, our findings clearly demonstrate that the three CVC parties (corporate firm, the CVC unit, and new ventures) are covered very differently throughout the literature. Extent research focused stronger on the corporate firm and its CVC activities. The corporate firm's impact on the strategic performance is covered more

extensively than the one on financial performance. Research on the CVC unit follows, while research investigating the impact on new ventures' performance is scarce.

### 3.6 Discussion

This article set out to deepen our understanding of the key CVC characteristics indicating either an explorative or an exploitative orientation of CVC programs and their respective impact on the three distinct CVC actors' performance to examine the research question: *what are the key characteristics of an explorative and an exploitative orientation of external CVC programs and how do these key characteristics impact the performance of such CVC programs?* More precisely, the purpose was threefold: First, to identify the significant characteristics of external CVC programs related to exploration, exploitation, and ambidexterity, concerning the performance of the different parties in CVC programs. Herewith, we contribute to CVC literature by providing a more nuanced analysis of exploration and exploitation in this CVC context (Jeon, 2018; Rossi et al., 2019), therewith answering various calls (Hill and Birkinshaw, 2014; Lee *et al.*, 2018). Second, we complement CVC research by reconciling previous inconsistent findings regarding the influence of investment diversity, CVC experience, firm size, and R&D expenditures on CVC performance. We do so by differentiating the performance level of analysis of the different parties involved in CVC programs. Third, by applying and adapting Parmigiani and Rivera-Santos' (2011) holistic framework to the CVC context we examine and confirm the generalizability of the framework for this specific mode of IOR. In addition, we speak to the literature on IOR analyzing the similarities and differences of IOR modes. The objective of any IOR is exploring and/or exploiting, regardless of its precise organizational form (Parmigiani and Rivera-Santos, 2011). Therefore, each of the IOR modes (e.g., M&A, alliances, and CVC) has pros or cons in order to achieve a certain exploration/exploitation orientation.

### **Implications for theory and future research**

This study has certain implications for theory and future research on CVC performance. We confirm prior literature that CVC investments can serve both to exploit existing knowledge and to explore new knowledge (Keil, 2001; Dushnitsky, 2004; Birkinshaw and Hill, 2005; Schildt *et al.*, 2005; Dushnitsky and Lenox, 2006; Benson and Ziedonis, 2009; Yang, 2012). Yet, our finding that all CVC characteristics that have a significant explorative or exploitative effect are positively related to the perspective of CVC performance, points to a research gap regarding (unintended) CVC characteristics that might be negatively related to CVC performance. This leads us – besides the many benefits of IORs – to their potential negative dimensions or dark sides, such as conflict or opportunism (Oliveira and Lumineau, 2019). Although those dark sides receive growing attention in the IOR literature, they have not reached the CVC related research so far. For instance, research on conflicts focuses on cultural conflicts, personal conflicts, or emotional and task related disputes between IOR managers (Oliveira and Lumineau, 2019). The literature on opportunism deals more with unfulfilled promises (John, 1984), abusive behavior (Morgan, Kaleka, and Gooner, 2007), restraining information (Kashyap, Antia, and Frazier, 2012) or exploiting contractual gaps (Wang, Gu, and Dong, 2013). Such negative aspects have harmful impacts on the outcomes of IORs. Considering, the wavelike occurrences of CVC programs, as well as their short lifespan of approximately 2.2 years (Dushnitsky, 2012), it is surprising that CVC research almost neglected the negative aspects of IOR as a possible explanation of CVC failure. Exceptions are the studies by Weber and Weber (2011) who explicitly examine social liabilities, and by Pahnke *et al.* (2015) who demonstrate a negative impact of CVC investment on the innovation performance of new ventures. Also emphasizing negative effects, Burgelman and Välikangas (2005) adduce that shut-downs of CVC units are decisions often based on subjective and irrational motivations and thus made on the individual

level. Therefore, scholars could contribute to CVC and IOR literature by utilizing the context of CVC to investigate the almost neglected potential negative aspects of CVC. Such potential negative aspects could have impacts on both the intra- as well as the interorganization level of analysis.

By demonstrating that the number of CVC program characteristics that show significant effects for certain CVC performance perspectives diminishes with the number of studies investigating those respective performance levels, we conclude that there is a clear need for more studies examining the perspectives of both the CVC unit and the new venture. With regard to the CVC units, in the relatively few studies conducted the units play an important role for (inter)organizational learning as well as for the identification and development of innovations (Drover *et al.*, 2017). For instance, Weber *et al.* (2016a) as well as Wadhwa and Basu (2013) point to the relevance of the corporate firms to actively get involved in their ventures, emphasizing the individual level of CVC relationships. Our findings show a positive impact of organizational CVC experience (firm age, number of CVC investments) on the different performance levels. Therefore, a promising research gap would be the individual experience of CVC personnel and its influence on the performance of CVC programs. Moreover, and in connection with the above mentioned negative aspects of CVC, the harmful aspects on the individual level should be examined. Future research could move beyond the organizational, and market level perspective and focus on the individual level. For instance, how do cultural or personal conflicts, emotional and task related disputes, individual opportunistic behavior, unfulfilled promises, abusive behavior, or the restraining of information impact the investment decision, and the support of portfolio companies?

When looking at the few CVC studies investigating the portfolio company level, the effects for those new ventures are only partly researched and provide potential for future research.

Previous research has suggested that the various value-added services provided by the corporations, have positive performance implications for entrepreneurial ventures. For instance, Ivanov and Xie (2010) and Maula and Murray (2001) find a valuation premium at IPO for CVC-backed ventures. In addition, the venture's survival chances seem to increase through corporate backing (Hochberg et al. 2007) as well as patent output compared to VC-backed peers (Alvarez-Garrido and Dushnitsky, 2016). However, CVC literature also points to disadvantages for entrepreneurial ventures that engage in CVC funding. For example, due to their less competitive compensation schemes, CVC units frequently face difficulties in recruiting and retaining skilled employees (Gompers and Lerner, 2000), undermining their capability to provide the excellent value-added services needed to new ventures. In addition, bureaucratic corporate processes may hamper venture's growth and young entrepreneurs might even find that autonomy and intellectual property are partly lost to the parent company (Dushnitsky 2012). CVCs may prevent their portfolio companies from forming alliances with their parent's competitors even though such collaborations would bring substantial benefit (Ivanov and Xie 2010). Weber and Weber's (2011) empirical study argues in a similar vein, showing that the CVC contract, indeed, can hinder new ventures' strategic reorientation due to personal and structural lock-ins.

What currently is missing is research that goes beyond the surface of interorganizational relationships and examines more deeply the causal coherences that influence the venture performance. Our meta-analysis can only show the positive or negative coherences based on meta-analytic correlations but cannot uncover the underlying mechanisms for instance between the provisions of pooled access to corporate's functional areas and the venture's performance. Recent developments (e.g., conference papers) indicate that the underrepresented parts of CVC research on the CVC unit and the new ventures begin entering the limelight of scientific research (e.g., Lee et al., 2018; Obeid and van de Vrande, 2018; Kim, Steensma, and Park, 2019).

However, these recent developments will not be able to quickly redress the imbalance in literature referring to the different parties of CVC programs. Therefore, we encourage scholars to focus their research on the perspectives of CVC units and new ventures, which are currently considered under researched.

Next to it, we can demonstrate that some CVC characteristics are related to only one CVC performance perspective whereas other characteristics are related to two or more perspectives. By turning our attention to the three distinct CVC performance perspectives we are able to investigate in a more nuanced manner whether the respective CVC characteristics create wealth for some, all, or none of the players of CVC programs. Thus, the question arises whether the maximization of a performance measure on the individual level automatically contributes to the overall CVC program or if contradicting effects emerge between the three parties. For instance, former CVC studies identified the CVC context as a valuable source of inter- and intraorganizational knowledge transfer and therefore an effective learning instrument (Dushnitsky and Lennox, 2005b; Maula, 2001; Maula *et al.*, 2003; Schildt *et al.*, 2005; Weber and Weber, 2007; Yang *et al.*, 2009; Weber and Weber, 2011). In this context CVC experience is usually considered to benefit CVC programs financially and strategically (Keil, 2004; Yang *et al.*, 2009; Dushnitsky and Lavie, 2010; Basu *et al.*, 2011). One significant finding in this study standing out is *experience* and its relation to the three CVC parties. Experience is not only related to corporate performance, but also to CVC unit performance, and venture performance. Future research could investigate this “triad-strategy” approach by reexamining additional common characteristics. For instance, from characteristics such as the investment managers’ incentive structure or the structural autonomy of CVC units we assume opposed effects between the different performance levels. A higher CVC unit autonomy has been proven to positively influence the strategic performance of CVC investments (Lee *et al.*, 2018). However, a higher autonomy can lead to independent investment decisions in portfolio companies that do not support or even

compete with the corporate firm's business model (Siegel *et al.*, 1988; Chesbrough, 2002; Yang, Chen, and Zhang, 2016). Therefore, a higher autonomy might have a positive impact on the performance of the CVC unit or the portfolio companies but a negative impact on the corporate firm's performance.

Finally, future research would be strengthened by a theoretically guided moderator analysis. Currently, such analysis lacks the necessary amount of studies. Conducting a detailed moderator analysis would provide valuable information about the boundary conditions that maximize or minimize the different associations. As more CVC research is completed, more primary studies will be available to conduct such moderator analyses. We hope that our meta-analytic review provides fruitful and promising avenues for future research and will spur more research on *how* and *when* CVC investments influence performance outcomes of the involved parties.

### **Implications for practice**

This article also provides valuable input for practitioners in the CVC context by drawing attention to the spectrum of significant characteristics influencing the performance of the respective parties involved. For instance, practitioners who aim to implement an explorative, exploitative, or an ambidextrous orientation can benefit from the knowledge regarding which CVC characteristics achieve a significantly higher performance on the related performance level. As some of the CVC characteristics are actionable (e.g., portfolio size, early stage investments, providing access to new technologies or to pooled functional areas) they may support managers' strategy. Moreover, given our insights regarding the importance of experience for all three performance levels, practitioners could capitalize on that insight for example by adapting a HR strategy through hiring more experienced staff or by increasing the number of investment rounds with smaller investments to gain experience.

## **Limitations**

The findings of the present study should be interpreted in light of its limitations. First, our meta-analysis is limited to the underlying primary CVC studies and the information they provided. This amount of studies limited our choice of variables to those that have been examined in a sufficiently high number of primary studies. Therefore, the present meta-analysis and the findings must be considered a summary of these most commonly studied determinants of firm performance in the CVC context that are of focal interest to this research field.

Second, related to the first limitation, the majority of CVC studies have focused on specific determinants and one specific outcome. Few studies have examined sets of determinants as well as different CVC outcomes and their respective interrelations. We believe that additional primary studies may help to capture unique and joint effects of sets of determinants for specific outcomes as well as the interconnectedness of CVC outcomes.

Third, we were unable to examine the effect of CVC programs on survival of the different CVC partners as few studies have examined this specific economic outcome. Thus, our meta-analysis may suffer to some degree from a survivor bias, which should be considered in the interpretation of the results. We encourage future research to examine the specific determinants that influence the survival of CVC partners.

A fourth limitation concerns the heterogeneity of the effect sizes. While potential moderators were identified in the current meta-analysis, we were not able to conduct a moderator analysis for the majority of the hypothesized relationships due to the small number of available studies for inclusion. However, the present meta-analysis enables us to test the proposed conceptual model across various samples, including different industries and institutional contexts, providing evidence of the validity of the proposed conceptual model. Future research may benefit from comparative studies across different industries as well as across different regions and countries.



Finally, we did not directly investigate the processes through which specific determinants and outcomes are related. For example, the positive relationship between CVC experience and financial performance may function through variables more proximal to financial performance than experience. Future research can help advance our understanding of CVC-related processes by examining how specific firm resources and capabilities are related to different outcomes. Despite these limitations, our study is an important first step to better understand the distinct effects of firm and industry-related factors on specific outcomes of CVC programs.

## **CHAPTER 4: A CONFIGURATIONAL ANALYSIS OF HOW AGENCY CONFLICTS AFFECT THE SURVIVAL OF CVC UNITS**

Co-authored with: Deniz P. Kruse, Hannes Leonardy, Christiana Weber

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### **4.1 Introduction**

Corporate venture capital (CVC) is defined as minor equity investments in entrepreneurial ventures made by established companies (Maula, 2007; Drover *et al.*, 2017). CVC has become a very promising means of strategic innovation management, strategic renewal and corporate development (Weber *et al.*, 2016a; Maula, 2007; Garrett, 2010; Dushnitsky, 2012; Basu *et al.*, 2016a; Hill and Georgoulas, 2016). Despite this promising development, we observe that many corporations' interest in CVC has cyclically ebbed and flowed – often in remarkably short time frames (Dushnitsky, 2012; Basu *et al.*, 2016b; Drover *et al.*, 2017). Furthermore, CVC units are susceptible to failure at a relatively early time in their life-cycles, with a tendency to premature shut-downs without robust assumptions (Gompers and Lerner, 1998; Campbell *et al.*, 2003; Burgelman and Välikangas, 2005; Garrett, 2010).

Until today, only a few studies investigate the survival of CVC units (Hill and Birkinshaw, 2008; Hill *et al.*, 2009; Teppo and Wustenhagen, 2009; Hill and Birkinshaw, 2014). These studies enlarge our understanding about the reasons for CVC shutdowns on an organizational level. However, they fall short of explaining the relationship between two important parties

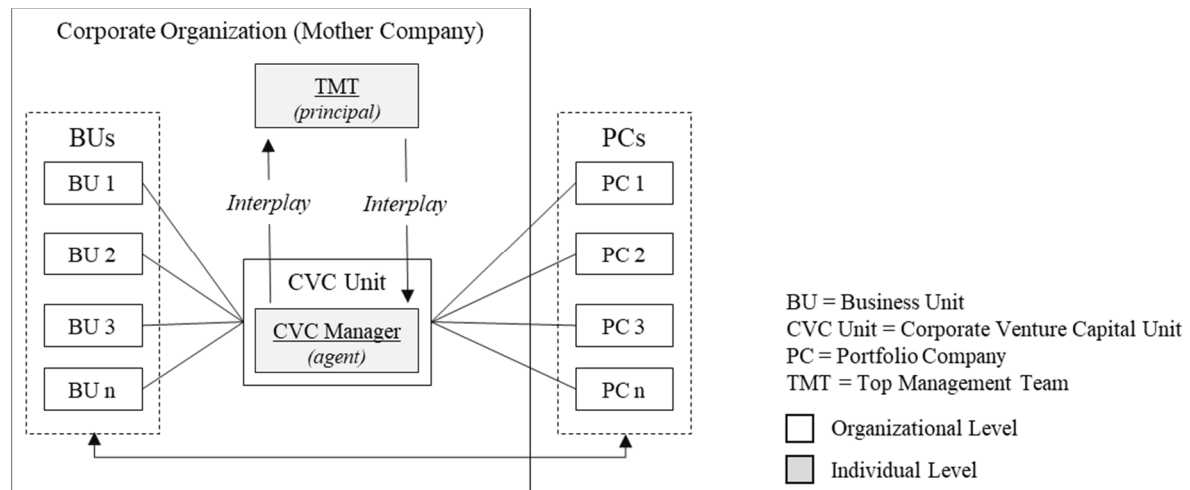
involved (top management team and CVC managers) and thus mostly neglect the individual level in CVC research (Drover *et al.*, 2017). To date, the role of individuals' behavior in CVC literature remains sparsely researched, "[...] partially due to limited data and partially due to the focus on organization-level dynamics prevalent in the corporate setting." (Drover *et al.*, 2017: 14). The few studies on individual CVC level examine CVC managers' professional backgrounds (Dokko and Gaba, 2012a; Hill and Birkinshaw, 2014), compensation schemes (Dushnitsky and Shapira, 2010), or CVC managers' mentality (Souitaris *et al.*, 2012). Burgelman and Välikangas (2005), in turn, argue that CVC units' termination is often grounded in subjective or irrational motives. Although these above-mentioned investigations provide valuable insights for the area of CVC in theory and practice, they do not consider whether and how individuals' behavior eventually impacts CVC units' survival or non-survival. More concretely, these studies do not take into consideration how the interplay between both parties' involved (TMT and CVC managers) might impact the survival of CVC units.

Beyond other possible reasons for early CVC termination on an organizational or market level, the emerging evidence of individuals' decision making and its influence on CVC activities (Drover *et al.*, 2017) combined with limited knowledge about the underlying mechanisms that cause these decisions lead us to focus on the significant role of individual decision-making in CVC activities.

When deciding to set up a CVC unit, the TMT specifies the goals, structures, staffing and the relationship management (Basu *et al.*, 2016b). *Figure 9* gives an overview of the typical CVC structure, the parties involved and the different levels of analysis. Usually, the TMT of a firm expects the CVC units to achieve certain goals (financial and/or strategic). For achieving these goals, they instruct CVC managers to act as their agents and to invest according to these goals. Thus, the relationship between TMT and CVC unit managers can be described as a typical principal-agent relationship, as the CVC managers (agents) accomplish various activities (e. g.,

investments) delegated by the TMT (principals) (Dushnitsky and Shapira, 2010). This holds as the actors involved suffer from information asymmetry, opposing attitudes toward risk, and goal conflicts (Jensen and Meckling, 1976; Jones and Butler, 1992).

**Figure 9: Typical CVC structure**



An agency relationship can be described as “a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decisions making authority to the agent” (Jensen and Meckling, 1976: 308). Like in any other relationship of this kind (where a principal assigns an agent) – a goal conflict can be influenced and limited by various governance mechanisms (Eisenhardt, 1989). In the relationship between corporate top managers (TMT) and CVC managers, for example, the top manager can grant a high or a low decision-making autonomy to the CVC managers. The CVC managers, in turn, can abuse this autonomy for their own benefit in an opportunistic manner. Another example is the execution of control by the TMT, which can be expressed by setting goals to incentivize CVC managers on these goals. The CVC managers can stick to those goals and rules or deviate from them. Because the TMT is not able to constantly and closely

supervise the CVC managers' activities, information asymmetries are a natural outcome. Concluding from these examples, we argue that agency theory is a fruitful theoretical lens that is able to capture the interplay between corporate top managers (TMT) and CVC managers. Our approach is further supported by Dushnitsky and Shapira (2010: 991) who state that "CVC provides an attractive setting to study all three elements of the principal-agent framework", this is, incentives, managerial behavior and the corporates' performance respectively TMTs' outcome.

The vast majority of agency theoretical research both in the CVC context and the related venture capital (VC) context looks at relationships between VC firms/CVC units and their portfolio companies (Sapienza and Gupta, 1994; Maula, 2001; Arthurs and Busenitz, 2003; Christensen, Wuebker, and Wustenhagen, 2009; Maula *et al.*, 2009). For instance, Weber and Weber: 263 (2011) in their study on CVC-PC relationships highlight that the investigated "CVCs found that the PCs can make life difficult because of the classic principal-agent issue." However, studies that investigate agency problems between TMT and CVC managers on the CVC individual level are rare (Drover *et al.*, 2017).

In this paper, we focus on the interplay between the corporates' top management team and CVC units' managers (individual level) and how agency conflicts contained therein affect the survival of the CVC program. We argue the CVC individual level to be characterized by a multitude of factors that are highly interrelated. For example, the above described decision-making autonomy of CVC managers might directly impact the effectiveness of outcome-based incentive structures for CVC managers as incentivization of agents might work less under situations of low autonomy (Eisenhardt, 1989). This idea of interconnections between the factors goes in line with Hill and Birkinshaw (2008) early suggestion that CVC units represent config-

urational settings of decisions regarding structures and systems that are best examined as bundles “[f]ollowing configurations logic” (Hill and Birkinshaw, 2008: 428) which, in turn, could influence CVC survival.

Thus, the aim of this paper is to understand – from an agency theory lens – which bundles of agency-related factors (conditions) lead to CVC units’ survival or failure (non-survival). To identify such bundles of survival/non-survival conditions, we apply a configurational approach using fuzzy-set QCA (fsQCA). This method suits well research that aims at identifying interrelatedness of influencing factors (Ragin, 2008; Fiss, 2011) and it thereby allows us to capture agency problems in the CVC context without losing the complexity agency theory assumes. Doing so, we answer calls from Dushnitsky (2012) and Drover *et al.* (2017) for new methodological approaches in CVC research that do not rely on regressions or other correlational methods. We base our analysis on a German proprietary dataset of three surveys of quantitative and qualitative data on CVC units collected over a period of 12 years between 2000 and 2012. Our results clearly reveal that it is, indeed, bundles of influencing factors rather than single variables which mutually impact survival as outcome. More precisely, we find seven solution terms that result in four CVC unit types leading to survival. We further provide explanations for these solution terms based on agency theory.

Our study contributes to CVC research in various ways: First, we contribute to CVC literature by shedding light on the widely unexplored relationship between corporates’ TMT and CVC units’ managers and how agency-constellations between them influence the survival of CVC units. Second, we demonstrate the appropriateness of agency theory on CVC individual level and show that agency theory helps to explain (non-)survival of CVC units with potential tensions between CVC managers and the corporates’ TMT. Third, we add to CVC literature by demonstrating the interrelatedness of important, yet well-known factors influencing CVC unit survival and showcase the causal asymmetry and equifinality of these influencing factors.

## **4.2 Theoretical background**

### **4.2.1 CVC and survival**

Overlooking CVC literature as a whole, four big activity waves have been described in the past that prove cyclical up-and-down movements of incumbents' CVC engagements (Gompers and Lerner, 1998; Maula, 2007; Bielesch *et al.*, 2012; Dushnitsky, 2012; Basu *et al.*, 2016b; Drover *et al.*, 2017). Dushnitsky (2012), for example, observed four CVC waves in the U.S. while Soluk and Landau (2016) described only two waves for CVC activity in Germany. These differences between regions led to various calls for taking more European studies into consideration in order to address different institutional contexts (Colombo and Shafi, 2016b; Colombo and Murtinu, 2017).

Prior research describes an average CVC unit life expectancy of 2 to 6 years, depending on the context (Fast, 1981; Rind, 1981; Gompers and Lerner, 2001). More recently, Dushnitsky (2012) reports an average longevity for U.S.-based CVC units of only 2.2 years which means that such units are susceptible to failure at a relatively early time in their life-cycle. At the same time, Leten and van Dyck (2012) argue, that a CVC unit usually needs 5 to 10 years to reach a level of stable performance. Thus, it seems that a reasonable number of CVC programs left the market without any chance to reach the desired performance (Burgelman and Välikangas, 2005; Garrett, 2010). Against the background of these statistics, in the CVC context, survival is a subject of high relevance because it can be considered an essential prerequisite for performance and thus a standalone success factor (Hill and Birkinshaw, 2014). As Hill and Birkinshaw (2008: 431) state, survival is “clearly a necessary condition for long-term success, and given the high mortality rates in the world of corporate venturing it is not a trivial matter for a unit to survive this long”.

Possible explanations for the cyclical interest of corporations' in CVC and their decisions to often prematurely terminate their CVC units are manifold, including failure of the actual CVC activities, downturns in company performance, a strategic reorientation (Sykes, 1992; Simon, Houghton, and Gurney, 1999), or a loss of political will in the parent company (Fast, 1978). Another reason of CVC units' non-survival can be altering economic conditions (Gompers and Lerner, 1998). This change in economy might vary from one country to another. Further research has linked CVC unit types such as exploiters or explorers (Hill and Birkinshaw, 2008) or the units' capability of becoming ambidextrous organizations (Hill and Birkinshaw, 2014) to CVC survival. Additionally, Teppo and Wustenhagen (2009) have developed a conceptual model that links organizational culture and different moderators such as management and evaluation skills to CVC survival.

These studies help gaining a better understanding of (early) termination of CVC units mainly on an organizational or market level. However, there is strong reason to believe that CVC units' performance and survival are significantly influenced by individual behaviour (Drover *et al.*, 2017). For instance, Teppo and Wustenhagen (2009) indicate a negative effect between investment decision-making and CVC fund survival, as investment decisions might be influenced by conflicts between CVC managers and parent firm managers stemming from their differing venturing expertise.

However, afar from some theoretical thoughts in literature, this important individual level is largely unexplored and widely neglected so far, although individual decision-making in CVC activities seems to be essential to better understand CVC units' survival. Therefore, we want to shed light on this individual level and uncover underlying mechanisms that might influence CVC termination.

We argue that the relationship between TMT and CVC managers is key and, at the same time, characterized by reciprocal dependencies, information asymmetry, conflicts of interest etc., this



is to be afflicted with typical agency problems. We further argue, that these agency problems might affect CVC survival, for example, via investment decisions of CVC managers. In the following chapters, we will delve deeper into these agency issues in this particular TMT-CVC manager constellation and shed light on the specific mechanisms involved.

#### **4.2.2 Agency theory**

Enrooted in neoclassical economics, agency theory is one of the most prominent theories that forecast human behavior (Jensen and Meckling, 1976; Shin and You, 2017). The agency lens has been applied to a variety of academic disciplines, such as psychology (Mayer and DaPra, 2012), sociology (Westphal and Zajac, 2013), law (Couwenberg and Lubben, 2013), political science (Moynihan, Pandey, and Wright, 2012), and frequently to business and economics (Gomez-Mejia, Makri, and Kintana, 2010; Misangyi and Acharya, 2014). Agency theory serves as a major approach for explaining suboptimal choices in economics and management (Bosse and Phillips, 2016).

First mentioned by Jensen and Meckling (1976), the theory describes the relationship between a principal and an agent, whose actions are based on self-interested utility maximization (Crook *et al.*, 2013). Agency theory assumes that principals generally have different agendas than the agents (Eisenhardt, 1989; Bosse and Phillips, 2016). Agents might be more risk averse than the principals (e.g., the firm or top managers), because agents might risk their jobs with taking risky decisions that eventually turn out as failing (Jones and Butler, 1992). Thus, from an agency perspective, the success of division of labor is dependent on successful alignment of incentives between agents and principals, or, put differently, the alignment of rewards with risk preferences (Eisenhardt, 1989; Hill *et al.*, 2009). However, due to the assumed opportunism this task is non-trivial. Principals are often not able (time-constrained, costs of monitoring, or the sheer impossibility) to monitor agents closely or are only able to see the effect of the agents' behavior

on the long term (Jones and Butler, 1992). By optimizing their personal pay-out (e.g., by increased income or by more secure employment), agents might accept the resulting inefficiencies and sub-optimal returns for the principal (Bosse and Phillips, 2016). To reduce such undesired agency conflicts, agency theory proposes that one should seek to align actors' varying interests (Misangyi and Acharya, 2014). According to the theory, this alignment can be reached by a wide range of governance mechanisms (Shin and You, 2017), executive equity programs (Jensen and Meckling, 1976), or monitoring (Fama and Jensen, 1983). In the recent past, some scholars challenge the generic assumptions of exclusively self-interested utility maximizers (Bosse, Phillips, and Harrison, 2009). Their view is supported by inconsistent findings that do not back the assumptions of the standard agency logic. Bosse and Phillips (2016: 276), for instance, state that "[...] still, mixed empirical findings challenge us to refine the theory in search of more nuanced explanations." Gormley and Matsa (2016) argue that risk-related agency challenges can even be worsened through financial incentivization of decision-makers. Thus, agency theory is especially suitable to investigate the TMT-CVC manager relationship as financial incentivization for decision makers (CVC managers) is a tool often-used by the TMT.

### **4.2.3 CVC and agency theory**

In the CVC and the related VC contexts, agency theory is a lens predominantly used to explain phenomena in the relationship between VC/CVC unit and their portfolio companies (Sapienza and Gupta, 1994; Gompers, 1995; Maula, 2001; Arthurs and Busenitz, 2003; Christensen *et al.*, 2009). Little research has been accomplished analyzing agency related problems within the very special relationship between the corporates' TMT and the respective CVC managers (Drover *et al.*, 2017). The few exceptions (Hill *et al.*, 2009; Benson and Ziedonis, 2010; Dushnitsky and Shapira, 2010) mostly include agency theory as one aspect of their work but do not

really carve out the special characteristics of the complex setting between CVC unit and corporate mother from an agency perspective.

The relationship between CVC managers and their mother firms' TMT is crucial as investments made through CVC units are to a large extent initialized and driven by a single or a few CVC managers on whose decision-making competency and overview the corporate mother must rely (Hill *et al.*, 2009). This holds as the CVC managers are often operating rather autonomously when screening the market for potential portfolio companies. These managers serve as a "matchmaker or an enabler to find, invest in, support, and monitor those new ventures that are likely to help meet the stated strategic and financial goals of one or more corporate BUs" (Weber and Weber, 2011: 257). CVC managers, thus, occupy a prominent position within the investment process where information asymmetries are present between CVC managers and their respective TMT. These information asymmetries are, in turn, linked to agency problems. Addressing these agency problems remains an important task for the TMT when setting up/running a successful CVC unit. The task is challenging as it is the CVC manager who has a large impact on the day-to-day investment practices within CVC units (Dokko and Gaba, 2012a). In addition, CVC units play a special role within their respective mother companies as their business is the financing of rather risky projects that sometimes do not lie within the boundaries of the knowledge base of the corporate mother. This is reflected in the often-stated assumption that CVC can be considered a means for exploration versus the more stabilizing, less risky, efficiency driven, and predominantly exploitation-based actions of the corporate mother (Schildt *et al.*, 2005; Gupta, Smith, and Shalley, 2006; Wadhwa and Kotha, 2006; Hill and Birkinshaw, 2008). Thus, at the heart of CVC lies the inclusion of entrepreneurial behavior into the firm. This inclusion implies potential tensions between the corporates' TMT and the CVC managers, a constellation which, by its very nature, covers potential agency problems. In order to ensure success these problems need to be solved. In sum, linking the above described TMT-

CVC-manager constellation and agency theory represents a research gap that is worth being investigated. This study thus aims to shed light on this specific agency relationship and its impact on CVC unit's survival.

In the next section we will theoretically derive and describe the relevant conditions of our analysis as well as their expected interrelations. Before that, we summarize the overall line of argumentation that we have developed over the course of the article so far. First, we focus on the context of CVC survival, which represents a crucial requirement for long-term success (Hill and Birkinshaw, 2014). Given the short lifespan of CVC units that might hinder these units to reach the desired performance (Burgelman and Välikangas, 2005; Garrett, 2010), we consider CVC unit survival to be an important subject to bring into question. Second, literature suggests that CVC survival might be influenced by mechanisms that lie on the individual level. Until today, this perspective on individuals' behavior in the context of CVC remains sparsely researched (Drover *et al.*, 2017). Third, we focus on the key relationship between TMT and CVC manager, as these parties are involved in significant decision-making (e.g., investment decisions) that might influence the survival of a CVC unit. Fourth, the relationship between TMT and CVC unit managers shows the typical pattern of a principal-agent relationship (Dushnitsky and Shapira, 2010). Therefore, agency theory is appropriate and helpful to investigate the governance mechanisms according to the interplay between CVC managers and their mother firms' TMT.

We thus develop propositions which touch a significant range of agency issues on the individual CVC level and address governance mechanisms in the specific individual CVC context. These governance mechanisms might reduce two important agency problems, namely differences in risk propensity and goal conflicts that mainly result from information asymmetry and that might influence CVC units' survival.

#### 4.2.4 Conditions, interrelations and propositions

In the following, we present our six agency-related conditions (*carried interest, decision-making autonomy, strategic fit, strategic support, strategic goals, financial goals*) embedded in proposed bundles that are based on agency theory, CVC literature and, if available, on existing agency related CVC research. Such procedure, developing conditions and deducing propositions for a configurational approach, has also worked very well in other studies that use QCA (Bell, Filatotchev, and Aguilera, 2014; Cui *et al.*, 2016; Lewellyn and Fainshmidt, 2017).

##### ***Alignment of risk preferences through contractual incentivization and monitoring (carried interest and autonomy)***

Incentives schemes (outcome-based contracts) are particularly important in the CVC context and are often employed in managers' contracts through *carried interest*. *Carried interest* is a profit share that the CVC manager obtains through the CVC units' investments he/she is responsible for (Hill *et al.*, 2009). Dushnitsky and Shapira (2010) empirically demonstrate that incentives do influence CVC managers' investment behavior which, in turn, impacts performance. However, Basu *et al.* (2016b) conclude that studies regarding the effect of variable compensation on the success of CVC units produce inconsistent findings.

Jones and Butler (1992) argue that incentive practices can be problematic depending on the ability of the corporates' TMT to monitor agents' behavior. Such monitoring can be facilitated by a mechanism described in agency theory: restricting the agent's *decision-making autonomy* (Roth and O'Donnell, 1996). Thus, a further crucial condition is the monitoring of CVC managers by constraining or enlarging their *decision-making autonomy* regarding investment decisions (Hill *et al.*, 2009). Assuming a certain degree of opportunism among CVC managers, we argue, that *decision-making autonomy* and outcome-based incentives (*carried interest*) for agents (CVC managers) represent two sides of the same coin that reflect the agency problem at

its very core: the alignment of risk preferences. When CVC managers' behavior is monitored rather loosely, the amount of their outcome-based incentives (*carried interest*) in their contracts should be lower – and the reverse. In their investigation, Benson and Ziedonis (2010: 479) find indications that “superior monitoring and compensation of investment activities” on program level reduce agency problems. We thus state our first proposition:

*Proposition 1: The employment of carried interest (outcome-based contracts) and decision-making autonomy form a bundle that affects survival of CVC units.*

***Alignment of risk preferences through strategic proximity (carried interest and strategic fit)***

Agency theory argues that uncertainty affects the behavior of risk averse agents (Eisenhardt, 1989). As a consequence, agents will avoid risky decisions in order to not be responsible for faulty decisions (e.g., loss of invested money, problematic investments) and to not face negative consequences of their own decisions. Transferred into the CVC context, this uncertainty is well reflected by CVC managers' uncertainty regarding their investment decision they have to make. When taking those decisions one important decision-making criteria concerns the *strategic fit* between the mother corporations' business activities and the respective portfolio company. Literature suggests that, when CVC investments are made mainly into new ventures that show a limited or no overlap with the mother companies' industry (low *strategic fit*), investment risk and CVC managers' uncertainty increase (Sykes, 1986; van de Vrande and Vanhaverbeke, 2013).

Generally, agency theory assumes that, in order to mitigate risk averse behavior, an “outcome-based contract is the appropriate contract to promote the bearing of uncertainty and reduction of opportunism” (Jones and Butler, 1992: 744). However, if the uncertainty of the investment decision the CVC manager must take reaches a level at which he/she has to rely on external

factors rather than his or her own capabilities in overlooking the market, outcome-based contracts (*carried interest*) might put the manager in personal risk. For example, Eisenhardt (1989: 61) states: “When outcome uncertainty is low [high *strategic fit*], the costs of shifting risk to the agent are low and outcome-based contracts [*carried interest*] are attractive. However, as uncertainty increases [low *strategic fit*], it becomes increasingly expensive to shift risk despite the motivational benefits of outcome-based contracts.” We therefore argue that outcome-based contracts with CVC managers (*carried interest*) have a positive impact on CVC units’ survival only if the strategic distance (risk or uncertainty) is rather low (high *strategic fit*). Thus, we conclude:

*Proposition 2: The employment of carried interest is positive for survival of CVC units only if it occurs in a bundle with investments characterized by a high strategic fit.*

***Alignment of risk preferences through reduction of uncertainty (strategic fit, carried interest and strategic support)***

The arguments brought up for proposition 2 suggest that low strategic proximity (low *strategic fit*) between the corporate and portfolio company might increase the above stated agency problems (risk and uncertainty) in the CVC context when *carried interest* (outcome-based contracts) is present. However, sometimes it is exactly these strategically distant investments that the TMT wants to pursue with their CVC activities (Dushnitsky and Lenox, 2006; van de Vrande and Vanhaverbeke, 2013). For example, keeping a window on technology might include investing outside the firm’s core (van de Vrande and Vanhaverbeke, 2013) and thus makes a low *strategic fit* of investments probable or even “necessary to get early access to new knowledge, which in turn can lead to first-mover advantages” (van de Vrande and Vanhaverbeke, 2013: 1022).

In CVC units that particularly strive for investments with low *strategic fit*, the potential agency problem of uncertainty is still present. Thus, the CVC manager is only partially capable to take a sound decision as he/she cannot rely on, for instance, profound BU managers' knowledge. As a consequence, such uncertainty needs to be mitigated through the alignment of uncertainty and incentives. As outlined above, agency theory suggests that monitoring or bonding activities are needed in order to make agent's outcome-based contracts (*carried interest*) effective and to overcome the agency problems (Jones and Butler, 1992).

In the CVC context, a typical activity a CVC manager might engage in to reduce such uncertainty is to get involved with the PC in order to provide strategic support (Ernst *et al.*, 2005). This high involvement not only implies recurring interactions between the CVC managers, the BUs and the portfolio companies but also allows such involvement to get reciprocal access to and exchange strategically relevant information. Following these arguments, a high involvement of the CVC manager may help reduce his/her uncertainty and to level out potential negative consequences that might arise due to a low strategic fit. Thus, from an agency perspective, CVC managers might try to reduce uncertainty by getting involved into their PCs with the purpose to provide them with strategic support and thus establishing a closer bond with them. This argument goes in line with Sykes (1990) who argues that success of a CVC program is more likely to be achieved if an active and formalized type of cooperation involving a recurring interaction with portfolio companies such as a strategic partnership, is in place. We conclude:

*Proposition 3: If the uncertainty for CVC managers is high (low strategic fit) and carried interest is present, the TMT and the CVC managers must ensure a high involvement in strategic decisions of the PC (high strategic support) to positively affect survival of CVC units.*



***Reducing goal conflicts through the alignment of goals (strategic goals and financial goals)***

While traditional VCs are more homogeneous regarding their structures and objectives, CVC units have repeatedly been identified as particularly heterogeneous as they often differ in their structures and their pursued goals (Basu et al., 2016b; Drover et al., 2017; Hill et al., 2009). Consequently, researchers suggested a variety of different categories of CVC units (Burgelman, 1984; Siegel *et al.*, 1988; Chesbrough, 2002; Maula, 2007; Souitaris *et al.*, 2012). Particularly, the goals of CVC units (strategic versus financial) represent a frequently discussed topic in the context of CVC research. While independent VC funds follow financial goals, the majority of corporate investors pursues, to some degree, both financial and strategic goals, whereby usually strategic goals are predominant (Chesbrough, 2002; Basu *et al.*, 2011; Basu *et al.*, 2016b). To date, there is an ongoing debate as to how these different goals affect a CVC units' survival. Scholars have produced inconsistent evidence about the combination of financial and strategic goals and their effect on CVC unit's survival (Hill and Birkinshaw, 2008; Teppo and Wustenhagen, 2009; Hill and Birkinshaw, 2014). Hence, there is no agreement on the influence of strategic or financial goals on CVC units' survival. Hill et al. (2009), for instance, state that distinct goals are required to survive while Teppo and Wustenhagen (2009) handle survival as a precondition to realize financial and strategic goals. These inconsistent findings about the influence of strategic and financial goals on performance and survival naturally suggest that certain variables or mechanisms must have remained unobserved so far (Vanneste, Puranam, and Kretschmer, 2014).

A possible explanation for this ambiguity might be provided by agency theory since it rests on the assumption that the goals of principals (TMT) and agents (CVC managers) differ (Arthurs and Busenitz, 2003; Christensen *et al.*, 2009). However, the goal conflict between both parties can be mitigated through the alignment of goals (e.g., via incentives or monitoring)

(Eisenhardt, 1989). In order to distinguish between situations where goals between the TMT and the CVC managers are aligned and those where goals are not aligned, we investigate both TMT goals (*strategic goals* and the *financial goals* the corporate mother pursues with its CVC activity) as well as the individual goals of the CVC managers. The goals of the CVC managers can be identified indirectly. For example, whenever CVC managers are incentivized via outcome-based contracts (*carried interest*), they can be considered as agents driven by rather financial goals in their investment decisions. This example follows the argument that when they are financially incentivized via carried interest, they think and act in a more short-term way and thus might opt for investments that promise to generate high financial returns on rather short terms (Ernst *et al.*, 2005). This makes *carried interest* a useful tool for those TMTs that wish to pursue rather financial goals with the CVC unit they set up.

Based on the agency-related arguments above and inconsistent findings regarding the solely influence of financial and strategic goals on survival, we argue that a determined influence of a particular configuration of strategic or financial goals alone cannot be expected. Instead, we propose the combination of these goals with already mentioned agency-related factors to have an influence on survival:

*Proposition 4: The goals the corporates' TMT pursue with the CVC unit have a clear-cut influence on CVC survival only when in combination with agency-related factors.*

After having deductively derived our six agency-related conditions (*carried interest, decision-making autonomy, strategic fit, strategic support, strategic and financial goals*), their assumed interrelationships as well as the respective propositions, in the next section, we will present our sample and methodological approach. We further describe how we calibrated and measured the conditions in our analysis.

### **4.3 Sample and methodology**

#### **4.3.1 Sample**

Data was collected during three distinct time phases in Germany (2000, 2004, and 2012), thus covering a period of twelve years. For the three periods, we identified a population of 24 (2000), 24 (2004), and 29 (2012) CVC units through databases such as the German Private Equity and Venture Capital Association (BVK) and Invest Europe, formerly known as European Private Equity & Venture Capital Association (EVCA). In each wave in those years 2000, 2004, and 2012, we started our inquiry by sending out surveys to the managers of these identified CVC units. In a next step, we contacted those managers via telephone to make sure they received our survey, and to kindly ask them to complete it. Additionally, we arranged personal interviews with the CVC managers. As a result, in most cases we ended with questionnaires and interviews which allowed data triangulation. The three waves resulted in an overall sample size of 64 CVC units, with 19 (79%) observed units in 2000, 24 (100%) units in 2004, and 21 (72%) units in 2012. While this sample is relatively small compared to other empirical work on CVC (e.g., Hill et al., 2009; Hill and Birkinshaw, 2014), it captures an average of 83% of the population of CVC units that was present in the German market at the respective points in time.

Because there may be cultural differences between the German market and other nations, we believe that a stable and consistent institutional context helps to better understand agency problems in the context of CVC survival. For example, according to Hofstede and Minkov (2010), the United States and Germany strongly differ in their long term normative orientation. Short-term-oriented cultures with low scores are oriented towards profits in this year or this quarter, whereas long-term oriented cultures like Germany are oriented on market positions and long-term success. Thus, we see an advantage in investigating one culturally homogenous sample as potential differences in culture between cases might affect our results.

### 4.3.2 Analytical approach

Hill and Birkinshaw (2008) suggested a configuration theoretical approach to the CVC context. Miller and Mintzberg (1983: 57) defined configurations as “commonly occurring clusters of attributes [...] that are internally consistent, such that the presence of some attributes can lead to the reliable prediction of others.” This means that each configuration consists of congruent, mutually supportive elements (Miller, 1986). Moreover, configurational methods assume equifinality, this is, that “two or more organizational configurations can be equally effective in achieving high performance” (Fiss, 2007: 1181). QCA allows for understanding important aspects of complexity in causation and takes into account *conjunctural causation* (i.e., only the conjunction of attributes really brings about an outcome (Ragin, 2008)), *asymmetry* (i.e., depending on the states of other conditions, both the presence as well as the absence of a condition can cause an outcome (Misangyi *et al.*, 2017), and *equifinality* (i.e., one outcome can be caused by many different configurations of conditions (Rihoux and Ragin, 2009)). Thus, whenever theory or empirical evidence leads to configurational assumptions about the interplay between influencing factors for a certain outcome, QCA is a well-fitting and powerful method. Through Boolean algebra, QCA identifies (sets of) conditions that are either necessary or sufficient for an outcome to occur. While necessity means that a condition (or conjunction) must be present (or absent) to make an outcome possible, sufficiency describes conditions (or conjunctions) that are “causes that always lead to the outcome” (Vergne and Depeyre, 2016: 1657). Thus, especially sufficiency analysis is “well-equipped for unraveling the equifinality inherent in complex causality” (Misangyi *et al.*, 2017: 264) and therefore is our main focus of inquiry.

We employ fuzzy set qualitative comparative analysis (fsQCA) to our data as this method is well-suited for analyzing complex interrelations between a set of conditions, and their combined effect on an outcome of interest. Since its introduction (Ragin, 1989), QCA as a method is on the rise in disciplines such as management (Crilly, Zollo, and Hansen, 2012; Misangyi

and Acharya, 2014; Greckhamer, 2016), innovation and entrepreneurship (Kulins, Leonardy, and Weber, 2016; Mandl, Berger, and Kuckertz, 2016; Muñoz and Kibler, 2016; Kraus, Ribeiro-Soriano, and Schüssler, 2017) that take advantage of being able to analyze complex causality between various conditions (Bell *et al.*, 2014). Some authors even argue that the success of this sharply increasing method (Kraus *et al.*, 2017) led to a neo-configurational perspective in the field of management and its adjacent fields (Misangyi *et al.*, 2017).

### 4.3.3 Measures and calibration

To be computable in an fsQCA, all variables, or conditions, must be calibrated, that is, for all variables the researcher must decide about thresholds that represent memberships in sets (Rihoux and Ragin, 2009). These membership scores then represent qualitative differences between cases (Schneider and Makszin, 2014). In the following, we describe measurement of all used variables and the calibration strategy we employed for every variable. *Table 14* shows descriptive statistics and correlations for all variables:

**Table 14: Descriptive statistics and correlations**

| Variables                       | mean | s.d. | 1     | 2     | 3    | 4     | 5     | 6    |
|---------------------------------|------|------|-------|-------|------|-------|-------|------|
| 1 Importance of strategic goals | 3.36 | 0.88 |       |       |      |       |       |      |
| 2 Importance of financial goals | 3.70 | 1.28 | 0.00  |       |      |       |       |      |
| 3 Carried interest              | 0.38 | 0.49 | -0.10 | 0.04  |      |       |       |      |
| 4 Strategic support             | 4.00 | 0.83 | 0.03  | 0.33  | 0.16 |       |       |      |
| 5 Decision-making autonomy      | 0.53 | 0.50 | -0.02 | 0.10  | 0.21 | 0.12  |       |      |
| 6 Strategic fit                 | 0.77 | 0.43 | -0.05 | -0.07 | 0.14 | -0.06 | -0.14 |      |
| 7 Survival after four years     | 0.66 | 0.48 | -0.19 | 0.03  | 0.00 | 0.06  | 0.11  | 0.13 |

Note: Descriptive statistics and correlations are based on uncalibrated values; values of >0.3 are significant at  $p < 0.05$

### Outcome

*Survival:* We measured whether the CVC units were still operating four years after the surveys were sent out. Hill and Birkinshaw (2008) captured survival in a comparable manner, but chose a time interval of two years. Since the average life expectancy is about 2.2 years (Dushnitsky,

2012), we argue that a distance of four years is more appropriate. Thus, for the years 2004, 2008, and 2016, we coded survival as a dummy variable: one for still operating in the focal year, zero for not operating in the focal year. As survival by its very nature is a dichotomous variable (you can either be alive or not), we did not need to recalibrate this outcome. The survival rates were 68%, 58%, and 74% for the years 2004, 2008, and 2016, respectively, underscoring the relevance of survival as outcome measure.

### **Conditions**

*Importance of strategic goals:* In order to measure the extent to which strategic goals are important for a CVC unit, we decided to use a factor of four items that reflect the complexity and diversity of strategic goals of CVC units. We asked respondents to rate on five-point Likert scales ranging from “fully disagree” to “fully agree”, the extent to which the following goals apply to their CVC unit: (1) strengthening the own business through investing in complementary firms, (2) finding candidates for future acquisitions, (3) establishing a “window on technology” for early access to disruptive innovations, (4) building up an idea-pool that enables knowledge transfer into the parent company. The factor shows acceptable reliability ( $\alpha = 0.7$ ) similar to other publications that use this measure (e.g., Hill et al., 2009). As with all Likert scales in this work, although they in themselves might have qualitative calibration anchors (Misangyi et al., 2017), we shifted the mid-point of the scales slightly upwards for calibration to take into account a possible social desirability bias (Ordanini and Maglio, 2009; Muñoz and Dimov, 2015; Misangyi et al., 2017). Thus, we set the calibration anchors as follows: <1.5 for fully out of the set of high importance of strategic goals; 3.5 for neither in nor out of the set of high importance of strategic goals; >4.5 for fully in the set of high importance of strategic goals.

*Importance of financial goals:* We measured the importance of financial goals by asking respondents to rate on a five-point Likert scale the extent to which achieving above-average financial returns was important. As calibration anchors, we, again, set the thresholds at <1.5 for

fully out the set of high importance of financial goals, 3.5 for full ambiguity, and >4.5 for fully in the set of high importance of financial goals.

*Carried interest:* We set up our measure carried interest as binary variable that captured whether CVC units applied carried interest as incentive for CVC unit managers or not. Due to its binary nature, it did not need recalibration for use in QCA. Thus, we coded as follows: A value of one for CVC units that relied on carried interest, a value of zero for units that did not.

*Decision-making autonomy:* The measure decision-making autonomy is meant to reflect the CVC managers' autonomy in deciding about investments and overall strategies of the CVC unit. Therefore, we asked respondents to state to whom they had to report about such decisions. Whenever the managers directly reported to the executive board, we regarded them as autonomous in their decisions (i.e., a value of one for decision-making autonomy). For all other cases, that is, when managers had to discuss their decisions with managers on lower levels than executive board, we regarded them as non-autonomous (i.e., a value of zero for decision-making autonomy).

*Strategic fit:* For measuring the strategic fit between the PCs and the mother company of the CVC unit, we asked respondents to report the industries each of the PCs operated in. Afterwards, we checked for each year the industries the mother companies were operating in. Whenever the majority of investments of the CVC unit had been made in related industries, we rated the CVC unit to be investing mainly in firms with strategic fit with their own industry (i.e., a value of one for strategic fit). In all other cases, we regarded the cases as not investing mainly in firms with strategic fit with their own industry (i.e., a value of zero for strategic fit).

*Strategic support:* We define strategic support as the extent to which the CVC managers invest time and effort into either supporting their PCs directly in strategically relevant tasks or into making other corporate or business units support the PCs. Therefore, we directly asked the respondents to rate on a five-point Likert scale ranging from "very few" to "very much" the

amount of time and effort that went into these tasks. Again, we set calibration anchors for fully out of the set of high strategic support, full ambiguity, and fully in the set of high strategic support at <1.5, 3.5, and >4.5, respectively.

#### 4.3.4 Analyses

Before performing the QCA minimization procedure, we constructed a *truth table*, which is a matrix that lists all possible configurations of characteristics and tells whether these configurations lead to the outcome in question (Fiss, 2007). The matrix is usually compiled with software. In our case, we used the QCApro package in R (Thiem, 2016). A truth table has  $2^k$  rows (with  $k$  being the number of conditions) directly corresponding to the  $2^k$  corners of a vector space built from fuzzy sets (Rihoux and Ragin, 2009). The researcher then has to decide on (a) the frequency threshold (the minimum number of cases in a configuration to be accepted) and (b) the consistency threshold (the minimum value for the configuration's consistency in leading to the outcome) (Fiss, 2011). As Rihoux and Ragin (2009: 107] noted, "the number-of-cases threshold chosen by the investigator must reflect the nature of the evidence and the character of the study." Because we deal with a medium-sized sample and relatively high familiarity with many of the cases, we chose a frequency threshold of one. For the consistency measure, we chose to set a threshold that produces solution consistencies of  $\geq 0.9$  that is generally accepted as a high consistency standard across journals and textbooks (Schneider and Wagemann, 2012; Muñoz and Dimov, 2015; Campbell, Sirmon, and Schijven, 2016; Garcia-Castro and Francoeur, 2016). Additionally, we chose to have our decision-making process include the measure of proportional reduction of inconsistencies (PRI) with a benchmark of  $\geq 0.65$ . This measure helps prevent the minimization process from including truth table rows that produce solution terms (or subsets of solution terms) that turn out to be sufficient both for the presence and the absence of the outcome. This benchmark is consistent with that used by Greckhamer (2016). In the next section, we present and discuss our results.



## **4.4 Results and discussion**

We start with a brief description of our solution terms. We then highlight several patterns of the solution by making sense of single solution terms as well as by emphasizing differences across the solution terms. The subsequent discussion is embedded into existing literature and follows the propositions that we suggested in the theory section.

### **4.4.1 Results – configurations leading to survival and non-survival**

We present our solutions according to Fiss's (2011) suggestion: black circles indicate the presence of a condition in a solution term while crossed circles indicate its absence. Blank spaces mark conditions that are irrelevant for a certain configuration to be sufficient. The size of the circles indicates whether a condition is core (large circle) or peripheral (small circle).

#### ***Presence of survival as outcome***

We reveal seven different solution terms that lead to survival. Overall consistency of the solution is 0.92 with a coverage of 0.4 which accords well with other highly published work using the method (e.g., Campbell et al., 2016; Garcia-Castro and Francoeur, 2016; Muñoz and Dimov, 2015). *Table 15* presents the solutions for the presence of survival as outcome:

*Table 15: Configurations for survival*

|                                     | Solution    |      |      |      |      |      |      |  |
|-------------------------------------|-------------|------|------|------|------|------|------|--|
|                                     | 1.a         | 1.b  | 2.a  | 2.b  | 3.a  | 3.b  | 4    |  |
| High importance of strategic goals  | ⊗           | ⊗    | ●    | ●    | ⊗    | ●    | ●    |  |
| High importance of financial goals  | -           | ⊗    | ●    | ●    | ●    | ⊗    | ●    |  |
| Carried interest                    | ⊗           | ⊗    | ⊗    | ⊗    | ●    | ●    | ●    |  |
| Decision-making autonomy            | ●           | ●    | ●    | ●    | -    | -    | ⊗    |  |
| Strategic fit                       | ⊗           | ⊗    | ●    | -    | ●    | ●    | ●    |  |
| Strategic support                   | ●           | -    | -    | ⊗    | ●    | ●    | ⊗    |  |
| Consistency                         | 1.00        | 1.00 | 0.87 | 0.91 | 0.87 | 0.91 | 1.00 |  |
| PRI                                 | 1.00        | 1.00 | 0.87 | 0.91 | 0.87 | 0.91 | 1.00 |  |
| Raw coverage                        | 0.06        | 0.04 | 0.12 | 0.07 | 0.13 | 0.10 | 0.02 |  |
| Unique coverage                     | 0.01        | 0.01 | 0.09 | 0.01 | 0.10 | 0.06 | 0.02 |  |
| <b>Overall solution consistency</b> | <b>0.92</b> |      |      |      |      |      |      |  |
| <b>Overall PRI</b>                  | <b>0.92</b> |      |      |      |      |      |      |  |
| <b>Overall solution coverage</b>    | <b>0.40</b> |      |      |      |      |      |      |  |

The seven solution terms can broadly be grouped into four solution types. Accordingly, we combine solution term 1a and 1b into type 1 and solution terms 2a and 2b into type 2 as they are qualitative permutations of one another (Fiss, 2011; Misangyi and Acharya, 2014). The resulting type 1 (solution terms 1a and 1b) and type 2 (2a and 2b) represent rather autonomously operating units whose CVC managers are not incentivized by carried interest as a financial incentive for CVC managers. However, we differentiate both types with respect to, for example, the importance the TMT has ascribed to financial and strategic goals of the unit. While the TMTs of type 2 declare both strategic and financial goals as highly important, TMTs of type 1 do not. Also, for type 1 the strategic fit between the PCs and the mother company of the CVC unit is low, while for type 2 it is either high (2a) or irrelevant (2b).

Solution type 3 (terms 3a and 3b) is described by investments exhibiting a high strategic fit with the mother company, presence of carried interest as incentive for CVC managers, and a high strategic support. We differentiate between solution terms 3a and 3b (type 3) as they are

methodologically no permutations but are qualitatively different in one dimension: while solution term 3a is described by a presence of financial goals and an absence of strategic goals, for solution term 3b the opposite is true.

CVC units covered in solution type 4 share a high importance of financial as well as strategic goals. Unlike type 2, their investment managers are incentivized by carried interests and the units predominantly invest in ventures of their own branch. Strategic support is absent, and decisions are not made autonomously by the CVC units' investment managers.

***Absence of survival as outcome (non-survival)***

The absence of survival is failure (non-survival). Hence, by showing the absence of our outcome (c.f. *Table 16*), we are able to reveal configurations leading to the shutdown of CVC units.

***Table 16: Configurations for absence of survival***

|                                     | Solution    |      |      |
|-------------------------------------|-------------|------|------|
|                                     | 1           | 2    | 3    |
| High importance of strategic goals  | ⊗           | ●    | ●    |
| High importance of financial goals  | -           | -    | ⊗    |
| Carried interest                    | ⊗           | ●    | -    |
| Decision-making autonomy            | ⊗           | ⊗    | ⊗    |
| Strategic fit                       | ⊗           | ⊗    | ⊗    |
| Strategic support                   | ●           | ●    | ●    |
| Consistency                         | 0.88        | 1.00 | 1.00 |
| PRI                                 | 0.88        | 1.00 | 1.00 |
| Raw coverage                        | 0.09        | 0.07 | 0.06 |
| Unique coverage                     | 0.04        | 0.07 | 0.00 |
| <b>Overall solution consistency</b> | <b>0.93</b> |      |      |
| <b>Overall PRI</b>                  | <b>0.93</b> |      |      |
| <b>Overall solution coverage</b>    | <b>0.18</b> |      |      |

QCA reveals three distinct solution terms, again with sufficiently high scores in overall consistency (0.93) and coverage (0.18). All three solution terms consistently show the presence of high strategic support, the absence of decision-making autonomy as well as the absence of a high strategic fit. In short, non-autonomously acting CVC managers that on one hand predominantly invest outside of their mothers' branch and that on the other hand put high emphasis on supporting their portfolio companies strategically seem susceptible to failure. This seems to be the case either when both the strategic goals and carried interest are absent (solution term 1) or both present (solution term 2). Solution term 3 reveals – again in combination with the bundle of the three conditions described above (presence of high strategic support, and absence of autonomy as well as strategic fit investing) – that CVC units fail whenever they rate strategic goals as highly important and at the same time do not consider financial goals.

#### **4.4.2 Discussion**

##### ***Proposed bundles of carried interest and decision-making autonomy (proposition 1)***

We suspected that carried interest and decision-making autonomy of CVC managers form a bundle that jointly affects survival of CVC units. We are able to carve out two different mechanisms within this bundle:

First, whenever carried interest is present in our solution terms, decision-making autonomy as condition is either absent (solution term 4) or seems to not matter (solution terms 3a and 3b where autonomy as condition does not show up). This finding suggests that, once the principal-agent-conflict is solved or mitigated through carried interest (outcome-based compensation), decision-making autonomy is not necessary for survival. Thus, we put in perspective former assumptions in the CVC context. For instance, Dushnitsky and Shapira (2010) find that finan-

cial incentives (*carried interest*) can indeed help to solve agency problems. However, our results reveal that this finding must be relativized as it depends on the other influencing factors in the configuration (e.g., autonomy of CVC managers' decisions).

One explanation for our result (solution term 3a, 3b, 4) might lie in the strategic fit as in all three solution terms discussed strategic fit needs to be present as well, no matter the particular goals the CVC unit is meant to pursue. Our finding could thus indicate that strategic fit, a high industry proximity between the corporate mother and the PC, makes unnecessary a particular degree of autonomy (low decision-making autonomy). The decisions to invest in PCs that are related to the same industry can be evaluated by the TMT itself (or in combination with BUs), as it has all the attributes (industry knowledge, market knowledge etc.) to make an informed investment decision. To the contrary, decisions driven by autonomously acting CVC managers (high decision-making autonomy), which are financially incentivized (*carried interest*), could lead to avoidable principal-agent-conflicts between TMT and CVC unit managers. Because of the strategic fit between the corporate mother and the PC, we argue, there is already a relatively strong knowledge base for decision-making for corporate top managers (TMT) (and respective BUs). For this reason, we assume that CVC constellations representing solution terms 3a, 3b, 4 do not suffer from excessive information asymmetry. This moderate information asymmetry, in turn, allows the TMT to employ *carried interest* for CVC managers as incentivization strategy, regardless of the status of decision-making autonomy. Further, our finding supports Benson and Ziedonis (2010) who demonstrate that less autonomously acting CVC managers are easier to monitor which helps preventing agency problems.

Second, we find that whenever CVC managers are not incentivized by *carried interest*, their decision-making autonomy is high (solution terms 1a, 1b, 2a, and 2b). What is known so far, is that CVC managers' incentivization influences their investment behavior which, in turn, influences performance (Dushnitsky and Shapira, 2010). In our study, we do not only find solution

terms that include the presence of carried interest, but also solution terms including the very opposite. This finding allows to add some further insights to previous literature: Our solution suggests that in constellations in which CVC managers are not incentivized via carried interest, principal-agent-conflicts in the CVC context can partly be solved through non-financial means such as an increased decision-making autonomy. This substitution might be explained by a mechanism described by Bartling, Fehr, and Herz (2014: 2005): the notion that managers “intrinsically value decision rights beyond their instrumental benefit.”

With these rights, the decision-making autonomy of managers might work as a form of non-financial incentive strengthening managers’ “freedom of choice” or “individual autonomy”. Thus, extrinsic motivators seem to be partly substitutable by intrinsic motivators – still being incentives. The idea of intrinsic motivators for agents has recently been discussed in the development of agency theory (Pepper and Gore, 2015) and its application (Rivera-Santos, Rufín, and Wassmer, 2017). Thus, our empirical findings put in question the economic man modelled within agency theory and suggest that a model that puts emphasis on behavioral aspects through non-financial incentivization works consistently for CVC managers (Pepper and Gore, 2015). Roberts (2010) in his theoretical paper, argues that these “weak incentives” might be especially fruitful for principals that want to encourage their agents for more experimentation in decision-making which accords well with the overall context of CVC. For example, one CVC manager working for a publishing house stated in an interview:

*“It was a precondition for me to work here. That I can work rather entrepreneurial and that it is my baby. That I can properly participate and generate a return for my company.” (CVC unit 1)*

Summing up, in all solution terms leading to survival, we find that either an extrinsic (carried interest) or an intrinsic motivator (autonomy) is present. One explanation for the fact that we

find no solution in which both motivators must be present might be that extrinsic motivators for the agent can “crowd-out” intrinsic motivation (Frey and Jegen, 2001; Pepper and Gore, 2015). As a consequence, the freedom to act autonomously loses its value when monetary incentives are employed.

***Proposed bundles of carried interest and strategic fit (proposition 2)***

Literature suggests that, when CVC investments are made mainly into new ventures that show a limited or no overlap with the mother companies’ industry (low strategic fit), risk and uncertainty increase (Sykes, 1986; van de Vrande and Vanhaverbeke, 2013). We summarized in proposition 2 that the employment of carried interest is positive for survival of CVC units only if risk and uncertainty are at the same time reduced via a high strategic fit. Solution terms 3a, 3b, 4 confirm our second proposition. As already outlined in the proposition 2 section, this goes in line with agency theory as outcome-based incentives (in this case carried interest) are conducive for reducing uncertainty (Jones and Butler, 1992).

We are therefore able to demonstrate that incentivization of CVC managers can be a critical success (or survival) factor and thereby support Dushnitsky and Shapira (2010). However, we relativize their findings by demonstrating that incentivization has to be complemented by additional factors such as strategic fit with the corporates’ own branch. In other words, if the TMT decides not to employ carried interest, this is, financial incentives for the CVC managers, decision-making autonomy might serve as a non-financial substitute in order to replace carried interest (solution term 1a, 1b, 2a, 2b). Decision-making autonomy might also allow more dynamic investment decisions. For example, in our interviews a CVC manager of a large automotive company stated that, indeed, a high decision-making autonomy can help CVC managers to act more agile on the market:

*"And then, many other questions are answered as well, because, as I said, we want to move away from our classic concept so that we can invest more self-directed and that means more separated from the group. Just to be agile on the market." (CVC unit 2)*

***Proposed bundles with strategic fit, carried interest and strategic support (propositions 3)***

We further proposed that if the uncertainty for CVC managers is high (low strategic fit) and carried interest is present, the mother corporation and the CVC managers must ensure a high involvement in strategic decisions of the PC (high strategic support) to positively affect survival of CVC units. We did not find solution terms leading to survival that support the combination of low strategic fit, the use of carried interest, and high strategic support. Hence, we cannot prove the configuration expected in proposition 3. One possible explanation for this observation can be that a high involvement such as strategic support does not necessarily lead to highly qualitative support. As a consequence, putting time and effort in strategic support will not lower agency problems.

We further explain this observation by arguing that CVC managers are more likely to secure useful strategic support when they are equipped with industry know-how the portfolio company can put to use (Weber and Weber, 2011). This argument of a mutual dependence between strategic support and strategic fit is based on the assumption that strategic support comes with certain knowledge about a context, processes and practices within the corporate organization that increases the possibility to make the PC successful and achieve higher returns on investments (Poser, 2012). The CVC manager of a large automotive company summarizes strategic support activities as follows:

*"[...], so you have to guide it [the PC], but in an advisory function and not in an operational support function, because if we set up their managerial accounting, then they never learn it themselves. This is a bit like feeding your son and never telling him to take the spoon in his*



*hand. And then he will not learn it, [...], and of course it is always tempting to get everything for the guys and make it, but they must be able to stand completely on their own legs and, basically, that must be taught to them.” (CVC unit 3)*

These observations from the specific CVC context show that the theoretically derived expectation at this point is not sufficient to reveal the CVC practices leading to survival. Indeed, we find that the configuration of high strategic support in combination with low strategic fit, in turn, hinders a positive effect on survival (c.f. *Table 16*). Thereby, the more related the industries between mother company and PC are (strategic fit), the better the ability of the CVC unit to provide strategic support. Conversely, investments into new ventures of non-related industries (low strategic fit), lower the CVC manager’s ability to ensure proper strategic support for the portfolio companies. We notice that the bundle of strategic fit and strategic support seems to play a crucial role – for both the presence and the absence of survival. In this respect, we recall that the combination of low strategic fit and high strategic support consistently appears in all three terms leading to the absence of survival (c.f. *Table 16*).

Beyond the bundle of low strategic fit and high strategic support that shows off in the configurations of non-survival, we unexpectedly notice a further condition (low decision-making autonomy) that equally appears in the three configurations of non-survival. This finding connects well to former work by Siegel *et al.* (1988: 246) who found that “autonomy and a firm commitment of capital [...] are necessary conditions to provide an environment conducive to effective corporate venture capital operations”. Furthermore, it also fits to Hill *et al.* (2009) as they emphasize that high autonomy of CVC managers dedicated by the TMT leads to better performing CVC units. Regarding the other three conditions in those three solution terms leading to non-survival, we find no clear pattern. Therefore, the solution terms for the absence of survival are as plain as they can be. The combination of the absence of strategic fit and decision-making

autonomy, as well as the presence of strategic support brings about failure of CVC units. A possible explanation for this unsuccessful combination lies in the questionable resource allocation going along with this strategy in combination with a lack of knowledge of the CVC managers as well as BUs about the PCs' industries that prevents those parties to provide meaningful strategic support to the PCs or – even worse – might lead to wrong decisions and recommendations for the PCs. Moreover, the absence of decision-making autonomy in combination with the absence of strategic fit might be crucial for the CVC units' failure, as autonomous governance would allow CVC managers to better deal with the strains and conflicts of interests between the different parties involved (Burgelman, 1985; Dougherty, 1995). With low autonomy, CVC managers are less likely to quickly learn and generate knowledge about new markets, which would be necessary for investments with low strategic fit. While this result suggests that above described configurations are to be avoided, survival is not necessarily related to the configuration's inversion (only one solution term, 2a, leading to survival includes this very configuration of high decision-making autonomy and high strategic fit).

***Proposed bundles with goals and carried interest (proposition 4)***

Additionally, we proposed that the goals the corporates' TMT pursues with the CVC unit have a clear-cut influence on CVC survival only when in combination with agency-related factors. We argued that whenever CVC managers are incentivized via carried interest, they can be seen as agents driven by rather financial goals in their investment decisions and might opt for investments that promise to generate high financial returns on rather short term (Ernst et al., 2005). Following this argument, the goals between the TMT and the CVC managers are aligned, if financial goals of the TMTs and carried interest for the CVC managers are either both present, or, both absent. In three solution terms (1b, 3a, 4) we find that financial goals between corporates' TMT and CVC managers are aligned. Combined with further agency-related factors, in

our QCA model we do not see other clear patterns. This might lie, indeed, within the subjectivity of untimely CVC unit shut-downs by the TMT that are not based on robust assumptions (Burgelman and Välikangas, 2005; Campbell et al., 2003; Gompers and Lerner, 1998). Following this line of thought, a TMT decision to close or maintain a unit might simply not be grounded in and therefore be independent from information concerning the CVC unit's goal attainment.

We also find arguments for the little relevance of goals in our interviews with CVC managers. For example, the manager of a CVC unit of a global power and automation technology company stated:

*"But generally [...] I have learned, also in the category [importance of financial and strategic goals], the discussion is not necessary. Actually, I have not really seen a single case where I should say: This case is strategically extremely interesting. This can give a huge impact on our business. But financially, they will be going bankrupt anyway. This is a contradiction. In other words, there has never been a case where the question arises: It is strategically and financially completely off." (CVC unit 4)*

Another explanation for the limited importance of the strategic and financial goals for survival of the CVC unit might be a change or an adjustment in those very goals decided by the TMT. In our data, we see that the goals for CVC units are being adjusted over time. For example, one case in our sample, a big corporation in the media industry, in 2000 belonged to solution type 1. Twelve years later, we find the same CVC unit in solution term 3a. Whereas in 2000 they did not put high emphasis neither on strategic nor on financial goals at all, in the year 2012 the CVC manager states:

*“We really see ourselves as a financial investor, with the goal of generating a return and the positive effect or strategic value is more of a random nature or a positive by-product. So, we do not go around and ask for a shopping list or something, but we really want to try to go into the market, opportunistically driven to discover the best opportunities and then try to carry that into the group. And not the other way around.” (CVC unit 5)*

This statement goes in line with a statement from a CVC manager from a large household electronics company:

*“We [...] sometimes have a financial investor perspective, sometimes a strategic perspective. It constantly changes.” (CVC unit 6)*

Such an adjustment might come, for instance, with an adaption of the CVC managers’ incentivization structure which, in turn, would influence the way a portfolio company is supported or interacted with. We show that CVC units’ survival is not influenced by the goals set by the corporate TMT, instead it might be the ability of the CVC unit to permanently adapt to those changes in goal settings to be able to bring about these goals successfully.

Summarizing the discussion, we relativize the view of Dushnitsky and Shapira (2010) by demonstrating that it is not solely the incentivization of CVC managers that impacts the survival of CVC units, but that incentivization must be complemented by additional factors such as strategic fit between the corporates’ and the PCs’ industries. Additionally, financial incentives (carried interest) seems to be substituted by non-financial incentives (decision-making autonomy) in order to achieve CVC units’ survival. Also, we show that the combination of low strategic fit, high strategic support, and the absence of decision-making autonomy will lead to non-survival of the CVC unit. Furthermore, we reveal that the bundle of strategic fit and strategic support seems to play a crucial role in a CVC unit’s longevity – for both the presence and the

absence of survival. Finally, we demonstrate that financial and strategic goals are of little relevance when it comes to the survival or on non-survival of CVC units. Instead, we propose that it might be the capability of CVC units to permanently adapt to the changes in TMTs goal settings that leads to the CVC units' sustainable development.

#### **4.5 Conclusion**

This study set out to investigate from a principal agent perspective which bundles of influencing factors lead to CVC units' survival or non-survival as well as to find the interrelations in place that explain those bundles. By applying fsQCA we broadened the methodological approaches in CVC literature and answered to various calls in this field of CVC research (Dushnitsky, 2012; Biniari *et al.*, 2015; Drover *et al.*, 2017). Further, with this study we add one of the few studies investigating European data. We thereby respond to Dushnitsky's (2012) call on country level to extend the predominant, yet limited U.S. perspective that is mainly sourced from databases such as the Thomson Financial's VentureXpert database. Also, as our dataset is based on primary data collected over a period of 12 years, we deliver results that are less prone to be affected by CVC waves or external unusual conditions. Summarizing, our study contributes to research in three important ways:

First, we contribute to CVC literature by shedding light on the widely unexplored relationship between corporates' TMT and CVC units' managers and how agency-constellations between them influence the survival of CVC units. By investigating this individual level in the CVC context, we explore an important research-gap in CVC literature (Drover *et al.*, 2017). With this, we open up an important black box in CVC research and demonstrate that the decisions of individuals in CVC context influences (non-)survival of CVC units.

Second, we demonstrate the appropriateness of agency theory on CVC individual level and show that agency theory helps to explain (non-)survival of CVC units with potential tensions

between CVC managers and the corporates' TMT. Further, we demonstrate agency theory's boundaries as we show that in constellations in which CVC managers are not incentivized by the TMT, agency-conflicts in the CVC context can be solved through non-financial means such as an increased decision-making autonomy. With this, we contribute to agency theory by empirically strengthening theoretical arguments about the usefulness of more behavioral thoughts in agency theory.

Third, we add to CVC literature by demonstrating the interrelatedness of important, yet well-known factors influencing CVC unit survival and showcase the causal asymmetry and equifinality of these influencing factors. Doing so, we make a step forward and away from traditional work relying on correlational methods and contribute by highlighting the benefits of such configurational thinking for CVC research.

#### **4.6 Limitations and future research**

Of course, our study comes with some limitations. First, there might be the limitation of a relatively small sample. Nevertheless, we captured an average of 83% of the respective populations of CVC units in Germany which allows a very reliable overview over this national market. However, this sample size only allows for a limited number of conditions in our analysis, since the complexity of configurations increases exponentially (Schneider and Wagemann, 2012). Notwithstanding, QCA as a method is designed to work well with mid-size samples and does not seek to generate generalizations based on correlational significance (Berg-Schlusser *et al.*, 2009). This being said, we are convinced that, with our selected conditions, we represent a significant range of agency issues on the individual CVC level.

Furthermore, one might consider our strength of including only CVC units based in Germany as a limitation by stating this to be a narrow focus. Although we agree that generalizing our findings to a U.S. or worldwide context must be done carefully, we would still argue that our

specific data set represents an asset of our work that allows for enriching the dominant U.S. view in CVC research. By investigating a culturally homogenous sample we excluded potential cultural effects that might have affected our results. Likewise, we follow to various calls for taking more European studies into consideration in order to address different institutional contexts (Colombo and Shafi, 2016b; Colombo and Murtinu, 2017).

Above mentioned limitations point to fruitful research avenues. The promising view on different institutional contexts can enlarge our understanding about the respective CVC environment, and the programs' success or failure. Also, there is reason to believe that there are further conditions having an influence on survival and non-survival of CVC units. We therefore ask scholars for more studies investigating the influences on survival as a substantial factor for CVC programs' success. We further call for additional studies applying a configurational lens in the CVC context. Since global interest of CVC increases steadily (Drover et al., 2017), we ask for more studies investigating other contexts with high CVC activity such as Asia. Finally, further research could include a broader set of theories exploring mechanisms that explain relations between CVC managers, their units and their mother companies and how these relations effect CVC performance or survival.

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## APPENDIX

**Table A1: Summary of studies included in the systematic literature review**

| Study                         | Journal   | Methodology  | Data Source   | Theoretical Framework                          |
|-------------------------------|---|--------------|---|--|
| Burgelman, 1984               | California Management Review                                  | conceptual   | Field studies   | <i>not specified</i>                           |
| Block and Ornati, 1987        | Journal of Business Venturing                                 | quantitative | Questionnaire   | <i>not specified</i>                           |
| Siegel <i>et al.</i> , 1988   | Journal of Business Venturing                                 | mixed        | <i>n/a</i>  | <i>not specified</i>                           |
| Winters and Murfin, 1988      | Journal of Business Venturing                                 | quantitative | Journal of Business Venturing                         | <i>not specified</i>                           |
| Sykes, 1990                   | Journal of Business Venturing                                 | quantitative | <i>n/a</i>  | <i>not specified</i>                           |
| Sykes, 1992                   | Journal of Business Venturing                                 | mixed        | Field studies and interviews                          | <i>not specified</i>                           |
| Sorrentino and Williams, 1995 | Journal of Business Venturing                                 | quantitative | STR4 from PIMS (Profit Impact of Market Strategy)     | <i>not specified</i>                           |
| Gompers and Lerner, 2000a     | Concentrated corporate ownership. University of Chicago Press | quantitative | VentureOne  | <i>not specified</i>                           |
| Thornhill and Amit, 2001      | Journal of Business Venturing                                 | qualitative  | Survey data   | <i>not specified</i>                           |
| Chesbrough, 2002              | Harvard Business Review                                       | conceptual   | <i>n/a</i>  | <i>not specified</i>                           |
| Maula <i>et al.</i> , 2003    | Venture Capital   | quantitative | Venture Economics database                            | Relational View                                |
| Keil, 2004                    | Journal of Management Studies                                 | qualitative  | Survey data   | Research-, Knowledge-, Capabilities-based View |
| Dushnitsky and Lenox, 2005a   | Strategic Management Journal                                  | quantitative | VentureXpert /US Patent office, Compustat             | Absorptive Capacity, Learning Theories         |
| Dushnitsky and Lenox, 2005b   | Research Policy   | quantitative | VentureXpert, Compustat, and the U.S. Patent Database | Absorptive Capacity, Learning Theories         |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                 | <b>Journal</b>                                 | <b>Methodology</b> | <b>Data Source</b>                                       | <b>Theoretical Framework</b>  |
|------------------------------|--|--------------------|--|---|
| Ernst <i>et al.</i> , 2005   | R&D Management                                 | quantitative       | German association of VC firms and press reports         | <i>not specified</i>  |
| Knyphausen-Aufseß, 2005      | Venture Capital                                | qualitative        | <i>n/a</i>   | <i>not specified</i>  |
| Schildt <i>et al.</i> , 2005 | Entrepreneurship: Theory & Practice            | quantitative       | Compustat, Thompson Financial's Platinum database, USTPO | Absorptive Capacity, Learning Theories  |
| Weber and Weber, 2005        | Venture Capital                                | quantitative       | <i>n/a</i>   | <i>not specified</i>  |
| Dushnitsky and Lenox, 2006   | Journal of Business Venturing                  | quantitative       | VentureXpert, Compustat                                  | <i>not specified</i>  |
| Reichardt and Weber, 2006    | Technological Forecasting and Social Change    | qualitative        | <i>n/a</i>   | <i>not specified</i>  |
| Wadhwa and Kotha, 2006       | Academy of Management Journal                  | quantitative       | VentureXpert, Lexis-Nexis, Factiva                       | Absorptive Capacity, Learning Theories  |
| Allen and Hevert, 2007       | Journal of Business Venturing                  | quantitative       | National Venture Capital Association                     | <i>not specified</i>  |
| Maula, 2007                  | Handbook of Research on Venture Capital        | conceptual         | <i>n/a</i>   | <i>not specified</i>  |
| Weber and Weber, 2007        | Journal of Engineering & Technology Management | qualitative        | Survey data  | Absorptive Capacity, Learning Theories, Resource-/ Knowledge-/ Capabilities-based View, Social Network Theory & Social Capital Network Theory |
| Gaba and Meyer, 2008         | Academy of Management Journal                  | mixed              | VentureXpert, industry publications, IT firms' websites  | Institutional Theory  |
| Hill and Birkinshaw, 2008    | Journal of Business Venturing                  | quantitative       | Questionnaire  | Configurational Theory  |
| Katila <i>et al.</i> , 2008  | Administrative Science Quarterly               | quantitative       | Venture Economics, VentureOne, Lexis-Nexis               | Resource Dependency Theory  |



**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                       | <b>Journal</b>                                 | <b>Methodology</b> | <b>Data Source</b>   | <b>Theoretical Framework</b>                                    |
|------------------------------------|--|--------------------|--|---|
| Keil <i>et al.</i> , 2008b         | Strategic Management Journal                   | quantitative       | Multiple sources   | <i>not specified</i>  |
| Keil <i>et al.</i> , 2008a         | Journal of Management Studies                  | qualitative        | <i>n/a</i>   | Research-, Knowledge-, Capabilities-based View                  |
| MacMillan <i>et al.</i> , 2008     | National Institute of Standards and Technology | mixed              | Multiple sources   | <i>not specified</i>  |
| Benson and Ziedonis, 2009          | Organization Science                           | quantitative       | VentureOne   | Absorptive Capacity, Learning Theories                          |
| Dushnitsky and Shaver, 2009        | Strategic Management Journal                   | quantitative       | VentureXpert, Venture Economics  | <i>not specified</i>  |
| Hill <i>et al.</i> , 2009          | Strategic Entrepreneurship Journal             | quantitative       | Survey data, VentureXpert  | Institutional Economics   |
| Masulis and Nahata, 2009           | Journal of Financial Intermediation            | quantitative       | SDC VentureXpert database, VentureXpert, Compustat, CorpTech, CRSP database, IPO Prospectus                | Behavioral Agency, Upper Echelon Perspectives                   |
| Maula <i>et al.</i> , 2009         | Journal of Business Venturing                  | quantitative       | Venture Economics database   | Absorptive Capacity, Learning Theories, Institutional Economics |
| Narayanan <i>et al.</i> , 2009     | Research Policy                                | quantitative       | Research Policy  | <i>not specified</i>  |
| van de Vrande <i>et al.</i> , 2009 | Journal of Business Venturing                  | quantitative       | VentureXpert   | Real Options Theory, Institutional Economics                    |
| Weber, 2009                        | Schmalenbach Business Review (SBR)             | qualitative        | Survey data  | Social Network Theory & Social Capital Network Theory           |
| Yang <i>et al.</i> , 2009          | Journal of Business Venturing                  | quantitative       | VentureXpert, European Venture Capital Association, NVCA, and other key associations in Asia and Australia | Absorptive Capacity, Learning Theories                          |
| Benson and Ziedonis, 2010          | Journal of Financial Economics                 | quantitative       | VentureXpert, SDC, VentureOne, others  | <i>not specified</i>  |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                  | <b>Journal</b>                                     | <b>Methodology</b> | <b>Data Source</b>  | <b>Theoretical Framework</b>  |
|-------------------------------|--|--------------------|---|---|
| Dushnitsky and Lavie, 2010    | Strategic Entrepreneurship Journal                 | quantitative       | VentureXpert, SDC Database, Edgar database, websites  | Research-, Knowledge-, Capabilities-based View  |
| Dushnitsky and Shapira, 2010  | Strategic Management Journal                       | quantitative       | Thomson Financial's Venture Economics database (VE).  | Institutional Economics   |
| Ivanov and Xie, 2010b         | Financial Management                               | quantitative       | VentureXpert, New Issue database  | <i>not specified</i>  |
| Keil <i>et al.</i> , 2010     | Entrepreneurship: Theory & Practice                | quantitative       | Compustat North America   | Social Network Theory & Social Capital Network Theory   |
| Sahaym <i>et al.</i> , 2010   | Journal of Business Venturing                      | quantitative       | Venture Economics' VentureXpert database, financial and industry-level data from Standard & Poor's Compustat database, and the U.S. Census Bureau and Bureau of Economic Analysis's Industry Economic Accounts Databases. | Absorptive Capacity, Learning Theories , Real Options Theory  |
| Weber and Weber, 2010         | International Studies of Management & Organization | qualitative        | Questionnaire   | Relational View   |
| Anokhin <i>et al.</i> , 2011  | Long Range Planning                                | quantitative       | VentureXpert, Corporate Venturing Directory & Yearbook, Compustat & USPTO   | Research-, Knowledge-, Capabilities-based View, Social Network Theory & Social Capital Network Theory |
| Basu <i>et al.</i> , 2011     | Journal of Business Venturing                      | quantitative       | VentureXpert, Compustat Business Segment Data, Annual Survey of Manufactures, R&D Ratios and Budgets, Delphion database, Compact Disclosure   | Research-, Knowledge-, Capabilities-based View  |
| Ginsberg <i>et al.</i> , 2011 | Entrepreneurship Research Journal                  | quantitative       | Venture Economics, Compustat, other   | <i>not specified</i>  |
| Masulis and Nahata, 2011      | Journal of Financial and Quantitative Analysis     | quantitative       | SDC Platinum's M&A Database, VentureXpert   | Institutional Economics   |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| Study  | Journal                                     | Methodology  | Data Source   | Theoretical Framework  |
|--|---|--------------|---|--|
| Tong and Li, 2011                                | Organization Science                        | quantitative | VentureXpert, Lexis-Nexis, Hoovers Online & Standard and Poor's Corporate Descriptions, Thomsons Financial's Securities Data Company (SDC) database | Absorptive Capacity, Learning Theories , Real Options Theory |
| van de Vrande, Vanhaverbeke, and Duysters, 2011a | IEEE Transactions on Engineering Management | quantitative | Thomson VentureXpert database, MERIT-CATI Database, Thomson ONE Banker  | <i>not specified</i>   |
| van de Vrande <i>et al.</i> , 2011b              | Journal of Product Innovation Management    | quantitative | USPTO, VentureXpert, MERIT-CATI ,Thomson ONE Banker   | Real Options Theory  |
| Weber and Weber, 2011                            | Journal of Business Venturing               | qualitative  | Interviews, site visits, archival records   | Social Network Theory & Social Capital Network Theory        |
| Dokko and Gaba, 2012b                            | Academy of Management Journal               | quantitative | Corporate Venturing Yearbook, VentureXpert, SDC's Global Issues Database, SDC's Mergers & Acquisitions Database                                     | Institutional Theory   |
| Dushnitsky, 2012                                 | Oxford Handbook of Venture Capital          | conceptual   | <i>n/a</i>  | <i>not specified</i>   |
| Gaba and Bhattacharya, 2012                      | Strategic Entrepreneurship Journal          | quantitative | VentureXpert  | Behavioral Agency, Upper Echelon Perspectives                |
| Park and Steensma, 2012                          | Strategic Management Journal                | quantitative | VentureXpert, LinkSV, Internet Archive, Factiva, Lexis-Nexis  | Institutional Economics                                      |
| Souitaris <i>et al.</i> , 2012                   | Academy of Management Journal               | qualitative  | Semistructured interviews with principal informants, Archival data, E-Mail communication with confirming informants, independent expert validation  | Institutional Theory   |
| Yang, 2012                                       | Management Research Review                  | quantitative | VentureXpert, Compustat, USPTO  | Behavioral Agency, Upper Echelon Perspectives                |
| Basu and Wadhwa, 2013                            | Journal of Product Innovation Management    | quantitative | Compustat Business Segment data, VentureXpert   | Real Options Theory  |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                         | <b>Journal</b>                             | <b>Methodology</b> | <b>Data Source</b>   | <b>Theoretical Framework</b>  |
|--------------------------------------|--|--------------------|--|---|
| Maula, Keil, and Zahra, 2013         | Organization Science                       | quantitative       | Thomson Financial's SDC Platinum, VentureXpert   | Attention-based View  |
| Park and Steensma, 2013              | Strategic Entrepreneurship Journal         | quantitative       | VentureXpert, LinkSV, Internet Archive, Factiva, Lexis-Nexis, USPTO, SDC, Compustat                              | Institutional Economics   |
| Smith and Shah, 2013                 | Strategic Entrepreneurship Journal         | quantitative       | VentureXpert   | Absorptive Capacity, Learning Theories  |
| van de Vrande and Vanhaverbeke, 2013 | Entrepreneurship: Theory & Practice        | quantitative       | VentureXpert, MERIT-CATI, Thomson One Banker   | Real Options Theory   |
| Wadhwa and Basu, 2013                | Journal of Product Innovation Management   | quantitative       | VentureXpert, LexisNexis, Factiva database   | Absorptive Capacity, Learning Theories , Real Options Theory                              |
| Wang and Wan, 2013                   | Strategic Entrepreneurship Journal         | quantitative       | VentureXpert, Thomson Financial's Securities Data Corporation, New Issue Database                                | Research-, Knowledge-, Capabilities-based View, Signaling Theory, Institutional Economics |
| Chemmanur <i>et al.</i> , 2014       | Review of Financial Studies                | quantitative       | VentureXpert, Factiva, Google, Lexus/Nexus, Compustat, Dun & Bradstreet Database, SDC Global New Issues Database | Institutional Economics   |
| Hill and Birkinshaw, 2014            | Journal of Management                      | quantitative       | Survey data, VentureXpert  | Research-, Knowledge-, Capabilities-based View  |
| Noyes <i>et al.</i> , 2014           | Journal of Small Business Management       | quantitative       | VentureXpert   | Resource Dependency Theory  |
| Souitaris and Zerbinati, 2014        | Strategic Entrepreneurship Journal         | qualitative        | Interviews, Archival Data  | Institutional Theory  |
| Yang <i>et al.</i> , 2014            | Strategic Management Journal               | quantitative       | VentureXpert   | Absorptive Capacity, Learning Theories  |
| Bjørgum and Sørheim, 2015            | Technology Analysis & Strategic Management | mixed              | Interviews, secondary data   | <i>not specified</i>  |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                                 | <b>Journal</b>                      | <b>Methodology</b> | <b>Data Source</b>  | <b>Theoretical Framework</b>                  |
|--|-------------------------------------|--------------------|---|---|
| Da Gbadji, Luc Armel G. <i>et al.</i> , 2015 | Entrepreneurship: Theory & Practice | quantitative       | Datastream, Compustat, VentureXpert, Equity and Venture Capital Association (EVCA), National Venture Capital Association, other local VC associations | Institutional Theory                          |
| Lee and Kang, 2015                           | Industry & Innovation               | quantitative       | Securities Data Company (SDC) Platinum Database; ThomsonOne; VentureXpert, USPTO  | Real Options Theory                           |
| Pahnke <i>et al.</i> , 2015                  | Administrative Science Quarterly    | quantitative       | Survey, membership lists conference proceedings, Venture Source, Venture Xpert, additionally 40 Interviews  | Institutional Theory                          |
| Alvarez-Garrido and Dushnitsky, 2016         | Strategic Management Journal        | quantitative       | Multiple sources  | <i>not specified</i>                          |
| Anokhin <i>et al.</i> , 2016                 | Journal of Business Research        | quantitative       | VentureXpert  | <i>not specified</i>                          |
| Basu <i>et al.</i> , 2016a                   | Strategic Entrepreneurship Journal  | qualitative        | Interviews, VentureXpert  | <i>not specified</i>                          |
| Colombo and Shafi, 2016a                     | Strategic Management Journal        | quantitative       | VICO database   | Institutional Theory                          |
| Gaba and Dokko, 2016                         | Strategic Management Journal        | quantitative       | VentureXpert, Corporate Venturing Yearbook and Directory  | <i>not specified</i>                          |
| Kim, Gopal, and Hoberg, 2016                 | Informations Systems Research       | quantitative       | VentureXpert, Compustat, SDC platinum   | <i>not specified</i>                          |
| Sahaym <i>et al.</i> , 2016                  | Journal of Business Research        | quantitative       | VentureXpert, Compustat   | Behavioral Agency, Upper Echelon Perspectives |
| Wadhwa <i>et al.</i> , 2016                  | Journal of Business Venturing       | quantitative       | VentureXpert, USTPO, official database of the National Venture Capital Association  | Absorptive Capacity, Learning Theories        |
| Weber <i>et al.</i> , 2016a                  | Strategic Entrepreneurship Journal  | quantitative       | EVCA, BVK   | Relational View                               |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                                  | <b>Journal</b>                             | <b>Methodology</b> | <b>Data Source</b>   | <b>Theoretical Framework</b>                  |
|---|--|--------------------|--|---|
| Yang <i>et al.</i> , 2016                     | Journal of Strategy and Management         | quantitative       | VentureXpert, Compustat, US Patent Office  | Attention-based View                          |
| Galloway <i>et al.</i> , 2017                 | Journal of Business Research               | quantitative       | Security Data Corporation's (SDC) Global New Ventures, dMerger & Acquisition database                                    | Behavioral Agency, Upper Echelon Perspectives |
| Uzuegbunam <i>et al.</i> , 2017               | Entrepreneurship: Theory & Practice        | quantitative       | KFS database   | <i>not specified</i>                          |
| Belderbos <i>et al.</i> , 2018                | Journal of Business Venturing              | quantitative       | PATSTAT database, Thomson Financial's VentureXpert database, Thomson's SDC Platinum, MERIT-CATI                          | <i>not specified</i>                          |
| Ceccagnoli <i>et al.</i> , 2018               | Strategic Management Journal               | quantitative       | Deloitte ReCap (ReCap) database, PharmaProjects  | Real Options Theory                           |
| Kang, 2018                                    | Entrepreneurship Research Journal          | quantitative       | Deloitte ReCap database  | Life Cycle Theory                             |
| Lee <i>et al.</i> , 2018                      | Journal of Business Research               | quantitative       | (SDC) Platinum Database, Thomson One, USPTO, Lexis-Nexis DB  | <i>not specified</i>                          |
| Park and Bae, 2018                            | Technology Analysis & Strategic Management | quantitative       | Thomson One  | <i>not specified</i>                          |
| Titus and Anderson, 2018                      | Entrepreneurship: Theory & Practice        | quantitative       | Thomson Financial's Securities Data Company Platinum, VentureXpert, COMPUSTAT  | Attention-based View                          |
| Di Lorenzo and van de Vrande, 2019            | Strategic Entrepreneurship Journal         | quantitative       | VentureXpert   | <i>not specified</i>                          |
| Guo, Pérez-Castrillo, and Toldrà-Simats, 2019 | Journal of Financial Economics             | quantitative       | Compustat, Institutional Brokers Estimate Systems (I/B/E/S) database, SDC Mergers and Acquisitions database, Thomson ONE | <i>not specified</i>                          |
| Kang, 2019                                    | Management Decisions                       | quantitative       | Thomson ONE, Compustat   | Multiple Agency Theory                        |

**Table A1: Summary of studies included in the systematic literature review (continued)**

| <b>Study</b>                 | <b>Journal</b>                       | <b>Methodology</b> | <b>Data Source</b>   | <b>Theoretical Framework</b>                   |
|------------------------------|--------------------------------------|--------------------|--|--|
| Kim <i>et al.</i> , 2019     | Journal of Management                | quantitative       | Thomson One VentureXpert database, LexisNexis, Factiva, USPTO, NBER, Compustat | <i>not specified</i>                           |
| Park, LiPuma, and Park, 2019 | Journal of Small Business Management | quantitative       | CorpTech, VentureXpert/SDC Platinum (SDC)                                      | <i>not specified</i>                           |
| Ma, 2020                     | Review of Financial Studies          | quantitative       | VentureXpert, Factiva, Google, LexisNexis, Compustat, NBERPatent               | <i>not specified</i>                           |
| Park and LiPuma, 2020        | Journal of World Business            | quantitative       | VentureXpert, Thomson Financial's SDC (henceforth SDC) Platinum database       | Resource-/ Knowledge-/ Capabilities-based View |

**Table B1: Measures**

| Variable                                    | Dependent variable(s)  | References (extract)  |
|---|--|---|
| <i>Corporate firm financial performance</i> | <p>annual shareholder returns, average firm return on assets, capex, cash, market value, equity, firm cash, income, income before extraordinary items plus depreciation, liquidity, liquidity / firm's leverage, peer adjusted return / equity per share, profitability, ROA, sales revenue, stock returns / cash flow, Tobin's Q, / return on sales,</p> <p>To what extent have you accomplished these financial goals in the last year?</p> <p><i>Subjective measure(s):</i></p> <p>Contribution to top-line growth, Financial goals - to what extent have you accomplished this goal in the last financial year, Increased valuation of corporate stock</p> | <p>Anokhin <i>et al.</i> (2016), Baierl, Anokhin, and Grichnik (2016), Basu and Wadhwa (2013), Basu <i>et al.</i> (2011), Belderbos <i>et al.</i> (2018), Benson and Ziedonis (2009), Dokko and Gaba (2012b), Dushnitsky and Lavie (2010), Dushnitsky and Lenox (2005a), Dushnitsky and Lenox (2006), Gaba and Bhattacharya (2012), Hamm, Jung, and Park (2018), Jeon (2017), Keil <i>et al.</i> (2010), Kim <i>et al.</i> (2016), Maula <i>et al.</i> (2013), Noyes <i>et al.</i> (2014), Sahaym <i>et al.</i> (2016), Weber and Weber (2011), Weber <i>et al.</i> (2016a), Yang <i>et al.</i> (2014)</p>                              |
| <i>Corporate firm strategic performance</i> | <p>patent count, patent citations, log of the depreciated count of patents issued to a firm, citation-weighted patent counts, patents / sales</p> <p><i>Subjective measure(s):</i></p> <p>Strategic goals - to what extent have you accomplished this goal in the last financial year?</p>   | <p>Basu <i>et al.</i> (2011), Belderbos <i>et al.</i> (2018), Dushnitsky and Lenox (2005a), Dushnitsky and Lenox (2005b), Dushnitsky and Lenox (2006), Gaba and Bhattacharya (2012), Gaba and Meyer (2008), Kim <i>et al.</i> (2016), Kim <i>et al.</i> (2019), Koster (2018), Lee and Kang (2015), Lee, Kim, and Jang (2015), Lee <i>et al.</i> (2018), Phelps and Wadhwa (2012), Schildt <i>et al.</i> (2005), Smith and Shah (2013), (Toschi, Federico Munari, and Paul Nightingale, 2012), Wadhwa and Kotha (2006), Wadhwa <i>et al.</i> (2016), Weber and Weber (2011), Weber <i>et al.</i> (2016a), Yang <i>et al.</i> (2009)</p> |
| <i>CVC unit performance</i>                 | <p>IRR, number of investments, proportion of VC-backed IPOs, ROI,</p> <p><i>Subjective measure(s):</i></p> <p>Above-average ROI - to what extent have you accomplished this goal in the last financial year?</p>   | <p>Allen and Hevert (2007), Dokko and Gaba (2012b), Gaba and Meyer (2008), Gaba and Dokko (2016), Weber and Weber (2011), Wadhwa and Basu (2013), Weber <i>et al.</i> (2016a)</p>   |
| <i>New venture performance</i>              | <p>IPO, patent citations, patent count, sales</p> <p><i>Subjective measure(s):</i></p> <p>We are satisfied with this PC's financial performance,</p> <p>We are satisfied with this PC's strategic performance</p>  | <p>Kim <i>et al.</i> (2019), Koster (2018), Park and Steensma (2012), Park and Steensma (2013), van de Vrande and Vanhaverbeke (2013), Wadhwa and Basu (2013; Wadhwa <i>et al.</i>, 2016), Weber <i>et al.</i> (2016a), Yang <i>et al.</i> (2009), Yang, Nomoto, and Kurokawa (2009), Yang (2012)</p>   |



**Table B1: Measures (continued)**

| Traits / characteristics | Independent variable             | Description  |
|--------------------------|----------------------------------|--|
| <i>Focus of IOR</i>      |                                  |  |
| New knowledge            | Industry diversity               | The (portfolio) diversity captures the variation of knowledge bases and is therefore a proxy for the inclusion of new knowledge from other industries. It is measured by the Herfindahl index of patenting within different patent classes, the distribution of a firm's patents over the primary technology class, or similar measures. In turn, the industry relatedness measures the overlap of knowledge bases, a proxy for the existing knowledge in a firm. It is typically measured as average match between the Standard Industrial Classification (SIC) codes of the corporate parent and its ventures. |
| Existing knowledge       | Industry relatedness             |  |
| <i>Key activity</i>      |                                  |  |
| Learning                 | Knowledge outflow (parent to PC) | Knowledge sharing is related to interorganizational learning; it represents an important objective in the context of CVC investing (Maula, 2007; Weber and Weber, 2005).<br>In order to capture the knowledge outflows from the parent to new ventures, we allocated a set of questions based on Schulz (2003). The author categorized knowledge outflow in knowledge related to sales and marketing, knowledge related to technology, and knowledge related to strategy.  |
| Learning                 | Access to new technologies       | The determinate measured the extent, to which the access to new technologies, production techniques, licenses or patents has been achieved.  |
| Learning                 | General venture involvement      | A higher involvement of the parent company with the ventures will necessarily increase the interexchange of information. We dedicated several measures that capture the intensity of involvement between the parties involved. (a) Venture involvement measures how often the CVC investors interact with their ventures (or similar). (b) Operative involvement is captured by the amount and time the CVC unit has spent to support the ventures' management in operational matters or (c) in strategical matters.   |
| Learning                 | Operative involvement            |  |
| Learning                 | Strategic involvement            |  |
| Expansion                | Firm size                        | Larger firms can provide more resources to invest in new ventures (Basu, Phelps, and Kotha, 2011), that might expand the corporate investors business. Furthermore, larger firms with more available resources are perceived as attractive alliance partners (Ahuja, 2000) to growth. The firm size is therefore a common item in CVC research and often gauged as natural log of annual sales/assets or the number of employees.  |
| Expansion                | (Industry) Growth rate           | (a) Industry growth represents an item for the availability of CVC investments in the CVC investors industry (Basu, Phelps, Kotha, 2011). This availability in turn, will impact the opportunity to growth by accessing external knowledge from new ventures (Basu and Wadhwa, 2013). In addition, the growth rate of the corporate investor (b) implies an increasing and expanding business itself. The item is a common control variable in the CVC literature and quantified by the sales growth in a firm or its primary industry, or by the change of annual total revenue.                                |
| Expansion                | Contribution to revenue growth   | The determinate scales the extent, to which the CVC unit accomplished to contribute to revenue growth during the last financial year.  |
| Expansion                | Strengthen existing business     | The determinate measures the extent, to which the CVC unit accomplished to contribute to strengthen the existing business during the last financial year.  |
| Expansion                | Identifying acquisition targets  | This variable captures the extent, to which the CVC unit accomplished to contribute to the identification of acquisition targets that might lead to an expansion of corporate business.  |
| Expansion                | Acquiring new employees          | This variable gauges the extent, to which the CVC unit accomplished to add to the acquisition of new employees to increase the ongoing business.   |

**Table B1: Measures (continued)**

| Traits / character-istics     |  | Independent variable                 | Description   |
|-------------------------------|--|--------------------------------------|---|
| <i>Key knowledge type</i>     |  |                                      |   |
| Tacit                         |  | CVC experience                       | CVC experience is a common control variable to scale time-variant characteristics on the firm level (Dushnitsky and Lavie, 2010). We incorporate measures of firm age, number of CVC investments, or similar measures that are related to tacit knowledge.  |
| Tacit                         |  | Venture experience                   | The venture experience quantifies the venture age, number of investment rounds or similar measures.   |
| Explicit                      |  | Systematic evaluation of investments | This measure captures the availability of checklists or similar tools that allow to systematically evaluating investments and that are related to explicit knowledge.   |
| <i>Type of value creation</i> |  |                                      |   |
| Innovation                    |  | Investment in radical innovation     | CVC investments in radical innovation provide access to future technologies (Cyert and March, 1963). The variable measures the extent, to which the CVC unit accomplished to conduce to investments in radical innovation.  |
| Efficiency                    |  | R&D expenditures                     | The amount of R&D expenditures is commonly applied to gauge the absorptive capacity of a company, and therefore a proper measure for how efficiently the company will learn from its investments in new ventures (Cohen and Levinthal, 1990). We incorporate gauges of R&D expenditures in terms of annual spending (or similar). |

**Table B1: Measures (continued)**

| Traits / characteristics   | Dependent variable                     | Description   |
|----------------------------|--|---|
| <i>Key hazard</i>          |  |   |
| Appropriation              | Unabsorbed slack                       | Parmigiani and Rivera-Santos (2011) point to key hazards in an IOR that are related to the use of resources as the source of value creation. Slack absorbs the environmental variability and improves the stability and adaptability of a firm (Cyert and March, 1963) and is therefore related to the slacking of the key hazard. In turn, Greve (2007) states that unabsorbed slack encourages managers to take more risk which will lead to the appropriation of the key hazard. The variable is captured by the ratio of current assets to liabilities. |
| Appropriation              | Portfolio size                         | The size of the portfolio of ventures influences the utilization of the corporate's firm resources. It measures the number of portfolio companies.  |
| Slacking                   | Better use of existing resources       | Slack is related to increasing the stability and adaptability of a firm (Cyert and March, 1963). The subjective proxy asks to what extent better use of resources has been accomplished in the last business year. We associated the proxy to the slacking perspective, because key hazards in an IOR are related to the use of resources as the source of value creation (Parmigiani and Rivera-Santos, 2011).   |
| <i>Environmental state</i> |  |   |
| Uncertainty                | Later stage investments                | Investment stages, such as early or later stage investments are common control variables ascribed by the CVC investor (Obeid and van de Vrande, 2018). In the context of CVC, Yang <i>et al.</i> (2009) point out that early stage investments are typically related to high uncertainty, whereas later stage investments are related to low uncertainty. Therefore, we associated later stage investments, measured as a binary or similar variable to the environmental stage of uncertainty.   |
| Uncertainty                | Prior venturing experience             | Venture experience, such as the number of investment rounds and firm age increase the quality and the performance of the venture (Siegel <i>et al.</i> , 1988). Therefore, the experience helps to reduce risk.   |
| Uncertainty                | Acquisitions and Alliances experience  | Instead of external CVC, firms can pursue alliances and acquisitions for their search of external innovation (Villalonga and McGahan, 2005). Alliances and acquisitions serve as a substitute for CVC (Villalonga and McGahan, 2005), thereby the firms' alliance and acquisition experience will reduce risk for making poor decisions in the CVC context. The variable captures the number of acquisitions and alliances that have been executed.   |
| Uncertainty<br>Risk        | Syndication<br>Early stage investments | Investment stages, such as early or later stage investments are common control variables ascribed by the CVC investor (Obeid and van de Vrande, 2018). In the context of CVC, Yang <i>et al.</i> (2009) point out that early stage investments are typically related to high uncertainty, whereas later stage investments are related to low uncertainty. Therefore, we associated early stage investments, measured as a binary or similar variable to the environmental stage of risk.  |
| Risk                       | Quality of investment portfolio        | Following Wadhwa and Kotha (2006), the quality of the investment portfolio includes the amount of CVC investment, the number of industries in the CVC portfolio, and the number of co-investors. We believe, pondering about quality issues is reflected by a poor quality of the venturing portfolio. Therefore, we argue, this variable is more related to risk, than to an uncertain environmental state.  |

**Table B1: Measures (continued)**

| Traits / characteristics       | Dependent variable                                 | Description   |
|--------------------------------|--|---|
| <i>Type of interdependence</i> |  |   |
| Reciprocal                     |  | n/a   |
| Pooled or sequential           |  | n/a   |
| <i>Decision making</i>         |  |   |
| Joint                          | Joint decision making with parents                 | The variable scales the extent, to which partnerships between the corporate firm and the new ventures have (not) been accomplished. We argue, that being in a partnership is related to working together, thereby the partners will discuss decisions together to make them jointly (and vice versa).   |
| Divided                        | Separate investment decisions by the CVC unit      |   |
| Divided                        | Low effort to foster collaboration (parent and PC) | The variable quantifies the low effort of time and energy spent on know-how and resource transfer between the ventures and the corporate firms' business units. We argue, that low effort is an indicator for poor collaboration; therefore the partners will make separate decisions.  |
| <i>Communication</i>           |  |   |
| Rich, ongoing                  | High effort to foster collaboration                | The variable measures the high effort of time and energy spent on know-how and resource transfer between the ventures and the corporate firms' business units. We argue that high effort is an indicator for good collaboration; therefore the partners will have a rich and ongoing communication.   |
| Thin, routine                  | Regular exchange meetings                          | The variable gauges if the CVC unit organizes direct exchanges between corporate firm, ventures and CVC unit on a regular basis. It is therefore a proxy for a routine communication on a regular basis.  |
| <i>Coordination</i>            |  |   |
| Interpersonal                  | Working in teams                                   | The variable measures if the ventures and the corporate firm employees are work together in teams. Thus, we argue, the coordination of the IOR is interpersonal.  |
| Interpersonal Routines         | Financial incentives<br>No financial incentives    | The variable quantifies if the parent corporation's business units have (no) financial incentives to cooperate with the ventures. We argue, financial incentives stimulate cooperation between the IOR partners and this will increase interpersonal exchange, a proxy for interpersonal coordination if an IOR. On the contrary, the absence of financial incentives will hinder cooperation, which is indicative that the IOR coordination is more on routines (e.g., weekly or monthly) than interpersonal.  |
| Routines                       | No working in teams                                | The variable measures if the ventures and the corporate firm employees are not working together in teams. Thus, we argue, the IOR coordination indicates coordination based on routines.  |
| Routines                       | Geographic diversity                               | The geographic proximity between Corporate firm and venture makes it easier for a new venture to utilize the corporate infrastructure. This geographic closeness will have a positive impact on the new venture's rate of innovation (Alvarez-Garrido and Dushnitsky, 2016). The geographic proximity facilitates the interpersonal exchange and the close collaboration with the business units (e.g., R&D). Vice versa, a geographic diversity will aggravate interpersonal exchange and will therefore necessitate regular meetings and standardized operating procedures. |

**Table B2: Summary of studies included in the meta-analysis**

| Study                                | Geographical focus | Sample size  | Sample period | Industry focus | Theoretical framework  |
|--------------------------------------|--------------------|--|---------------|----------------|--|
| Allen and Hevert (2007)              | U.S.               | 90 engaged in CVC  | 1990-2002     | ICT            | n/a  |
| Anokhin, Peck, and Wincent (2016)    | n/a                | 153 engaged in CVC   | 1998-2001     | mixed          | n/a  |
| Baierl, Anokhin, and Grichnik (2016) | n/a                | 162 engaged in CVC   | 1998-2003     | mixed          | Social networks theory   |
| Basu and Wadhwa (2013)               | U.S.               | 477 engaged in CVC<br>(4749 firm-year observations)                          | 1990-2000     | mixed          | Resource based view  |
| Basu, Phelps, and Kotha (2011)       | U.S.               | 477 engaged in CVC<br>(4406 firm-year observations)                          | 1990-2000     | mixed          | Real options theory  |
| Belderbos, Jacob, and Lokshin (2017) | no focus           | 55 engaged in CVC  | 1998-2007     | mixed          | n/a  |
| Benson and Ziedonis (2009)           | U.S.               | 489 acquisitions   | 1987-2003     | ICT            | Absorptive capacity  |
| Dokko and Gaba (2012)                | U.S.               | 70 CVC units (375 firm-year observations)                                    | 1992-2008     | ICT            | Organizational learning perspective  |
| Dushnitsky and Lavie (2010)          | U.S.               | 372 firms, 29 thereof with CVC investments (2,448 firm-year observations)    | 1990-1999     | Software       | Resource based view  |
| Dushnitsky and Lenox (2005a)         | U.S.               | 2289 firms, 247 thereof with CVC investments (45,664 firm-year observations) | 1969-1999     | mixed          | n/a  |
| Dushnitsky and Lenox (2005b)         | U.S.               | 1171 firms, 115 thereof with CVC investments (60,444 firm-year observations) | 1990-1999     | mixed          | Organizational learning perspective  |
| Dushnitsky and Lenox (2006)          | U.S.               | 1173 firms, 171 thereof with CVC investments (8,630 firm-year observations)  | 1990-1999     | mixed          | Organizational learning perspective  |
| Gaba and Bhattacharya (2012)         | U.S.               | 71 CVC units (1,424 firm-year observations)                                  | 1992-2003     | ICT            | Behavioral theory of the firm  |
| Gaba and Dokko (2016)                | U.S.               | 70 CVC units (404 firm-year observations)                                    | 1992-2008     | ICT            | n/a  |
| Gaba and Meyer (2008)                | U.S.               | 264 firms, thereof 94 with CVC investments (1,726 firm-year observations)    | 1992-2001     | ICT            | Diffusion theory   |
| Hamm, Jung, and Park (2018)          | n/a                | 133 engaged in CVC<br>(1,766 firm-year observations)                         | 1996-2017     | mixed          | n/a  |
| Jeon (2017)                          | n/a                | 286 engaged in CVC<br>(10,261 CVC investments)                               | 1993-2013     | mixed          | Behavioral theory of the firm, organizational control theory, ambidexterity theory |
| Keil, Maula, and Wilson (2010)       | U.S.               | 358 firms engaged in CVC<br>(1,443 firm year observations)                   | 1996-2005     | mixed          | Social networks theory, relational view  |
| Kim, Gopal, and Hoberg (2016)        | U.S.               | 145 firms engaged in CVC<br>(1,185 firm-year observations)                   | 1997-2007     | ICT            | n/a  |

**Table B2: Summary of studies included in the meta-analysis (continued)**

| Study                                       | Geographical focus | Sample size  | Sample period | Industry focus   | Theoretical framework   |
|---|--------------------|--|---------------|--|---|
| Kim, Gopal, and Hoberg (2016)               | U.S.               | 145 firms engaged in CVC<br>(1,185 firm-year observations)   | 1997-2007     | ICT  | n/a   |
| Kim, Steensma, and Park (2019)              | U.S.               | 402 new ventures, 29 CVC investors<br>(52,122 dyad years)    | 1990-2006     | ICT  | n/a   |
| Koster (2018)                               | n/a                | 18 firms engaged in CVC<br>(569 investments)                 | 1995-2017     | Chemical, biotechnology, energy, ICT                       | n/a   |
| Lee and Kang (2015)                         | U.S.               | 97 firms engaged in CVC<br>(1,313 firm-year observations)    | 1990-2010     | High-tech industry   | Dynamic capabilities, ambidexterity theory, real options theory |
| Lee, Kim, and Jang (2015)                   | U.S.               | 29 firms engaged in CVC<br>(178 firm-year observations)      | 1995-2005     | ICT  | Absorptive capacity   |
| Lee, Park, and Kang (2018)                  | U.S.               | 77 firms engaged in CVC<br>(318 firm-year observations)      | 1990-2010     | High-tech industry   | n/a   |
| Maula, Keil, and Zahra (2013)               | U.S.               | 195 to 693 firm-year observations<br>(average 464.25)        | 1989-2000     | ICT  | Attention based view  |
| Noyes, Brush, Hatten, and Smith-Dorr (2014) | U.S.               | 150 firms engaged in CVC                                     | 1996-2003     | mixed  | Social networks theory, resource dependence theory              |
| Park and Steensma (2013)                    | U.S.               | 508 ventures, 271 thereof wit CVC backing                    | 1990–2003     | Wireless communications, computer hardware, semiconductors | Multiple agency theory  |
| Park and Steensma (2012)                    | U.S.               | 508 ventures, 271 thereof wit CVC backing                    | 1990–2003     | Wireless communications, computer hardware, semiconductors | Transaction cost economics                                      |
| Phelps and Wadhwa (2014)                    | n/a                | 302 investor-venture dyads<br>(1,635 dyad-year observations) | 1989-1999     | Telecommunications equipment                               | Real options theory   |
| Sahaym, Cho, Kim, and Mousa (2016)          | U.S.               | 172 IPO firms engaged in CVC                                 | 2001-2005     | mixed  | Behavioral agency theory, upper echelon theory                  |
| Schildt, Maula, and Keil (2005)             | U.S.               | 110 firms engaged in CVC<br>(5,091 firm-year observations)   | 1989–2001     | ICT  | Organizational learning perspective                             |
| Smith and Shah (2013)                       | U.S.               | 4 corporations<br>(128 corporate investor-startup dyads)     | 1978–2007     | Medical devices  | n/a   |
| Toschi, Munari, and Nightingale (2012)      | U.S.               | 234 firms engaged in CVC                                     | 1996-2006     | mixed  | n/a   |

**Table B2: Summary of studies included in the meta-analysis (continued)**

| <b>Study</b>                           | <b>Geographical focus</b>         | <b>Sample size</b>  | <b>Sample period</b> | <b>Industry focus</b>                          | <b>Theoretical framework</b>                             |
|--|-----------------------------------|---|----------------------|--|--|
| Van de Vrande and Vanhaverbeke (2013)  | U.S.                              | 78 firms engaged in CVC<br>(5,320 firm-year observations)         | 1990–2000            | Pharmaceutical                                 | Real options theory                                      |
| Wadhwa and Basu (2013)                 | U.S.                              | 43 firms engaged in CVC<br>(248 corporate investor-startup dyads) | 1996–2000            | Telecommunication, semiconductor, and computer | Real options theory, interorganizational learning theory |
| Wadhwa, Phelps, and Kotha (2016)       | U.S.                              | 40 firms engaged in CVC<br>(417 firm year-observations)           | 1989–2000            | Telecommunication, semiconductor, and computer | n/a  |
| Wadhwa and Kotha (2006)                | U.S.                              | 36 firms engaged in CVC<br>(383 firm-year observations)           | 1989–1999            | Telecommunication                              | n/a  |
| Weber and Weber (2011)                 | Germany                           | 12 CVC triads   | 2002                 | Media, publishing, and high-tech industry      | Social networks theory                                   |
| Weber, Bauke, and Raibulet (2016)      | Austria, Germany, and Switzerland | 23 CVC units<br>(47 corporate investor-startup dyad)              | 2010–2012            | n/a  | Relational view  |
| Yang (2012)                            | U.S.                              | 232 CVC unit investments  | 1996–2000            | mixed  | Agency theory  |
| Yang, Narayanan, and Zahra (2009)      | U.S.                              | 166 firms engaged in CVC<br>(2,110 CVC investments)               | 1990–2001            | mixed  | Organizational learning perspective                      |
| Yang, Narayanan, and De Carolis (2014) | U.S.                              | 189 firms engaged in CVC<br>(475 firm-year observations)          | 1990–2004            | mixed  | Real options theory                                      |
| Yang, Nomoto, and Kurokawa (2009)      | U.S., Japan                       | 61 complete surveys   | 2007                 | mixed  | Agency theory  |

**Table B3: Robustness checks for all relationships with at least ten studies**

| Determinants                                | Before outlier removal |          |          |            |           |                       |      |       |          |             | After outlier removal |          |          |          |            |      |       |          |            |  |
|---|------------------------|----------|----------|------------|-----------|-----------------------|------|-------|----------|-------------|-----------------------|----------|----------|----------|------------|------|-------|----------|------------|--|
|   | <i>k</i>               | <i>N</i> | <i>r</i> | CI         | <i>Q</i>  | <i>I</i> <sup>2</sup> | # TF | Side  | <i>r</i> | CI          | # out                 | <i>k</i> | <i>N</i> | <i>r</i> | CI         | # TF | Side  | <i>r</i> | CI         |  |
| Strategic performance of the parent company |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| <i>Focus of IOR (new knowledge)</i>         |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| Investment diversity                        | 10                     | 14,354   | 0.27     | 0.10/0.43  | 355.97    | 97                    | 5    | left  | 0.07     | -0.08/0.21  | 1                     | 9        | 10,368   | 0.21     | 0.11/0.30  | 5    | left  | 0.06     | -0.05/0.17 |  |
| <i>Key knowledge type (Tacit)</i>           |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| CVC experience                              | 20                     | 124,233  | 0.16     | 0.03/0.28  | 1679.49   | 99                    | 0    |       |          |             | 5                     | 15       | 119,953  | 0.17     | 0.12/0.23  | 2    | left  | 0.14     | 0.09/0.20  |  |
| <i>Focus of IOR (existing knowledge)</i>    |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| Industry overlapping investments            | 10                     | 120,765  | 0.03     | -0.13/0.18 | 3,883.98  | 100                   | 5    | left  | -0.18    | -0.31/-0.04 | 0                     |          |          |          |            |      |       |          |            |  |
| <i>Key activity (expansion)</i>             |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| Firm size                                   | 18                     | 178,937  | 0.36     | 0.22/0.49  | 5,284.06  | 100                   | 0    |       |          |             | 7                     | 11       | 164,096  | 0.35     | 0.29/0.41  | 0    |       |          |            |  |
| <i>Type of value creation (Efficiency)</i>  |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| R&D expenditures                            | 14                     | 123,222  | 0.27     | 0.10/0.43  | 6,898.97  | 100                   | 7    | right | 0.54     | 0.42/0.63   | 0                     |          |          |          |            |      |       |          |            |  |
| Financial performance of the parent company |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| <i>Key knowledge type (Tacit)</i>           |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| CVC experience                              | 17                     | 79,122   | 0.02     | -0.05/0.10 | 432.20    | 96                    | 3    | right | 0.07     | 0.02/0.12   | 1                     | 16       | 78,747   | 0.00     | -0.05/0.05 | 4    | right | 0.06     | 0.01/0.10  |  |
| <i>Key activity (expansion)</i>             |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| Firm size                                   | 15                     | 76,706   | 0.23     | 0.0/0.44   | 15,412.83 | 100                   | 8    | right | 0.67     | 0.47/0.81   | 0                     |          |          |          |            |      |       |          |            |  |
| <i>Type of value creation (Efficiency)</i>  |                        |          |          |            |           |                       |      |       |          |             |                       |          |          |          |            |      |       |          |            |  |
| R&D expenditures                            | 13                     | 77,772   | 0.32     | -0.03/0.44 | 8,376.80  | 100                   | 4    | right | 0.41     | 0.19/0.58   | 0                     |          |          |          |            |      |       |          |            |  |

Note: *k* = number of independent samples cumulated, *N* = cumulative sample size (number of individuals), *r* = sample-size weighted correlation, CI = 95% confidence interval. '# TF' denotes the number of estimated missing effect sizes imputed in trim-and-fill procedure. 'Side' provides information on which side of the meta-analytic correlation the estimated missing studies are imputed in the trim-and-fill procedure.