Corporate Venturing: Decoding Returns on Innovation

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Acknowledgement

First and foremost, I would like to dedicate this dissertation to my parents, who made this journey possible for me. I am the first person in my family to have the opportunity to pursue an academic career. I value this chance very much and do not take it for granted. My parents and brother have supported me with great energy during the PhD marathon and have carried me through all ups and downs. Thank you for all the distractions and advice or just for being a listening ear during this process. I would also like to extend my heartfelt thanks to my closest friends and mentors, who have always encouraged me to keep pursuing my personal goals – even during the Covid-19 pandemic and social isolation. Furthermore, I would like to thank my thesis supervisors, Prof. Dr. Dietmar Grichnik, Prof. Ph.D. Joakim Vincent and especially Prof. Dr. Manuel Heß, for providing me with great advice and feedback, while challenging me to leave my consultant mentality behind and become a truly independent researcher throughout my doctoral studies. I am also very grateful for the consistent support of Corinne Metzger and the PhD office, which assisted me in bureaucratic matters. In this context, I would like to highlight the approach of the Chair of Entrepreneurship to focusing not only on theory but also on practical application. Thus, I was able to carry out a project with a Swiss bank that conducts Corporate Venturing (CV) activities. This project helped me to better understand and deepen my knowledge in CV, and it motivated me to strive for insights and solutions to current problems in literature and practice. In the end, I even received the opportunity to write the book *Corporate Venturing Navigator* with very renowned companies to further share and test the knowledge gained. Finally, I would like to thank myself. This is probably rather unusual but thanking oneself is always forgotten. I pursued this dissertation for myself! I set goals, followed my own purpose and went through my own personal journey. This dissertation is the result of a major learning curve that represents one of my greatest personal developments and is part of the legacy that I am creating. With this dissertation, I not only want to make further contributions to science and practice, but I also intend to inspire others through my passion and motivation to drive myself to the next level every day. It all comes down to one's

inner attitude, and whether there is a lock-down or not, one should always look for opportunities given and bring out the most positive for oneself and others.

Cape Town, October 24, 2022

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List of abbreviations

C:	Control Variable
CCVS:	Centre for Corporate Venturing in Switzerland
CP:	Corporate Performance
CS:	Corporate Strategy
CV:	Corporate Venturing
CVC:	Corporate Venture Capital
DV:	Dependent Variable
EO:	Entrepreneurial Orientation
GCV:	Global Corporate Venturing
IPO:	Initial Public Offering
IRR:	Internal Rate of Return
IV:	Independent Variable
KPI:	Key Performance Indicator
M:	Moderator
M&A:	Mergers and Acquisitions
R&D:	Research and Development
ROI:	Return on Investments
RQ:	Research Question
VC:	Venture Capital

Executive summary

In this dissertation, I investigate the phenomenon of the raison d'être of Corporate Venturing (CV) programs that are designed to help companies maintain their positions in their business environments. I explore what (additional) value can be achieved during the CV process and develop a framework for the optimal design, implementation, and termination of a CV program. This research was driven by a lack of transparency and measurability of CV program development. Although scholars have been studying CV for decades, research findings are fragmented and sometimes contradictory as CV programs are viewed as failures or even discontinued while facing the persistent lack of understanding and unmet objectives. As a result, I contribute to literature and practice by presenting new insights into CV value extraction and a tool concept that can be used to bring CV practice to the next level – thus promoting innovation in companies. The first paper provides new evidence for the existence and relevance of CV through marginal performance spillovers that are caused by CV investments into the core business of a corporation. I introduce the importance of business strategy and the idea of problemistic search to explain these spillovers. In this context, I also consider the role of past performance. I make a methodological contribution by running quantitative research with a European panel data set – an area that has been rather neglected in CVC research so far. The second paper highlights the urgent need for a navigator tool that can successfully establish, execute, and terminate CV programs, as well as the urgent call for research to better evaluate such programs through created transparency and measurability. For this reason, I present a *Corporate Venturing Navigator* (CVN) concept, which includes the CVN-Framework and CVN-Cockpit. Contributions to the CV literature and design science research theory are made. In the third paper, the developed CVN concept is discussed, evaluated, and further enhanced for practical application. I refine and extend the elements, interdependencies, and dynamics for both artefacts, the CVN-Framework and CVN-Cockpit, through case studies. Overall, I contribute to existing CV, innovation, and strategy literature by using an unprecedented data sample, applying a familiar methodological approach in a new

domain, and developing and evaluating *Corporate Venturing Navigator*, which can be used as a guide and a measurement tool.

Zusammenfassung

In dieser Dissertation untersuche ich das Phänomen der Daseinsberechtigung von Corporate Venturing (CV)-Programmen, die Unternehmen helfen soll, ihre Position in ihrem Geschäftsumfeld zu stärken und zu halten. Ich untersuche welcher (zusätzliche) Wert während des CV Prozesses erzielt werden kann und entwickle einen Rahmen für den optimalen Aufbau, die Umsetzung und die Beendigung eines CV-Programms. Ausschlaggebend für diese Arbeit war der Mangel an Transparenz und Messbarkeit bei der Entwicklung von CV-Programmen. Obwohl sich die Wissenschaft seit Jahrzehnten mit Corporate Venturing befasst, sind die Forschungsergebnisse fragmentiert und manchmal widersprüchlich. CV-Programme werden als Misserfolge angesehen oder sogar eingestellt, während sie mit einem anhaltenden Mangel an Verständnis und unerreichten Zielen konfrontiert sind. Daher möchte ich einen Beitrag zur Literatur und Praxis leisten, indem ich neue Erkenntnisse über die CV-Wertschöpfung und ein CV-Tool-Konzept vorstelle, mit dem die CV-Praxis auf die nächste Stufe gehoben werden kann - und damit die Innovation in Unternehmen gefördert wird. Der erste Beitrag liefert neue Beweise für die Existenz und Relevanz von CV durch Leistungsübertrag, der durch CV-Investitionen in das Kerngeschäft ausgelöst wird. Ich führe die Bedeutung der Unternehmensstrategie und die Idee der problematischen Suche ein, um zu erklären, wie diese Spillover entstehen. In diesem Zusammenhang erkläre ich auch die Rolle der früheren Unternehmensleistung. Darüber hinaus leiste ich einen methodischen Beitrag, indem ich quantitative Untersuchungen mit einem europäischen Paneldatensatz durchführe - ein Bereich, der in der CV-Forschung bisher vernachlässigt wurde. Der zweite Beitrag unterstreicht den dringenden Bedarf an einem Navigationstool, welches CV-Programme erfolgreich einrichten, durchführen und beenden können, sowie die dringende Notwendigkeit, solche Programme durch Schaffung von Transparenz und Messbarkeit besser zu bewerten. Aus diesem Grund stelle ich das Konzept des Corporate Venturing Navigators (CVN) vor, welches das CVN-Framework und das CVN-Cockpit umfassen. Es werden Beiträge zur CV-Literatur und zur designwissenschaftlichen Forschungstheorie geleistet. Im dritten Beitrag wird das entwickelte CVN-Konzept diskutiert, evaluiert und für die praktische Anwendung weiterentwickelt.

Ich verfeinere und erweitere die Elemente, Interdependenzen und Dynamiken für beide Artefakte, das CVN-Framework und das CVN-Cockpit, durch praktische Fallstudien. Insgesamt leiste ich einen Beitrag zur bestehenden CV-, Innovations- und Strategieliteratur, indem ich eine noch nie dagewesene Datenstichprobe verwende, einen vertrauten methodischen Ansatz in einem neuen Bereich anwende und den *Corporate Venturing Navigator* entwickle und evaluiere, der als Leitfaden und Messinstrument verwendet werden kann.

1 Overall introduction

1.1 Main dissertation topic

How can corporations generate new capabilities to adapt to increasing developments and technological disruptions? This question has become the current focus of most corporations (Gutmann, 2019; Prügl & Spitzley, 2020). In academia and practice, corporate venturing (CV) draws attention in this regard as it offers a source of competitive advantage and a vehicle that can be used to move towards higher financial and non-financial performance (Ma, 2019). CV represents a mean for corporations to establish, capture and provide innovation to survive in turbulent and competitive environments (Gutmann, 2019). It adheres to the central idea that corporations form alliances with ventures to establish new business models and to create and invest in new business organizations within a corporation (Wadhwa & Kotha, 2006; Hill *et al.*, 2009; Prügl & Spitzley, 2020).

Research on CV is, however, rather fragmented. Studies rarely build on each other (Narayanan, Yang & Zahra, 2009; Huang & Madhavan, 2020) and do not agree on a uniform definition of CV (Reimsbach & Hauschild, 2012) nor a homogenous theoretical framework for distinguishing between relevant characteristics of CV modes (Yang, Narayanan and Zahra, 2009; Gutmann, 2019). Building on the work of Narayan *et al.* (2009), Gutmann (2019) contributes towards more clarity by harmonizing CV modes, which include alliances, acquisitions, joint ventures, or corporate venture capital (CVC), amongst other modes (Chesbrough, 2002; Phan *et al.*, 2009; Röhm, 2018b). The latter, CVC, is the most prominent CV mode (Reimsbach & Hauschild, 2012) and is often equated with CV in research, which is the primary focus of this dissertation. CVC, which involves direct minority investments that corporations make in start-ups, has risen tremendously in the past (CBInsights, 2019; GCV, 2020).

However, many CV investments overall exhibit low performance rates, look rather poor on paper, or are generally viewed as failures (Dushnitsky, 2012). Scholars have tried to investigate the major causes of new or recurring challenges, particularly regarding the lack of performance (Teppo & Wüstenhagen, 2009; Jeon, 2017). But such studies have not proven to be conclusive yet (Hill *et al.*, 2009; Röhm *et al.*, 2018a). On the contrary, the

existing literature claims that very little is known about how CVC particularly influences and affects a parent company's business strategy – that is, how firms compete in a particular business segment (Beard & Dess, 1981; Yuan *et al.*, 2020) and performance. Only rudimentary, predominantly qualitative approaches are available (Covin & Miles, 2007; Basu & Wadhwa, 2013), while controversial results exist regarding performance outcomes (Huang & Madhavan, 2020). Given the often-minor financial returns of CVC investments in contrast to the financial performance of parent companies (Dushnitsky and Lenox, 2006), the research relevance of the intersection of CVC activity, business strategy and corporate performance is clear (Covin & Miles, 2007; Weber, Bauke & Raibulet, 2016). Research is needed to better enable CV investments to best contribute to corporate performance (Allen & Helvert, 2007) and to provide further evidence of their performance spillover effects (Huang & Madhavan, 2020).

In line, CV literature in general fails to offer a comprehensive and coherent CV framework to best set-up, run, assess, and eventually close CV activities (Poser, 2003; Battistini, Hacklin & Baschera, 2013; Gaule, 2017). Scholars have repeatedly emphasized that decoding the CV return-on-innovation regarding finance and strategic impact reflects an unexploited research field (Bassen *et al.*, 2006; Chiang, 2018; Ma, 2019). Such scholars have recently pointed out that the understanding of strategic CV benefits, especially those of CVC, cover a significant "ongoing research agenda" (Ma, 2019). It is, therefore, remarkable that only very few attempts have been made so far to decode strategic value-adds from CV investments (Chiang, 2018).

From a strategic management perspective, the capture and measurability of CV collaboration activities and especially strategic CV practices are highly relevant to the purposes of intervention and control (Poser, 2003; Busi & Bititci, 2006), as well as program success evaluation. However, this currently remains a challenge. As a result, strategic value cannot be properly realized, and thus the CV return-on-innovation potential is limited (Dushnitsky, 2009; Ma, 2019). Corporate management can neither be clearly expressive about the development of current CV investments nor tell where the sources of certain obstacles may lie; they also cannot estimate where best to allocate focus and resources in the future (Chiang, 2018). In summary, prior research lacks an answer as to how CV can

best contribute to corporate performance to justify its existence. Accordingly, in three individual papers, answers will be elaborated.

This dissertation makes several contributions to the Corporate Venturing and strategic management literature and provides an enhanced understanding of innovation. New insights into justifying the existence of CV through performance spillovers, the importance of business strategy and the application of problemistic search, as well as new knowhow and capabilities generated on how to best launch and run a CV activity, are provided. Academic and practical insights on phase-specific dynamics and outcomes of CV activity are offered with special attention to determinant factors that can also be used to decode strategic CV returns on innovation. Through the application of the *Corporate Venturing Navigator*, which is developed, tested, and optimized in this dissertation, a positive intervention impact is developed in addition to new theoretical and practical findings on how to improve the navigator concept, with particular focus on decoding returns on innovation. New ways of thinking and different approaches also arise.

In summary, the dissertation results contribute to improved corporate performance through CV investments and further advances in the CV landscape. An outlook on nascent research areas and the shortcomings of existing CV literature is given, as well as indications of how CV will evolve in the future. This dissertation builds the foundation for the book *Corporate Venturing Navigator*, which is a manual being developed by the University of St.Gallen in collaboration with PM Equity, the venture arm of Philipp Morris, for the systematic establishment or reorientation of companies.

1.2 Research gaps

1.2.1 Research gap: Paper I

CV and its most dominant form, CVC, is widely and increasingly becoming a more important vehicle for promoting corporate innovation, while its existence and impact are constantly being questioned in both literature and practice (Huang & Madhavan, 2020). Therefore, this scientific paper specifically investigates the issue of the justification of CVC by examining the performance spillover effect initiated by CVC investments into the core business of a corporation. The research question is “how can corporates make use of search through CVC activity to improve performance?” The role of business strategy is

considered, as well as problemistic search, which is rooted in the Behavioural Theory of the Firm (BTF), to provide plausible explanations for spillover effects. Examining the business strategy is a rather relevant topic as most modern CVC programs are increasingly operating with a predominant strategic focus – however, their strategic impacts on corporate performance have only been rudimentarily explored in research (Fels, Kronberger & Gutmann, 2021). As for search, there is a lack of scientific evidence on CVC orientation whether matching or non-matching CVC activities with the company's core business can most benefit the firms in their competitive environment (Posen *et al.*, 2018). Thus, we investigate if CVC activities matching a company's core business hold a positive effect on the positive relationship of business strategy and corporate performance. We are examining prevailing competing arguments against the traditional problemistic search perspective. In this context, the role of poor past corporate performance is introduced, and its effects on search are further elaborated. We argue that to overcome particularly poor performance, the problematic search for ventures within the familiar territory and familiar capabilities can more quickly leverage the effectiveness of CVC on the relationship between business strategy and business performance. We assume that this search allows for marginal spillovers of knowhow and access to capabilities that can drive corporate performance out of the predicament. So far, science and performance theory have demonstrated counterarguments (Yuan *et al.*, 2020).

1.2.2 Research gaps: Paper II and III

Paper II and III also build on how to justify the existence and underline the advantages of CV investments for a corporation by providing proof that such investments are worthwhile. Many CV programs struggle to survive and experience quite severe failure rates (Hill *et al.*, 2009; Hill & Birkinshaw, 2014) or sudden "death syndrome" (Teppo & Wüstenhagen, 2009). Why are some CV programs successful, while others are not is still an ongoing research agenda (Fels, Kronberger & Gutmann, 2021). Many individual CV program aspects have been explored (Teppo & Wüstenhagen, 2009; Röhm, 2018b), but a comprehensive and coherent practical tool for optimally establishing, managing and terminating a CV program overall has been lacking. Such a tool could be used to create

new CV programs and improve current ones by adapting to their ever-changing ecosystem and achieving a sustainable competitive advantage for the corporate parent. CV programs often do not know and are not able to respond to internal and external changes properly because they are currently incapable of tracking and capturing their progress over time. Some scholars have pointed out this gap in deciphering strategic returns on innovation and have made initial attempts to better measure the value created by CV investments (Napp, Minshall & Probert, 2009; Chiang, 2018). But this research field remains in its infancy. CV programs are still unable to exhibit or track the progress of their CV portfolio as extracting their value is not yet fully possible, which makes the justification of CV investments quite vulnerable. This also puts programs at risk in terms of the frequent turnover of key stakeholders who demand to see measurable results. In summary, a research gap exists regarding how corporations can conceptualize CV activities and quantify strategic returns on corporate performance in the future.

Therewith comes the following research question: "What (additional) value-adds can be achieved for a CV program by applying the *Corporate Venturing Navigator*?" By developing the CVN concept and testing it in practice, I provide a better academic and practical understanding of improved self-assessment skills and how to add value through CV investments while enabling companies to make the most of their CV investments, leading to improved organizational performance in the long run.

Overall, this dissertation, with its three papers, focuses on "*How can CV be justified by demonstrating its contribution towards corporate performance?"*

1.3 Thesis structure

The outstanding parts of this dissertation are organized into chapters. Chapter 1 covers the introduction, whereas Chapters 2, 3 and 4 represent the three papers of this cumulative dissertation. Chapter 5 then addresses the general research questions, provides implications for theory and practice, and presents an overall conclusion for this dissertation.

The study presented in Chapter 2 has been accepted as part of the Babson College Entrepreneurship Research Conference (BCERC) 2021 and has been submitted to the *Strategic Entrepreneurship Journal* 2022. The study presented in Chapters 3 and Chapter 4 has been the foundation for the handbook *Corporate Venturing Navigator*, which is

currently undergoing review by several high-end publisher. This chapter closes with the overview of the thesis structure, which is presented in Table *1*.

Table 1: Thesis structure

Chapter 1	Main dissertation topic Research gaps 1. How can corporates make use of search through CVC activity to improve performance? 2. What (additional) value-adds can be achieved for a CV program by applying the *Corporate Venturing Navigator*? Thesis structure	
Chapter 2	Paper I: How corporates rely on search through CVC strategies to improve performance. Working title: Patience is Bitter, but its Fruit is Sweet: An Alternative to the "When-Where" of Distance Search in Business Strategy and Corporate Venture Capital Activities *Paper submitted to BCERC 2021* Working title: How corporates rely on search through CVC strategies to improve performance. *Paper submitted to SEJ 2022*	Reuther, J., Hess, M., Grichnik, D., Vincent, J. (2022).
Chapter 3	Paper II: Corporate Venturing Navigator – Conceptual development	Reuther, J., Hess, M., Grichnik, D., (2022).
Chapter 4	Paper III: Corporate Venturing Navigator – Evaluation along Case Studies	Reuther, J. (2022).
Chapter 5	Concluding chapter	

2 Paper I: How corporates rely on search through CVC strategies to improve performance

Research Summary: Although Corporate Venture Capital (CVC) is widely believed to drive corporate innovation, its relevance is often questioned. This study uses problemistic search to investigate whether CVC activities consistent with a firm's core business are likely to have a positive impact on the positive relationship between business strategy and firm performance. We pay particular attention to prior negative past performance. Results confirm that CVC investments aligned with a company's core business have a positive effect, even when past performance was negative. In difficult times, the marginal effect is weaker but still positive. As soon as the business recovers, CVC activities are expected to contribute to greater corporate competitiveness as CVC activities related to the core business are compatible with a recovered business strategy.

Managerial Summary: The ever-changing disruptive business environment is forcing companies to develop advantageous behaviours and seek new business opportunities to maintain competitiveness in a dynamic ecosystem. As a result, companies are increasingly turning to CVC to drive innovation. However, little is known about how CVC affects and feeds back into parent companies' business strategies and performance. We address the question of whether greater focus of CVC activity in a company's core business will positively impact the positive relationship between business strategy and corporate performance. We also pay particular attention to when past expectations for corporate performance could not be met with the intention to provide management with practical guidance on how to best set up and use CVC in the future. The results confirm that management should focus on CVC investments in a company's core business, as they have a positive impact even when performance problems have occurred. However, only small marginal effects can be expected until business operations are restored.

Key words: corporate venture capital; strategic impact; business strategy; corporate performance; problemistic search

2.1 Introduction

Corporate Venture Capital (CVC), direct minority investments by corporations in outside ventures (Dushnitsky, 2012), are a recognized way to stimulate innovation (Phan *et al.*, 2009; Rossi *et al.*, 2020). Many scholars have emphasized the role of CVC in building corporate competence (Basu, Phelps & Kotha, 2016; Ma, 2019) and formulating corporate strategy (Park & Steensma, 2012).

Although the practice of CVC is widespread, prior research has questioned its benefits. Study results of the effects of CVC on corporate performance are inconclusive, especially because approaches to measuring the effect of CVC on corporate performance vary widely (Chiang, 2018; Fels, Kronberger & Gutmann, 2021). The measurable contributions of CVC programs to performance, in particular strategic performance, are often neglect (Dushnitsky & Lenox, 2006). Little is known about how CVC affects firms in their ability to compete in a particular business environment, given its parent company's business strategy (Beard & Dess, 1981; Yuan *et al.,* 2020). Understanding the relationship between CVC and corporate performance is key to better aligning CVC programs with corporate strategy to enhance corporate performance (Fels, Kronberger & Gutmann, 2021).

This study draws on the problemistic search literature (Angus, 2019; Duke *et al.,* 2021), which is rooted in the behavioural theory of the firm (BTF). The traditional view of problemistic search suggests that searching for CVC investment targets close to the firm's core business should enhance the relationship between business strategy and performance by contributing to the profitability of the firm's core business (March & Simon, 1959; Cyert & March, 1963; Posen *et al.*, 2018). In contrast, investing in ventures outside of the firm's core business may result in more innovation. More innovation can be caused by performance spillovers between the new venture and existing businesses and access to new markets occur, all of which affecting strategic actions and access to new markets, which drive corporate performance (Argote & Hwang, 2013; Posen *et al.,* 2018; Angus, 2019).

This study evaluates the relationships among search behaviour, business strategy, and corporate performance. More specifically, we evaluate the effect of the search for venture capital opportunities on the positive relationship between the firm's business strategy and

corporate performance. We pay particular attention to how previous performance shortfalls affect such search behaviour using a unique sample comprising ninety-five listed European companies that used CVC programs between 2009 and 2019 (Dushnitsky, 2012; Fischer *et al.*, 2019).

This study makes two important contributions to the literature by (1) identifying performance spillovers through CVC investments and (2) introducing the role of business strategy to explain how performance spillovers from the ventures towards the corporate occur. Prior research on problemistic search identified the need to specify search directionalities and characteristics in particular business fields (Posen *et al.,* 2018; Angus, 2019; Duke *et al.*, 2021; Lenz *et al.*, 2021). We extend the concept of problemistic search and therewith the BTF by focusing on the search process itself, distinguishing between searches taking place within the knowledge and capability boundaries of the company itself and searches that go beyond those boundaries (cf. Salge, Kohli & Barrett, 2015). We therewith investigate if performance spillovers are greater or less when investing in ventures within the core business. Results confirm the positive effect, also when corporate performance has been poor in the past.

Second, we contribute to the evidence of the benefits of CVC programs by emphasizing the roles of business strategy, CVC, and previous performance shortcomings (Huang & Madhavan, 2020; Fels, Kronberger & Gutmann, 2021). Our study demonstrates that CVC activities closely related to the company's core business do positively affect the positive relationship between business strategy and corporate performance and enhance corporate competitiveness.

2.2 Theory and hypotheses

This study draws on problemistic search in the context of the BTF (Angus, 2019; Cyert & March, 1963) to examine how using CVC in problemistic search can increase the competitive position of a corporate. Problem-oriented search developed as a reaction to the behavioural assumptions of neoclassical economics, which scholars of the Carnegie School viewed as unrealistic representations of the cognitive abilities of individuals and organizations (Simon, 1947; March & Simon, 1959). Problemistic search is the search for solutions to specific current and anticipated problems, which solutions result in

improvements in present organizational capabilities and routines and in the development of new capabilities (Cyert & March, 1963; Posen *et al.*, 2018). The distinguishing characteristic of such improvements in capabilities is that they were developed in response to a specific problem.

Although the literature on search characteristics of corporate decision-making is quite extensive, the literature on search solutions focused on solving a specific problem is limited and rather diffuse (Angus, 2019). We begin with the "characteristics of solution search" identified by Posen *et al.* (2018), such as problemistic search, which distinguishes between the search for a solution to a problem that matches the company's core business and one that does not. The most common distinction is between geographical distance (local versus non-local) of a solution (Angus, 2019). In this paper, we extend problemistic search by investigating whether search for CVC opportunities aligned with the company's core business impacts the positive relationship between business strategy and corporate performance (Clough, Reineke & Piezunka, 2022). In search of a solution to improve performance, various scholars have studied the impact of strategy on performance. Titus, Parker & Covin (2020), for instance, investigated the influence of a corporation's distinctive strategic attitude on behavioural reactions to discrepancies in the provision of services. Anwar, Shah & Hasnu (2016) researched the impact of business strategy on performance along different measurements and relationships used in strategy-performance linkage research, using the typology of Miles & Snow (1978) (extended version by Desarbo *et al.* 2005). Results of these studies have been mixed.

In the same vein, research has studied the impact of CVC on performance. Huang & Madhavan (2020) conducted a meta-analysis, analysing and evaluating the various, partly contradictory results. Fels, Kronberger & Gutmann (2021) parsed from the literature four factors directly related to CVC performance: "portfolio composition, corporate knowledge, organizational relationship, and managerial influence and focus." Strategy was not highlighted in this context. Previous research has however found that CVC supports shaping strategy (Vanhaverbeke & Peeters, 2005; Park & Steensma, 2012), emphasizing the linkage between CVC and strategy. In the Entrepreneurship Orientation (EO) literature, of which CVC is a part, there is often discussion of strategy, with EO even being defined as a strategic posture (Covin & Wales, 2012), decision-making practice, or

strategic behaviour and as a contributor to strategic learning (Wales, Gupta & Mousa, 2011). Other rather recent studies also refer to strategy in entrepreneurial settings (Ott & Tidhar, 2018).

Overall, scholars seeking to project the effect of CVC on corporate performance have begun to examine the link between CVC and strategy (Thornhill & Amit, 2001; Rauch *et al.,* 2009). The few scholars who have examined the link have done so by investigating entrepreneurship orientation (Rauch *et al.*, 2009) and performance of the venture (Thornhill & Amit, 2001), mostly through qualitative research e.g., case studies. Considering the growing demand for strategic CVC (Napp & Minshall, 2011; Ma, 2010; Fels, Kronberger & Gutmann, 2021), the lack of scientific research into using the link between CVC and corporate strategy to predict the effect of CVC on corporate performance is unexpected. Future research is required. Indeed, Allen & Helvert (2007) called for future research on strategic spillover already.

Building on the research question, we develop two regression models, in addition to the base line, each covering a counterhypothesis (see appendix *Figure 8*). Other possible models have been disregarded, given the status of the literature. Nevertheless, a robustness check was run for verification. In general, the models assume an essential difference and clear separation between corporate strategy and business strategy (Beard & Dess, 1981; Yuan *et al.*, 2020). Corporate strategy addresses the businesses the corporation should be in. Business strategy, on the other hand, addresses how the corporation competes within its chosen lines of business. The question of how to compete is in focus. In analogy to this definition, the corporate strategy sets in both models the initial impulse but is not investigated in the models of concern.

2.2.1 The traditional view of the problemistic search

The traditional view of problemistic search, rooted in the behavioural theory of the firm (BTF), hypothesizes that searching for CVC opportunities related to the company's existing businesses can increase profitability (Cyert & March, 1963; Yuan *et al.,* 2020). Research has shown, particularly in the organizational learning literature, that performance-enhancing learning is more likely to occur when experiential knowledge is applied in a similar, related context than when it is applied in a contrasting, unrelated

context (Knudsen & Levinthal, 2007; Argote & Hwang, 2012; Angus, 2019). In the context of CVC, this means that investing in ventures closer to a firm's core business increases the efficacy of strategy execution and leads to better performance. Thus far, however, it is unclear whether the impact of CVC activities in a core business on future corporate performance will be positive (Laursen, 2012; Posen *et al.,* 2018). Therefore, we hypothesize:

> **Hypothesis H1a:** *CVC activity matching a company's core business has a positive moderating effect on the positive relationship between business strategy and corporate performance.*

2.2.2 Extending the traditional view of the problemistic search

The traditional view of problemistic search aside, and approaching the issue from an organizational perspective, we contend that search among non-core businesses enables more innovation-oriented strategies through spillovers of broader knowledge and access to new markets. That, in turn, assumes that CVC investment matching a company's core business has no positive effect on the corporation and a search for CVC solutions to current or anticipated problems outside the company's core business will improve organizational performance (Laursen, 2012; Angus, 2019). Problemistic search allows companies to combine newly acquired, far-flung knowledge with existing, familiar knowledge, increasing the potential for breakthrough innovation (Piezunka & Dahlander, 2015) and competitive advantage through differentiation. In terms of CVC, this means that investing in ventures more removed from a company's core business enables new knowledge, market access, and growth. In addition to existing capabilities and strengths, new ones can be tapped and exploited, which is likely to have a positive impact on overall performance. This hypothesis follows:

> **Hypothesis H1b***: CVC activity matching a company's core business has no positive moderating effect on the positive relationship between business strategy and corporate performance.*

2.2.3 Problemistic search when past corporate performance is negative

Because problemistic search is induced (Cyert & March, 1963), companies may wait to search for solutions until the problem is severe. A problem in the corporate context is

said to be severe when a company is about to miss one or more targets or when the failure to achieve a target is foreseeable. Accordingly, problemistic search describes a behaviourally credible process by which companies both learn from and are driven by performance feedback. When performance falls short, the BTF predicts that companies will initiate problemistic search to initiate changes to close that performance gap, such as strategic change and realignment, corporate risk-taking behaviour, organizational adaptation, knowledge and resource generation, organizational learning, and innovation (Laursen, 2012; Piezunka & Dahlander, 2015; Salge, Kohli & Barrett, 2015; Lenz *et al.,* 2021).

Since problemistic search is thought to be triggered by negative past performance (Salge, Kohli & Barrett, 2015), we evaluate the effect of poor past performance on the impact of CVC activities that correspond to a firm's core business on the positive relationship between business strategy and firm performance.

Researchers have explored how companies respond to underperformance (Duke *et al.*, 2021), specifically, when non-local CVC search is beneficial and when it is harmful (Gavetti & Menon, 2016). Angus (2019) and Posen *et al.* (2018) began resolving the ambivalence in the literature of problemistic search. However, the extent to which a particular CVC search and its results impact current and especially future business performance remains to be explored.

Although we examine the traditional perspective of problemistic search, we extend that traditional perspective by considering both expansion (local and non-local search) and diversification of activities. According to Duke *et al.* (2021), previous research has not considered the company's strategic positioning. Past research has generally addressed broader search activities caused by underperformance (Gaba & Bhattacharya, 2012). For example, an underperforming company with a more focused CVC portfolio may diversify its VC activities to restore overall company performance. In contrast, an underperforming company with a diversified CVC portfolio might seek to specialize in a limited number of activities to improve performance.

Thus, a company's starting point, i.e., whether its strategic approach narrows or diversifies, can impact how problemistic search proceeds (Duke *et al.*, 2021). As a result, strategy becomes even more important, leaving two perspectives to investigate.

On one hand, initial research on problemistic search argues that a history of corporate underperformance leads firms to search predominantly locally for a solution (Cyert & March, 1963). In support of this view, research over the years has highlighted the distinct advantages of locally-based search (Posen *et al.*, 2018). Research has found that companies have limited expertise and resources, so the knowledge they need is readily available in similar, well-known fields (Jung & Lee, 2016). The cost of a local search may be lower than that of a more distant search (Taylor & Greve, 2006; Laursen, 2012). The traditional argument leads to this hypothesis:

> **H2a:** *Poor corporate performance in the past is positively associated with the moderating effect of CVC activity matching a company's core business on the positive relationship between business strategy and corporate performance.*

On the other hand, studies find that local search is not advisable when a company has experienced negative performance and is about to recover (Gavetti, Levinthal & Ocasio, 2007; Angus, 2019). Companies investing in CVC are better advised to search non-locally, moving away from opportunities with low value. Searching outside familiar territory can help an underperforming firm increase its chances of finding higher value elsewhere. Specifically, in complex environments, significant performance improvements are more likely to be found through new practices and routines (Puranam *et al.*, 2015). Clearly, this increase in value creation does not require bounded-rational companies to acquire distant knowhow (Gavetti & Menon, 2016). The argument for non-local search is strengthened by very early research by Norten and Tenenbaum (1993), who argue that non-matching versus matching search is often a strategic decision in itself. The same is true for the strategic choice between narrow and diversified investments(Duke *et al.*, 2021). The following hypothesis reflects this perspective:

> **H2b:** *Poor corporate performance in the past is not positively associated with the moderating effect of CVC activity matching a company's core business on the positive relationship between business strategy and corporate performance.*

2.3 Data and methods

2.3.1 Analytical approach

For this study, we specifically built and used a panel data set comprising ninety-five listed European companies with CVC programs between 2009 and 2019. This period was chosen to represent a suitable range of time during which to control for strategic and performance development and for its timeliness.

We manually coded and tracked CVC portfolio companies to determine their distance from the corporate parent's core business. We conceptualize the moderating variable, CVC activity, as CVC orientation (CVC investments that match or do not match with the corporate core business). Our independent variable, business strategy (BS), is operationalized following prior research (Beard & Dess, 1981; Quigley & Hambrick, 2012) using capital intensity, debt leverage and sales ratio. Our dependent variable, corporate performance (CP), is measured as percentage return on investment on a US Dollar basis (cf. Beard & Dess, 1981; Röhm *et al.*, 2018a).

We control for various factors, such as portfolio venture performance, corporate firm size, corporate age, CVC program age, industry volatility, among others. All controls are lagged by one year. To reduce multicollinearity, the independent variable business strategy (BS) is also lagged by one year (Hochberg, Ljungqvist & Yang, 2007; Kreiser *et al.,* 2019) and calculated as a rolling three-year average. The dependent variable, corporate performance (CP), is calculated each year (Röhm, 2018b).

The analysis uses ordinary least square (OLS) regression models in Stata SE 15.1. We test our hypotheses using a fixed effects regression model. All hypotheses are tested using clustered robust standard errors to mitigate concerns about heteroscedasticity (Henderson, Miller & Hambrick, 2006; Quigley & Hambrick, 2012) and control potential error variances across various industries (Sirén, Patel & Wincent, 2016). Each model was then tested for collinearity using the variance inflation factor (VIF). The VIF remains below 10 in all cases, which is the benchmark for unproblematic observations (Quigley & Hambrick, 2012). Fixed effect models are used to control for remaining heterogeneity, which are supported by Hausman tests (Zahavi & Lavie, 2013; Certo, Withers & Semadeni, 2017). As in prior research, the year and the lagged CP are controlled for using dummy variables

(Quigley & Hambrick, 2012). For models predicting performance, an autoregressive correlation structure was chosen to account for time-related correlation within each panel (Quigley & Hambrick, 2012).

The variables used to investigate a CVC impact (business strategy and corporate performance) are expected to be correlated. Statistical analysis and testing of the hypotheses used a gradual linear regression method. For the tested regression equations, the minimum acceptance level of statistical significance is $p < 0.05$. The model is tested for each of the eleven years (2009-2019) and for a three-year average regarding the IV. The aim of the hypothesized regression models is to verify the significance and value-add of CVC on corporate performance. This approach was chosen to improve our understanding of the CVC leverage effect and timing, along with the corporation's strategy for improving performance.

2.3.2 Data sources and study sample

The identified models are evaluated using a panel dataset. The data are sourced primarily from Pitchbook and Bloomberg, but also include certain elements of Obris and Thomson ONE / VentureXpert. The paper focuses on Europe, as past research has shown that most investigations had put primary emphasis on CVC activities in the United States. CVC activity in Europe is increasing but remains highly fragmented (Colombo & Murtinu, 2017).

The data used for the calculation of the dependent variable (corporate performance) and independent variable (business strategy) are drawn from Bloomberg. SIC codes for all corporations and their CVC venture portfolios were initially obtained from the Obris database; additional and missing SIC codes were obtained from the Thomson ONE database. The information needed for the evaluation of CVC activity, as moderating variable, was gathered from Pitchbook, Obris and Thomson ONE / VentureXperts. Data on control variables were obtained from Bloomberg, Pitchbook, Obris and Thomson ONE / VentureXperts. The data collected for negative performance by the Bloomberg dataset holds an approach leaned on past scientific approaches (Huang & Madhavan, 2020).

2.3.3 Measures

Derived from the research question, the variables in use were generally structured into two core clusters: The *dependent variable (DV)* and the *independent variables (IVs).* Those clusters were enriched by *moderators (Ms)* and scrutinized using *control variables (CVs)*. An overview of the variables in focus, including calculations and data sources, can be found in *Table 7* in the appendix.

Dependent variable

Corporate Performance (CP) is measured based on the work of Quigley & Hambrick (2012), and Li & Chen (2020). CP is measured using return on investment (ROI): investment return divided by investment cost and presented as a percentage.

Independent variables

Business Strategy (BS) is measured based on the approach used by Beard & Dess (1981), which in turn finds application in more recent studies such as Yuan *et al.* (2020). Business strategy is measured relative to industry norms using three corporate characteristics:

(1) *Capital intensity ratio,* the amount of capital required to generate one dollar of income, calculated as the ratio of the corporation's total assets to total sales divided by the average ratio for all firms in the appropriate industry. The smaller the ratio, the less capital is needed to run the corporation.

(2) *Debt leverage ratio*, the relative size of the corporation's debt, calculated as the ratio of the corporation's debt to its equity, divided by the corresponding average ratio for all corporations (obtained from corporate tax returns) in the appropriate industry. A high ratio indicates that a corporation may have borrowed more than it can reasonably be expected to serve using its current cash flows.

(3) *Sales size ratio*, the corporation's sales divided by average sales of all firms in the appropriate industry. The higher the figure, the better the sales performance of a corporation relative to its industry peers in the given year.

The three ratios (capital intensity, debt leverage and sales size) are equally weighted and averaged over the previous three years, a common practice in past research (see, e.g., Dushnitsky & Shapira, 2010; Abernethy, Dekker & Grafton, 2020). Importantly, an often-

applied approach first used by Miles & Snow (1978) was not employed here because the approach focuses primarily on strategy typologies in focus, which our research did not investigate. Applying the Miles & Snow approach is one avenue for future research).

Moderating variables

The models outlined use the moderating variable *CVC orientation,* which captures the direction of CVC investments, either matching a certain strategy of the corporation or not. Matching CVC investments involve funding for ventures which operate in familiar business fields, either market-related or technology-related or both (Rosenkopf & Nerkar, 2001; Anand, Mesquita & Vassolo, 2009). Non-matching CVC investments, in contrast, are independent of the corporation's current fields of operation and available knowledge. Accordingly, non-matching CVC investments capture the extent to which investments explore new technologies and operate in unfamiliar markets.

To determine whether investments are matching or non-matching, we obtained Standard Industry Classification codes (SIC codes) (Bhojraj & Lee, 2002; Dushnitsky & Shaver, 2009; Klobucnik & Sievers, 2013) for each year, each corporation, and each venture of the CVC portfolio (Röhm *et al.*, 2018a). The SIC code matching score is calculated by comparing each SIC code of each venture in the CVC portfolio with that of the corporate parent. The measure of matching takes on a value of "1" if all three digits of the venture SIC code match and "0" otherwise (Wang & Zajac, 2007). In most cases, there are several ventures per year in a portfolio; in those cases, we used a weighted average of the matching score.

Venture investments were considered only once; follow-up investments were not separately considered. Thus, the matching score shows the matching percentage of a CVC investment in a perfectly familiar market or field of knowledge for the corporation. Because hypotheses 1b and 2b assume that in case of non-matching CVC investments, CVC will have no positive impact on the association between business strategy and corporate performance, the variable is inverted.

Model 3 compares the moderating variable CVC orientation with a three-way interaction term of *past negative corporate performance*. Past negative corporate

performance is captured by the inverted corporate performance score and calculated using ROI.

Control variables

For verification reasons, we apply several control variables. Corporate size, corporate age, CVC program age, and industry volatility are controlled for using data from Bloomberg and Obris, since each of these variables can affect both corporate behaviour and corporate performance (Miller, Le Breton-Miller & Lester, 2013; Yang, Chen & Zhang, 2016; Röhm *et al.*, 2018a).

Corporate size has been identified as a potential influence on innovation expenditures, degree, and direction, as well as on propensity to operate a CVC program (Basu, Phelps & Kotha, 2011; Younge & Tong, 2018). The larger the corporation, the greater the available resources to support CVC activities. Corporate size is quantified as total corporate assets in USD (Yang, Chen & Zhang, 2016).

Corporate age and *CVC program age* are measures of how established the corporation is and for how long a CVC program has been in place. Both are calculated using years of operation in 2019, the end of the study period (Röhm *et al.,* 2018a).

Industry volatility is included to control for certain characteristics of industries, as well as the performance of the corporation in comparison to its direct peers for a given period. It is measured as the change in corporate performance compared to the change in market performance of the same industry sector, based on return on assets (ROA) (Dushnitsky & Lennox, 2005).

Corporate status is a dummy variable set to "0" if not operating CVC activities and "1" if active in CVC (Hill *et al.*, 2009), using data gathered from Pitchbook.

CVC autonomy is measured by the legal form of the CVC unit. Internal programs and wholly-owned subsidiaries are distinguished from external investments using data from Obris, validated, and supplemented using data from Thomson One (Yang, Chen & Zhang, 2016; Lee, Park & Kang, 2018).

The *capital intensity* ratio, *debt leverage* ratio and *sales size ratio* are individually controlled using data from Bloomberg (Beard & Dess, 1981).

For further control, we investigated *corporate investor status* and *autonomy status*. *Corporate investor status* is a dummy variable set to "1" if the company has an active CVC program and "0" otherwise (Hill *et al.*, 2009). *Autonomy* provides information on the legal form of the CVC program, using data from Obris and Thomson One / VentureXperts to distinguish between an internal, incorporated CVC program and a wholly-owned CVC subsidiary (Yang, Chen & Zhang, 2016; Lee, Park & Kang, 2018). Prior research assumes that fully incorporated CVC programs have a greater tendency to have a strategic focus, because the program has a specific budget and an internal team to run CVC activities (Lee, Park & Kang, 2018). CVC investments are closely linked with the strategic interests of the corporation, but with less autonomy in their decision making. The opposite is the case for wholly-owned CVC subsidiaries, which strongly resemble traditional VC fond.

Lagged corporate performance and the year, based on Bloomberg data, and commonly used in past research (Quigley & Hambrick, 2012), complete the list of the control variables. Corporate performance is lagged by only one year, because changes in strategy might take some time to affect corporate performance. The year is included as a dummy variable for each calendar year to control for time, general economic circumstances, and industry tendencies (Zhang, 2006; Yang, Chen & Zhang, 2016).

2.4 Results

2.4.1 Analytical results

Table 2 displays descriptive statistics, including means, standard deviations, and correlations, of the variables being investigated. Overall, the table shows that the independent variables are not highly correlated with the dependent variable. No multicollinearity problems are present, as Variance Inflation Factors (VIF) stays below 10 (Hair *et al.*, 2014).

Table 2: Descriptive statistics and correlations

Variables	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Corporate Performance	9.015418	16.7418	1												
(2) Business Strategy	0.851896	6.32963	-0.0395 0.1772	1											
(3) CVC orientation matching	0.041053	0.14618	-0.0034 0.929	0.0584 0.1169	1										
(4) Negative Corporate Performance	0.047516	6.30635	-0.5564 0	-0.0118 0.7278	0.0401 0.3231	1									
(5) CVC program age	4.598575	6.86383	-0.0739 0.0107	0.0245 0.3927	0.0488 0.1842	-0.0504 0.1298	1								
(6) Venture portfolio number	4.757755	4.07915	-0.0481 0.2235	0.0519 0.1845	0.0118 0.7872	0.0404 0.3363	-0.0128 0.7397	1							
(7) Corporate size	165339.8	402857	-0.1351 0	0.0123 0.6719	-0.0852 0.0218	0.0087 0.7965	-0.1288 0	0.0808 0.0386	1						
(8) Corporate age	66.8266	56.2735	-0.0615 0.0337	0.0371 0.1957	-0.083 0.0238	0.0009 0.9788	0.0626 0.026	0.1003 0.009	0.0336 0.2404	1					
(9) Industry volatility	48.64584	64.7988	0.0282 0.3322	-0.0308 0.2911	-0.0366 0.3304	-0.0521 0.1219	0.0475 0.0986	-0.0671 0.0882	0.0948 0.001	-0.0197 0.4931	1				
(10) Lagged Corporate Performance	9.015418	16.7418	1 0	-0.0395 0.1772	-0.0034 0.929	-0.5564 0	-0.0739 0.0107	-0.0481 0.2235	-0.1351 0	-0.0615 0.0337	0.0282 0.3322	1			
(11) Corporate status	0.878068	0.32734	0.0329 0.2556	0.0087 0.762	-0.1081 0.0032	0.0006 0.9864	-0.2581 0	0.0001 0.9979	0.1282 0	-0.0045 0.8742	-0.0773 0.0072	0.0329 0.2556	1		
(12) CVC autonomy	0.095804	0.29444	0.0455 0.1163	0.0075 0.7924	-0.0273 0.4586	-0.0015 0.965	-0.1331 0	0.0787 0.0406	-0.0163 0.5701	0.0615 0.0288	0.0984 0.0006	0.0455 0.1163	0.0309 0.2731	1	
(13) CVC SIC codes	4642.371	1824.53	-0.0002 0.9944	-0.021 0.4643	0.1913 0	-0.0196 0.5559	0.1472 0	-0.0242 0.5299	0.2371 0	-0.2602 0	0.162 0	-0.0002 0.9944	-0.1219 0	0.004 0.886	1

Models 1, 2 and 3 in *Figure 8* in appendix illustrate the conceptual framework of our research into the moderating impact of CVC activity on the positive relationship between business strategy and corporate performance. In Model 1, we regress business strategy and the various controls on the independent variable, company performance, to establish a baseline. In Model 2, we examine the moderating impact of CVC activity matching a company's core business on the positive relationship between business strategy and corporate performance, whether positive (H1a) or non-positive (H1b). Model 3 illustrates the possibility of a moderating effect of negative past performance of the corporate parent on the positive relationship between business strategy (BS) and corporate performance (CP), either positive (H2a) or non-positive (H2b), three-way interaction. All regression results are shown in *Table 3*.

Table 3: Effects of CVC on corporate performance

Variable	Model 1	Model 2	Model 3
Business Strategy (BS)	122.2*	85.50***	72.69***
	(69.07)	(23.94)	(21.45)
Matching CVC		-2.016	-0.527
		(1.856)	(0.978)
Matching CVC on BS		70.08***	31.46***
		(5.381)	(7.191)
Past negative Corporate Performance (CP)			0.910
			(0.569)
Past negative CP on BS			5.613***
			(1.173)
Past negative CP on matching CVC			-0.0576
			(0.778)
Past negative CP on matching CVC on BS			12.30***
			(2.574)
Corporate size	3.70e-05	1.55e-05	7.87e-06
	(3.23e-05)	(1.30e-05)	(9.53e-06)
Corporate age	-2.247	0.536	-1.980
	(4.998)	(2.799)	(2.112)
CVC program age	2.060	1.121	1.315
	(1.280)	(0.788)	(0.887)
Venture portfolio number	-0.00411	0.0784	0.0578
	(0.152)	(0.147)	(0.111)
Industry volatility	-0.0206	-0.0145	-0.00395
	(0.0237)	(0.0207)	(0.0205)
Past negative CP as control			0.112
			(0.129)
CP as control	-0.388	-0.334	
	(0.269)	(0.283)	
Constant	154.0	-31.92	141.3
	(343.4)	(193.3)	(147.1)
Observations	354	354	354
R-squared	0.329	0.657	0.703
Number of Corporates	95	95	95

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Following Dawson and Richter (2006), we ran slope difference tests and used the Stata SE 15.1 "margins" command with test values set to one Standard Deviation (SD) below and above the mean. For all models, analysis of variance (ANOVA) was used with the F distribution and one-tailed significance tests (Dawson & Richter, 2006). This choice is based on the directionality of our hypotheses (Neter *et al.*, 1996). To further illustrate the modules, in particular the three-way interactions, we plotted the interaction effects in *Figure 1* and *Figure 2* (Feng *et al.*, 2019). *Figure 3* compares only matching CVC activities with positive and negative past performance, underlining the results presented. We analyse the differences between CVC activity matching and non-matching as the moderating variable in high versus low past negative corporate performance. We then compared the differences in slopes between matching and non-matching CVC activity as moderator across high versus low past negative performance. Our results confirm Model 1, namely, that business strategy positively and significantly affects corporate performance (ß=122.21; $p<0.1$), underscoring that business strategy reflects how companies compete within a particular business and thus influences performance (Beard & Dess, 1981; Yuan *et al.*, 2020). By including the influence of CVC activity matching a company's core business on the positive relationship between business strategy and corporate performance, Model 2, we find that the coefficient estimates of CVC activity matching a company's core business is both significant and positive (ß=70.08; $p<0.01$). In other words, matching CVC activity has a positive effect on the positive relationship, between business strategy and corporate performance. The coefficient estimates of poor corporate performance in the past on CVC activity matching a company's core business, Model 3, is also significant and positive (ß=12.30; $p<0.01$), along with a positive effect of matching CVC activity on the relationship between BS and CP. Therefore, H1a and H2a receive strong support.

Figure 1: Model 2

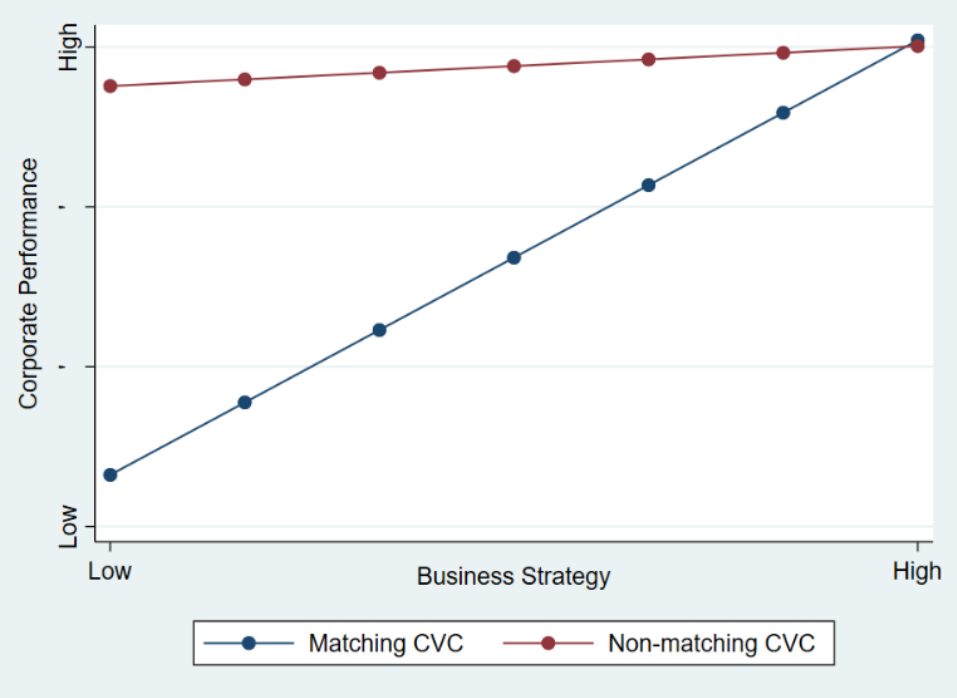


Figure 2: Model 3

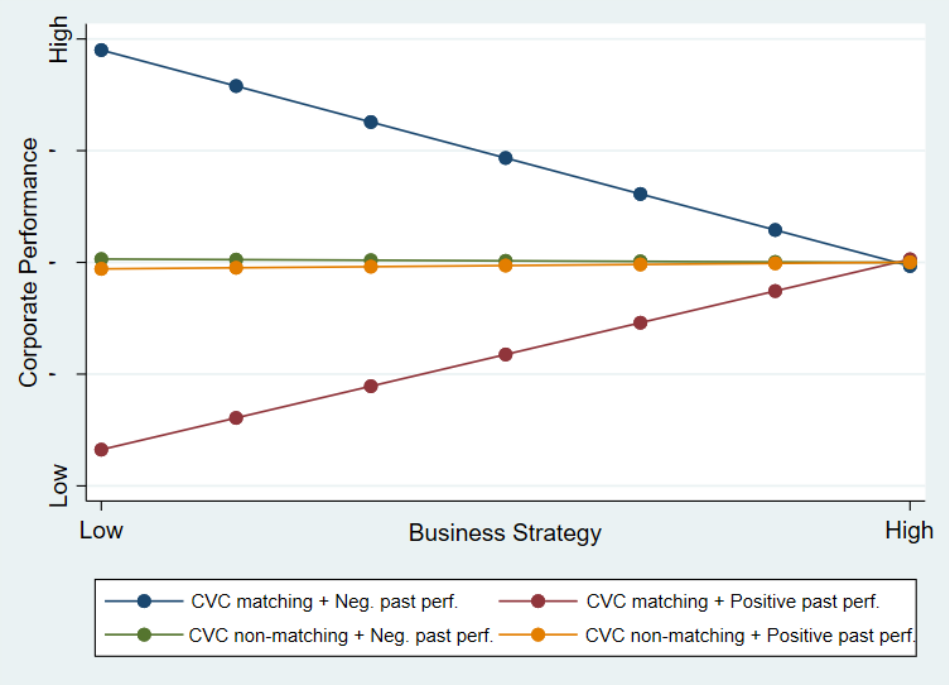
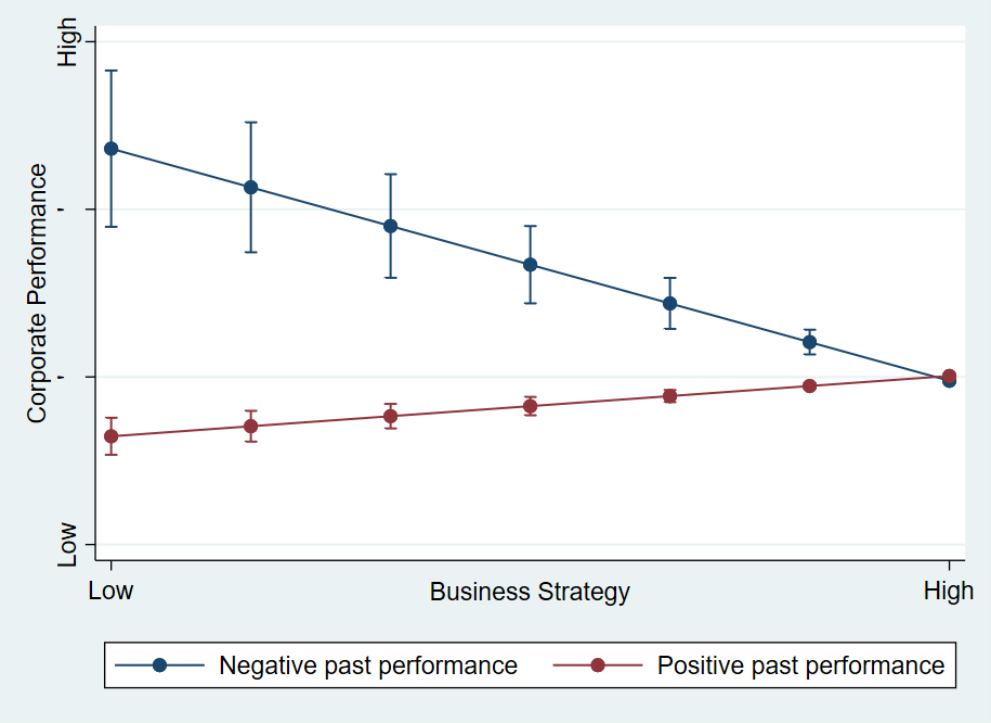


Figure 3: Model 3 - Only matching CVC activities



That the effect of CVC activity matching a company's core business *without* considering poor past performance is stronger (ß=70.08; p<0.01) than the effect *with* it (ß=12.30; p<0.01) suggests that previous negative corporate performance generally mitigates the efficacy of CVC activity on corporate performance. We surmise the fact that the business in general is recovering explains the result. The change in R2 from Model 1 to Model 2 to Model 3 indicates that CVC activity matching a company's core business, whether past performance has been negative or not, largely explains the positive relationship between business strategy and corporate performance.

Consistent with the traditional view of problemistic search, we find that CVC activities that fit a firm's core business, i.e., searching for solutions to current or anticipated problems near the firm's boundaries, have positive marginal effects by enabling innovation-oriented strategies with broad knowledge spillovers and providing access to new business models and technologies in familiar business fields that improve firm performance.

2.4.2 Robustness checks

To increase the applicability of our results, we evaluated alternative variable operationalizations and model specifications. We first tested SIC codes regarding hypotheses 1a and 2a. In addition to the three-digit SIC codes previously tested, we analysed one- and two-digit SIC codes. Results were significant for two-digit SIC codes for both H1a (ß= 81.42; $p<0.01$) and H2a (ß= 23.27; $p<0.01$). No inflated results were detected (VIF). Results were also significant for one-digit SIC codes for both H1a (ß= 95.23; $p<0.01$) and H2a (ß= 24.05; $p<0.01$). The significance increased with the reduction in the number of SIC codes because the congruence increased. With one-digit SIC codes, only one number must match; with three-digit SIC codes, all three must match. Robustness analyses can be found in *Table 8*. In general, the auxiliary analyses show the robustness of our results due to qualitatively similar outcomes in terms of effect sizes and significance levels.

2.5 Discussion

The results of this study show that CVC activities that fit within a company's core business have a positive impact on the positive relationship between business strategy and company performance. This confirms the traditional approach to problemistic search to find solutions to current or anticipated problems through CVC activities close to the core business, with the ultimate goal of improving current organizational capabilities or developing new ones. Our analysis shows that CVC investments that match existing corporate businesses enable and strengthen innovation-driven strategies with broader knowledge sharing and access to familiar markets that allow companies to meet goals and expectations, thereby enhancing the relationship between business strategy and corporate performance. In the case of a company experiencing negative past performance, CVC investment that aligns with the core business allows the company to use its existing, proven knowledge and capabilities to further drive the new venture's activities. Based on lessons learned and experience gained, there is potential for breakthrough innovation and competitive advantage for ventures through an efficiency-focused strategy execution, which in turn will improve corporate performance. H1a and H2a are verified. However, we find that in the case of past negative firm performance, firm conditions do not support

the positive effect of CVC activities on the business strategy and corporate performance relationship as strongly (Model 3a, lower ß-value; negative slope) as they would in the case of a firm with good past performance. We attribute this to the inability to leverage the impact of matching CVC activities to its full degree due to corporate performance difficulties.

In summary, when a company is prospering, CVC activities related to the company's core business have a positive effect on the positive relationship between business strategy and corporate performance. In difficult times, the marginal effect is weaker but still positive. Once the company recovers, we expect that CVC activities will provide a greater benefit, because CVC activities related to the core business are consistent with a recovered business strategy.

2.5.1 Implications

This paper addresses several theoretical and practical implications for strategic entrepreneurship, corporate ventures, and search. Primarily, this paper aims to clarify the benefits of CVC by identifying performance spillovers from CVC activities to the parent company. We provide substantial evidence of the existence and benefits of CVC investments by analysing CVC value creation. In doing so, we answer the call of Allen & Helvert (2007) and Huang & Madhavan (2020) for future research.

Second, we introduce the role of business strategy and the idea of problemistic search to explain how performance spillovers occur (Ott, Eisenhardt & Bingham, 2017; Posen *et al.*, 2018). We contribute to previous work that investigated the link between CVC activities and the corporation's comprehensive strategic agenda (Birkinshaw, van Basten Batenburg & Murray, 2002; Covin & Miles, 2007; Hill *et al.*, 2009), but only from a qualitative perspective. Some quantitative studies, such as those collected in the meta-analysis by Huang & Madhavan (2020), also focus on the strategic rationale but not on business strategy per se. Although research findings show that CVC investments generally improve the strategic performance of corporate investors (Allen & Helvert, 2007), our results show that matching CVC activities have a positive effect on the relationship between business strategy and firm performance.

Third, in terms of problemistic search, we measured the distance between the corporation's core business and its CVC activities and tested competing hypotheses about the traditional view of search. On one hand, we referred to the traditional perspective that search behaviour that is closer to a company's core business (so-called matching CVC activity) has a positive effect on more efficiency-related strategy improving the business strategy-performance relationship through increasing profitability (cf. Yuan *et al.*, 2020). On the other hand, we explored whether searching for matching CVC opportunities has a non-positive effect on more innovation-oriented strategies, driving corporate performance. The data demonstrates that matching CVC activities strengthen the relationship between business strategy and corporate performance. Existing knowhow and capabilities as well as efficiency gains can be leveraged, contributing to the spillover effects made possible by CVC investments.

Fourth, we introduced the role of past performance, contributing to prior research on how firms respond to underperformance (Duke *et al.*, 2021). We provide evidence that search in familiar territories, in the same business field as the corporate parent, is beneficial when a firm underperforms relative to expectations (Gavetti & Menon, 2016; Angus, 2019). The data also demonstrates that the positive impact of matching CVC investments on the relationship between business strategy and firm performance is rather flat when past performance is negative but holds increasing impact when performance is again flourishing. In both cases, however, matching CVC investments lead to performance spillovers.

Fifth, our use of panel data has implications for methodology. To date, most studies have concentrated on cross-sectional studies, focusing on a certain time period (Dushnitsky & Lenox, 2006). We suggest a longitudinal panel study to better control influencing or interfering factors and consideration of in-depth information about the various components and their relationship to each other (Dushnitsky & Lenox, 2006). Further panel research will provide additional insights on how CVC is manifested within a corporation to achieve a closer congruence between theory and management practice (Wales, 2016).

Despite the merits of the theoretical proposition, the results make practical contributions by making corporations aware of the impact of CVC on the corporation's

innovation agenda and thus on corporate performance. The new knowledge can enable management and key stakeholders to better understand underlying CVC rationales and how to best to capture spillover effects from CVC in line with business strategy to enhance corporate performance in the long run. Those investigations contribute towards the work of Titus & Anderson (2016), who first elaborated the different structures of managerial attention on certain forms of CVC activities. The research findings aim to diminish managerial uncertainty over how to act and react to stimulate increased strategic learning, technology knowhow and market understanding. In particular, findings on handling strategic CVC programs to improve performance will lead to improved alignment with the parent company and establish more flexible and therefore improved realization of strategic CVC benefits. CVC stakeholders are provided with enhanced awareness and skills to be more aware of the potential impact, force, and direction of CVC investments on strategy and performance. Consistent with future performance increases, knowledge of how to grow and ensure expected CVC program performance can then again attract even more and higher qualified ventures and staff in the future (brand and reputation), besides building a foundation of innovation capabilities and growth.

2.5.2 Limitations and future directions

This paper can cover its subject to only a certain degree, which leads to limitations and directions for future research. Most of the limitations are inherent in the use of panel data as well as in the field of CVC research. Even though a unique longitudinal dataset offered an excellent opportunity to answer the research questions, some reservations remain.

First, the results of the various regressions rely on retrospective data to analyse a contemporary phenomenon. For reliability and validity reasons, primary data (case studies, interviews, or surveys) should also be gathered. In addition, the current data set could be made complete by drawing on other datasets or on primary data.

Second, the insights identified here might not apply to all types of corporations and industries in the same way. An analysis of industry characteristics would help to better understand whether and to what extent industry-specific attributes influenced our results. This additional breakdown would complement this research, and earlier cross-sectional

case studies, by examining specific CVC elements within an industry. We analysed only surviving CVC programs, without checking for survivor bias. Future research is strongly encouraged to evaluate whether higher corporate performance also carries a higher risk of failure.

Third, we encourage further in-depth investigation into the strategic and financial orientation of CVC programs. In this study, CVC orientation is synonymous with CVC legal status, which provides information on the degree of the CVC's autonomy. Past studies have obtained information about CVC orientation from announcements in the Lexis-Nexis Academic Universe (Dushnitsky & Lenox, 2006). Such amplified differentiation of CVC orientation may provide even further insights.

Fourth, examining exploiting versus exploring CVC activities would be insightful. Information on the organizational status of the organization would allow further conclusions about the extent of CVC investments that match (or do not) the corporation's core business. Further explanations of the dialogue between strategy and CVC activity would also be useful.

Fifth, problemistic search suggests that the likelihood that a firm will search for new solutions to performance deficits depends on the characteristics of the organization (Angus, 2019; Lenz *et al.*, 2021), such as strategic orientation, narrow versus broad portfolio approach, problem versus solution search, the severity of past performance (performance size and resource availability), organizational change, and risk-taking mentality. None of these aspects were considered in this study and should be investigated in future research. Similarly, neither the impact nor the relevance of the CVC mandate itself were considered (Norton & Tenenbaum, 1993).

Sixth, many corporations in the selected sample invest in tech-related ventures (e.g., SIC code 737), which do not match the corporate SIC code. However, such ventures often contribute to the profits of the core business. We suggest future analyses distinguish between supporting investments and investments that totally deviate from the corporate business.

Seventh, apart from the moderating variables investigated, it would be interesting to consider additional moderators in depth, such as the organization's pro-entrepreneurship structure and the established processes, behaviours and advocacy of management and

CVC-relevant employees. As mentioned by Kreiser *et al.* (2019), these aspects are essential for corporate entrepreneurship and thus might also apply to CVC as a subcategory of corporate entrepreneurship. Individual stakeholder dependency is critical. Previous studies have shown that entrepreneurial outcomes typically rely on the personalities involved (Tseng & Tseng, 2019). Further research on corporate strategic decision-making, decision processes, strategic renewal, and the availability of competences and capabilities is needed (Burgelman *et al.*, 2018).

Eight, the process through which CVC can influence corporate performance through strategy is examined only from a holistic viewpoint of the effect on performance. It might be fruitful to separate corporate performance into, for example, corporate productivity, marketability, and competitive advantage. A more detailed analysis of the dependent variable and the moderating effect of CVC could provide further insights and additional practical awareness and knowhow on the application of the phenomenon.

Ninth, our research confirms and extends the traditional view of problemistic search. We have shown that spillover effects occur when a CVC program focuses on matching CVC activities, whether the parent company has performed well or poorly in the past. What we did not examine in this study is when exactly matching CVC as opposed to non-matching is preferred, to detect spillover effects. Nor did we define the difference between matching CVC activity and non-matching CVC activity.

Overall, although the quantitative review shows substantial evidence of the CVC impact on the parent company, certain research limitations provide significant paths for future research to assess additional nuances of CVC practice in detail.

2.6 Conclusion

This study applied and extended the Behavioural Theory of the Firm with focus on problemistic search to an area of debate about Corporate Venture Capital practices. We demonstrated the positive impact of CVC investments on the parent company through marginal spillover effects. We showed how companies can leverage CVC activities to improve performance. To the best of our knowledge, we are the first to distinguish between core and non-core businesses, with particular emphasis on negative past corporate performance. We tested competing hypotheses that argue against the traditional view of problemistic search. We find that CVC activities that match a company's core business have a positive impact on the positive relationship between business strategy and corporate performance, also considering when past corporate performance has been negative. These results illustrate the spillover effect of CVC investments by adding new business models, services, and technologies in already well-known business areas, justifying the use of CVC programs to contribute to corporate innovation and competitiveness.

3 Paper II: Corporate Venturing Navigator – Conceptual development

Research Summary: Corporate venturing (CV) has become a very important business tool for both corporations and start-ups and has received considerable research attention. However, existing studies are ambiguous and incomplete in terms of the optimal set-up, operation and termination of a CV program and the capture of value that is generated for the parent company. Based on the available research, I applied design science research to create two artefacts: 1) the CVN-Framework and 2) the CVN-Cockpit. The results provide initial guidance on how to improve CV activities and realize their full potential but also require further evaluation in practice with greater scope for specific nuances of practical application. I highlight the contributions of CV in terms of theory and measurement.

Managerial Summary: How can one prove that investments in CV operations are worthwhile for a parent company? CV programs are quite attractive for companies that want to take innovation to the next level, but most companies struggle with how best to structure and deliver such a program. It is critical that some performance impact is achieved, but this requires the right framework for a CV program and raises the question of how to actually capture and measure financial and strategic CV value. This qualitative study, the *Corporate Venturing Navigator* (CVN) concept paper, outlines the CVN-Framework and the CVN-Cockpit, which represent a return-on-innovation tool that encompasses all the nuanced CV elements and interactions, as well as their practical contributions to a parent company.

Keywords: corporate venturing; design science research; behavioural theory of the firm; *Corporate Venturing Navigator* (CVN) framework; return-on-innovation

3.1 Introduction

Corporate venturing (CV) has experienced tremendous growth and has received very positive attention in recent years from academia (Dushnitsky, 2011; Röhm, 2018b; Prügl & Spitzley, 2020). The increasing interest in CV, which is the entrepreneurial effort of established corporations to invest in and/or create new businesses, can be traced back to its unique opportunities for corporations to redefine innovation and investment practices (Dushnitsky & Lenox, 2006). Today, many corporations are challenged more than ever by the dynamic market fields and various disruptive technology advances (Battistini, Hacklin & Baschera, 2013; Fels, Kronberger & Gutmann, 2021). CV, in this regard, is often considered an organizational vehicle for building competencies and has thus turned out to be a promising vehicle for promoting innovation strength (Dushnitsky & Lenox, 2005b; Vanhaverbeke & Peeters, 2005). CV is seen as a holistic approach to innovation enhancements as it carries the advantage of exploiting current business activities and exploring new business fields and markets (Rossi *et al.*, 2020). It is often seen as a positive corporate supplementation of internal R&D activities and capability development (Barretto-ko, 2011). It has demonstrated that it is one of the fastest growth strategies for transforming a traditional closed, linear approach to corporate innovation into a more collaborative, open and agile model based on new research and development partners (Napp & Minshall, 2011).

However, this rapid growth has led to significant shortcomings in prior research. In general, the relevant research remains rather fragmented as researchers have hardly built on each other's work (Yang, Narayanan & Zahra, 2009). Scholars have selectively concentrated on different elements of CV rather than promoting a common and coherent framework that advances systematic and cumulative science (Yang, Narayanan & Zahra, 2009). In the past, CV has been mostly practised in the form of finance-oriented CV investments with financial returns as the central anchor (Dushnitsky & Lenox, 2005b; Basu, Phelps & Kotha, 2016). Yet, strategy-oriented CV investments with strategic value generation in focus have garnered increasing interest and experienced expanded application (Napp & Minshall, 2011; Ma, 2019; Pinkow & Iversen, 2020). However, measuring the strategic value generated and the CV return-on-innovation as a whole raises unresolved questions (Chiang, 2018). Groundwork on measuring CV value-add has been

called for by several scholars (Napp & Minshall, 2011; Chiang, 2018; Fels, Kronberger & Gutmann, 2021) who believe that establishing a profound academic approach to realizing value-adds by financial and strategic CV investments is necessary. An in-depth understanding of the mechanisms behind the achievement of expected CV performance is lacking so far.

Along with the missing ability to track CV value that is generated, and the process of the CV program comes the unresolved dilemma of CV survival. Academia has placed considerable attention on better understanding the underlying reasons for the new and recurring obstacles and the prevailing high failure rate (Hill & Birkinshaw, 2014; Prokop, Huggins & Bristow, 2019). Scholars have tried to find insights into adopting different CV investment perspectives by analysing specific CV types (Chesbrough, 2002; Gutmann, 2019) and approaches (Hill & Birkinshaw, 2014). However, investigations into the overall life cycle of CV investments (Ma, 2019), along with initial attempts to assess the CV set-up and process (Gaule, 2017) have provided room for further research.

Overall, most scholars have found that past research has not sufficiently provided efficient insights into and academic explanations for the reoccurring lack of performance and growth concerning CV investments (Huang & Madhavan, 2020; Fels, Kronberger & Gutmann, 2021). More research is needed to better understand the fundamentals and mechanisms of how to best set-up, run and close CV investments. In particular, insights into the causal relationships of CV investment objectives, the organizational structure, the governance and the many more essential CV elements are needed to make CV programs successfully contribute to parent corporations as promised. CV programs are to be made more robust to better cope with internal changes such as management changes and changes in activity foci, as well as external alterations such as amended market fields, competition, customer demands or new technologies. In this context, several researchers have emphasized again that in accordance with the further examination of CV launch and management, the strategic value-add extraction of CV investments is key (Chiang, 2018). In accordance with the identified research gap, a *Corporate Venturing Navigator* (CVN) concept is developed in this paper to answer the following research question: *"What (additional) value-adds can be achieved for a CV program by applying the CVN?"*

The navigator aims to develop a conceptual model to (a) properly set-up, manage and close or calibrate CV activities (CVN-Framework) and (b) to capture and measure generated value throughout the activity (CVN-Cockpit). Both elements are expected to result in better self-assessment capabilities and the ability to handle change and disruption. In turn, enhanced CV activities are anticipated to have a positive impact on sustainable competitive advantages and thus contribute to the performance of the parent company.

For corporations, the ultimate implications of the CVN are achieving improved or promising new CV operations that are supported by data-driven decision-making and a better understanding of the neural system of CV investments. CV performance targets that can be realized as financial and strategic returns on innovation will be made transparent and tangible. For academia, contributions to multiple research streams such as the literature of corporate venturing and innovation will be generated. Implications on how the CVN concept can take CV theory and practice one step forward to optimize CV performance, will be outlined in detail. The application of the attention-based view and the behavioural theory of the firm is expected to augment and offer explanations on corporate decision-making processes in the CV context, while design science research is applied in the conceptualization process.

In general, the CVN is based on the *St.Galler Start-up Navigator*^{TM}, which was created at the Institute of Technology Management at the University of St.Gallen in 2018. The *St.Galler Start-up Navigator*^{TM} evolved based on a systematic approach to building new ventures and a quantifiable system for data-driven decision-making. Insights were generated by evidence-based findings from academia and practice through literature reviews and semi-structured interviews. Thus, the CVN has been conceptualized as a dynamic tool to guide corporates through an intuitive step-by-step approach with a total of four main concept categories and eighteen elements. The methodology applied is design science research.

3.2 Theoretical foundation

3.2.1 Status quo: Corporate venturing application and success

The past has proven that the continued existence of CV activities is not unconditionally guaranteed. CV activities are not merely preceded by their reputation of being ephemeral but have their objectives and structures moved apart. This is reflected across companies, industries and regions (Gompers & Lerner, 2000). Regarding transience, many scholars have started to investigate why the majority of historical CV initiatives have failed but have not contributed to corporate performance and growth as expected (Teppo & Wüstenhagen, 2009; Hill & Birkinshaw, 2014). Scholars have highlighted macroeconomic reasons such as the cyclical course of CV (Dushnitsky & Lenox, 2006) and numerous specific and broad microeconomic reasons. The main microeconomic aspects that have been studied in particular are the focus of this section and are analysed in the following passages.

Gompers & Lerner (1998) were amongst the first to understand what factors determine CV investment success. What they found was the lack of a clearly defined mission and insufficient corporate commitment to the CV program (Gompers & Lerner, 1998; Röhm, 2018b). Other scholars followed with their own research, such as Hill & Birkinshaw (2008; 2012), by analysing determinants of CV program failure. The results demonstrated new key aspects that can lead to failure when they are not present, which include lacking CV relationships, systems and activities. The aspect of relationships, especially the one between corporate management and CV managers, was recently studied by Fischer *et al.* (2019), who proved its significant effects.

Going in line with research on academic explanations for the reoccurring CV "dead syndrome", Teppo & Wüstenhagen (2009) sought to gain valuable insights by adopting a more holistic perspective on CV investments – namely, looking into organizational culture, which they identified as an aspect that has been overlooked in previous research. They found that cultural mismatches between CV units and their parents are the primary cause of short-term CV existence and noted that More research is needed to better understand decision-making processes and capabilities in handling and measuring success (Teppo & Wüstenhagen, 2009). Recently, researchers have demanded more research be done on the

latter subject (Chiang, 2018). Hill & Birkenshaw (2014) tapped into the field of ambidexterity and how it relates to CV success. They applied ambidexterity in a corporate context as well as within CV. Both exploration and exploitation demonstrated that CV programs can leverage existing corporate capabilities to simultaneously build new ones, which makes better use of CV to coordinate and legitimize investments with sustainable impacts on a parent firm. Simultaneously, their results revealed that CV programs hold the need to be ambidextrous to be successful and survive (Hill & Birkinshaw, 2014).

Gaba & Dokko (2016) studied the aspects of practice utilization and staffing decisions as a negative influence on CV success and concluded that they not only directly affect the likelihood of program abandonment but also pressure firms to leave a CV program when social referents do so.

As none of the previous researchers had considered CV as a whole, Ma (2019) investigated CV success through a broader lens by addressing the CV life cycle. He came to the conclusion that the strategic role of a CV program is to address weaknesses in internal innovation (Ma, 2019). But even Ma (2019) highlighted the need for further research, particularly on strategic benefits and, in this context, how CV programs are structured to enable the extraction of strategic value added. Early approaches to assessing CV set-ups, structures and processes can be found. However, they are mostly old and more academic than is suitable for practical use (Poser, 2003; Battistini, Hacklin & Baschera, 2013; Gaule, 2017). Many also describe influential factors on the structure instead of detailed structural options and their interdependencies (Kann, 2000).

Overall, many more studies have been conducted in the past that are indirectly related to CV value creation and program success (Dushnitsky & Lenox, 2006; Keil *et al.*, 2008). However, they are often not sufficient and call for future research or present rather contradictory results and leave a research gap behind. Corresponding evidence reflects the continuing phenomenon of CV's recurring failure to add value to corporate performance (Röhm, 2018b). So far, past literature reflects that scientific research has not conclusively demonstrated how CV investments can contribute to corporate performance. Additional research is needed to better understand the fundamentals and mechanisms of how to best establish, operate and close CV investments with value generation as an overall process.

There is a need for insights and practical guidance on general determining factors of CV to successfully launch and navigate CV activity.

3.2.2 Value-add generation through corporate venturing

Over the course of time, more and more researchers have emphasized the need for groundwork to capture and measure CV value-adds (Allen & Helvert, 2007; Bititci *et al.*, 2012; Chiang, 2018). They have emphasized this ability as a requirement of controlling for the development and achievement of set CV investment goals, which implies CV success and a positive impact on corporate competitiveness in the long-term. The achievement of set objectives and expectations through CV activity is, however, still currently unattainable, which especially concerns strategic-oriented investments (Thornhill & Amit, 2001; Napp & Minshall, 2011; Chiang, 2018). Gaba & Bhattacharya (2012) underlined this status quo by stating that strategic outcomes hold a long-term orientation and are not easy to quantify. Yet Gaba & Bhattacharya (2012), as well as Chiang (2018), referring to an existential requirement to return strategic value to the parent company, which is currently not possible for the vast majority of CV programs (Chiang, 2018). As of today, the evaluation of strategic CV performance aligns mostly with financial KPIs with a short-term perspective (Thornhill & Amit, 2001), whilst only introductory approaches for strategic evaluation criteria have been covered (Napp, Minshall & Probert, 2009; Chiang, 2018). Busi & Bititci (2006), as well as Westphal (2010), stressed that the lack of measurement has caused insufficient understanding of the CV activity effect (Busi & Bititci, 2006; Westphal, Thoben & Seifert, 2010) and how it is generally successfully achieved (Poser, 2003). Simultaneously, this lack of measurement obscures the possibility to intervene or improve certain CV practices (Poser, 2003) as no information is available about how a CV program performs and to what extent it targets set objectives overall. As a result, the lack of measurement provides reasons why management has repeatedly abandoned CV investments. Other researchers have indirectly confirmed that strategic performance is seen as a primary consideration for CV program success – which, if not measured, is rather difficult to realize and poses a "real" problem to a corporation (Dushnitsky & Lenox, 2005b, 2005a; Gaba & Dokko, 2016; Ceccagnoli, M., Higgins & Kang., 2018; Fels, Kronberger & Gutmann, 2021). Currently, the evaluation of strategic CVC performance

aligns with financial KPIs that have a short-term perspective (Thornhill & Amit, 2001); sometimes, financial success is suggested as an indicator of strategic success (Poser, 2003). This is contradictory, however, as financial success may be needed to achieve strategic goals.

Beyond that perspective, initial approaches have been made to mitigate the dilemma of measuring strategic value creation (Kann, 2000; Knyphausen-Aufseß, 2005; Bassen *et al.*, 2006b; Napp, Minshall & Probert, 2009; Chiang, 2018). One of the first scholars to determine strategic value was Kann (2000), who became active around the turn of the century just as the fourth wave of CV was taking hold. This was the wave in which the software industry emerged and flourished because corporations decided that CV was more strategic to their futures. Kann (2000) developed a valuation framework that clearly distinguishes between strategic and financial value and identifies the factors by which they are computed. (Kann, 2000). In the conclusion to her study, she highlights the fact that strategic benefit measuring is an unexplored topic. She also advocates for future research in this area to improve corporate decision-making and better leverage the benefits of synergistic CV investments. In particular, she highlights the need to measure the strategic value of each investment, quantify the network effects in a CV portfolio and evaluate the long-term strategic options of CV portfolios.

Knyphausen-Aufseß (2005) recognized the prevailing research gaps revealed by Kann and further explored the determinants of strategic value creation through external CV investment. He argued that to explain the different performance of CV programs, it is necessary to distinguish between different types of CV that provide the framework for value creation (Knyphausen-Aufseß, 2005) as different companies rely on different resources. In his study, he notes that the mobilization process and the transfer of resources and capabilities should be further investigated as the question of how the CV value creation process takes place is unanswered in the existing literature.

Bassen *et al.* (2006) developed the balance scorecard theory and practice by using Kaplan & Norton's research to measure CV performance (Bassen *et al.*, 2006). They transferred the more qualitative concept to the CV context by creating a performance measurement framework with the goal of making financial and strategic CV activities transparent and measurable. The framework comprises three perspectives: the financial

perspective, the strategic/market perspective and the internal process perspective. Although this approach represents another significant step toward CV value measurement, the concept presented is rather manual and has not found great application in practice yet.

Napp *et al.* (2009) addressed the previously identified gaps in CV research by examining the existing processes and mechanisms for capturing strategic value in the field by focusing on operational linkages as well as metrics. They adopted a multi-dimensional approach by looking at CV investments from a three-layer perspective that comprised the value, operational and metrics layers. The value layer summarizes the underlying transfer of strategic value, and the operational layer covers the observed operational relationships; the metrics layer gives an overview of initial metrics for the strategic value measurement of CV activity. Overall, the preliminary framework needs to be refined and further tested to substantiate its informational value. In particular, the metrics layer exhibits current gaps and must provide a more complete picture of CV investment (Napp & Minshall, 2011).

One of the most recent scholars to address the capture and measurement of strategic value is Chiang (2018), who proposed a framework for characterizing four taxonomies of strategic investment goals. Thus, his goal was to determine whether the achievement of strategic value in CVs results from the system design of a CV's structure, practices and organizational linkages (Chiang, 2018). His quantitative work, the survey, revealed that the vast majority of CV programs are unable to measure or do not attempt to measure strategic value-add. But the literature up to this time has failed to provide an answer. In his study, Chiang emphasizes the need for a proven and reproducible approach to measuring strategic value and widespread adoption of these methods.

In summary, the review of current work related to the potential strategic value described in the preceding paragraphs reveals significant research gaps in the areas of operational dynamics and linkages for seizing value, and in the area of measuring strategic value. A holistic, scientifically based approach that can be transferred into practice to capture and measure strategic added value in the CV process is currently lacking. some initial approaches have been made, but they have various gaps and are largely static. A scientific CV concept and practical tool is needed to realize the full value of financial and strategic CV investments.

3.3 Theory and research question

3.3.1 Attention-based view and behavioural theory of the firm

The basis for enabling and explaining CV investment application overall can be found in the attention-based view (ABV) and the behavioural theory of the firm (BTF). The two theories in combination can provide profound explanations of when CV practices are called for, how a certain impact by CV can be realized and what pattern of organizational attention will affect corporate survival.

As initially stated, the ultimate goal of a corporation amounts to the achievement of sustainable competitiveness and long-term survival. In academia, this is often referred to as growth and as a variation of focus and limits of managerial attention (Joseph & Wilson, 2017). Managerial attention originated from how interventions of corporations and the nomination of managerial resources, prototyping and corporate mandates are aligned and lived. Exploiting opportunities in this regard is recognized as a central element (Kaplan, 2008; Maula, Keil & Zahra, 2013; Shepherd, McMullen & Ocasio, 2017). Researchers have found that one of the daily tasks of C-level management is to identify and allow such opportunities to unfold. This can be attributed to the fact that top management's attention acts as the gatekeeper for the recognition and realization of such chances (Shepherd, McMullen & Ocasio, 2017). Management's focus is grounded in available knowhow, skills and past experiences and can also be influenced by external factors.

As this paper investigates which (additional) value-add for a CV program can be achieved by applying the CVN and to what extent it can thus contribute to the competitiveness and survival of companies in the long term, the basis for enabling and explaining a CVN effect is found in the ABV.

The ABV theory refers to management attention and explains how corporations and their present governance, structures and processes, control and allocate the attention of their decision-makers (Ocasio, 1997, 2011). The ABV also provides information on corporate behaviour. The idea of an attentional focus assumes that there is a restricted number of business-related topics on which decision-makers in a corporation can focus on at any point in time. The concept also implies that priority topics can influence the actions of decision-makers (Titus & Anderson, 2016). Pursuing new opportunities is not a choice

among present alternatives but rather a mirror of the attention and behaviour of corporate management in response to environmental influences (Joseph & Wilson, 2017). The attention perspective is commonly analysed according to two schools of logics in academia: the top-down and the bottom-up opportunity realization (Ocasio, 2011). A top-down perspective typically involves given knowledge structures through which management deductively interacts with environmental stimuli to perceive, interpret and correspond to new external impulses (Bogner & Barr, 2000). The bottom-up perspective, in contrast, involves sequences of actions with properties of being simple and grouped and with a motive that connects with higher management's evaluation of discontinuous change (Shepherd, McMullen & Ocasio, 2017). Those two lenses combined enable a comprehensive understanding of how corporations seize, decipher and concentrate on novel opportunities, which may not be compatible with established beliefs (Zbaracki & Bergen, 2015; Shepherd, McMullen & Ocasio, 2017).

This paper assumes that CV investments are one of many strategic decisions which stay in competition to limited attention of certain corporate decision-makers. As previously described, several ongoing debates concern whether and to what extent CV investments are in themselves an important factor for a company's value creation (Christensen & Raynor, 2003; Barretto-ko, 2011). Hitt *et al.* (2001) and Titus & Anderson (2016), for example, stated that value creation through entrepreneurial action depends on the alignment of an activity with a corporate strategy (Hit *et al.*, 2001; Titus & Anderson, 2016). Independently of this debate, it is worth noting that while the involvement in CV investments draws management's attention to activity, it does not implicate that performance efficacy automatically follows. Attention does not equal success by definition (Titus & Anderson, 2016).

The ABV can, therefore, be supplemented by the BTF, which combines managerial reactions and the responses of a corporation to performance feedback (Cyert & March, 1963; Titus, Parker & Covin, 2020). In accordance with other behavioural theories, the BTF underlines cognitive limitations on managers of a corporation (Simon, 1947) and observes that strategic actions are made dependent on the distribution of attention towards problems and opportunities amongst various stakeholders (Cyert & March, 1963; Joseph & Wilson, 2017). Titus, Parker and Covin (2020), for instance, recently investigated the

influence of a corporation's distinctive strategic attitude towards behavioural reactions to discrepancies in the provision of performance (Titus, Parker & Covin, 2020). Their findings evince that corporate performance that exceeds aspirations tends toward a so-called "status quo effect" with the absence of engagement in uncertain activities. In contrast, corporate performance that falls behind aspirations, management actions are prompted, and risks are taken into account. Accordingly, this paper anticipates that the more negative the performance of a corporation is, the more intensified the effect of CV investments will be.

Together, the ABV and the BTF are used to explain the CV dependency on attentional mechanisms and performance feedback by regulating the approval, selection and impact of the CVN. Findings on how strategic CV investments pay into performance spillovers and how they can be made transparent and call the attention of management will be explored. Based on the theory and the prevailing academic and practical demand for the optimal establishment, operation and termination of a CV program and solutions to capture the value generated for the parent company, the research question has been structured accordingly.

3.3.2 Research question

Based on this theoretical foundation, CV is seen more than ever as an important means to drive innovation in companies to survive in a very dynamic ecosystem. However, in the past, many CV programs have failed because they did not achieve set aspirations such as their intended performance outcomes for a parent company. It is common for those programs to even be labelled as "throwing money out the window" (Huang & Madhavan, 2020). A lack of understanding, especially on the executive side, and the absence of knowhow and skills to effectively launch and apply CV in practice are identified. No tools or universal methods are currently available to identify and measure the financial and the strategic CV added value, although the demand of "how me the numbers and impact generated" has increasingly arisen as the strategic perspective of CV programs has become more important.

As a result, many isolated solutions that are very specific and often not even made known to the other players in the field currently exist, but management focus and resources

are often misplaced and distributed. CV programs are highly dependent on key stakeholders and are very vulnerable without a set framework and measurement tool. This baseline raises the following research question: “What (additional) value-add can be achieved for a CV program by applying the *Corporate Venturing Navigator*?” The development of the CVN artefact will be explained in detail in the following chapter, while the theories presented earlier will make an important contribution to the discussion later.

3.4 Methodology

3.4.1 Design-oriented research method

3.4.1.1 Design Science Research

The methodology applied in this paper to conceptualize the CVN is design science research (DSR). It originated from the science of the artificial and engineering (Simon, 1996) and is essentially a problem-solving paradigm. DSR can enhance technological and scientific knowhow and generate design knowledge (DK) through the creation of new inventive artefacts (Hevner *et al.*, 2004). More specifically, such artefacts can be models and concepts, such as decision-making or control tools (governance), modelling systems, or even evaluation methods that then initiate change measures (Gregor & Hevner, 2013). As an outcome, scientists have exhibited a strong interest in recent years as DSR can contribute to solving real problems and strengthening the innovative capacity of companies, in addition to contributing to the much-needed sustainable transformation of society (Vom Brocke, Hevner & Maedche, 2020). That said, the goal of DSR towards companies is to improve effectiveness and efficiency, especially in terms of practical contributions (e.g., through digital innovation) (Rai, 2017). DSR aims to solve problems in terms of extending human boundaries and corporate capabilities (e.g., how certain elements are or can be arranged or designed to hit a set of objectives while improving the surrounding ecosystem is key). As a result, DSR allows for not only a solution to a certain problem through an artefact but also for improved understanding of the extent to which the artefact initiates improvements or termination in the area of application (Rai, 2017). With respect to this study, the design science paradigm seeks to expand the capability boundaries of corporate management by developing two novel, innovative artefacts:

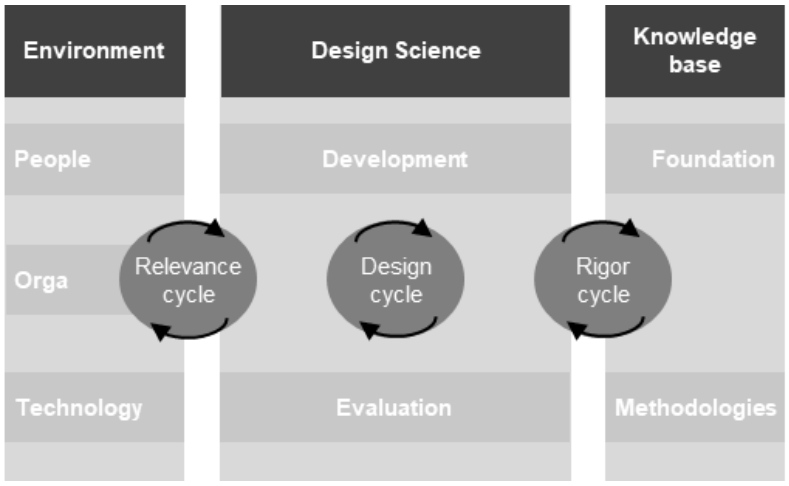
- the CVN-Framework , and
- the CVN return-on-investment tool.

These are expected to provide answers about how CV investments are initiated, managed and potentially completed and how organizations derive value from the CV process. The DSR fundamentals of Hevner (2004) and the most commonly used DSR process of Peffers *et al.* (2013) are outlined and applied to develop the artefacts.

3.4.1.2 DSR foundation

The foundation of the DSR was established by Hevner *et al.* (2004), who initiated the conceptual three-cycle framework for understanding, managing and accessing design research (Hevner *et al.*, 2004). The framework consists of three broad pillars: (1) the environment, (2) the design science as such and (3) the knowledge base (see Figure *4*).

Figure 4: DSR three-cycle perspective



Source: Extension of Hevner and Chatterjee (2010).

(a) The environmental pillar is set by the goal to enhance the environment by introducing new and innovative artefacts as well as the processes that are used to create those artefacts. It includes people, organizations and current or future technologies that all work toward specific goals and address problems that stakeholders believe need to be solved. Accordingly, needs are assessed in the context of people and their roles, capabilities and characteristics, business strategies that are in place, the governance and

structures that have been established and the prevailing culture. These are then related to the IT infrastructure and architecture, as well as the expected capabilities, resources and development capabilities. This sets the stage for the research problem and research relevance.

(b) The knowledge base pillar provides, in accordance with the environmental pillar, the raw material from which and through which the DSR is achieved. This includes, on one side, foundations (e.g., previous research from related disciplines such as theories, other frameworks, instruments, constructs, models or methods). This existing experience and knowhow define the prevailing state of the art. On the other side, the knowledge pillar includes methods such as experimentation, data analysis techniques, measures and validation criteria that provide guidance for assessment. Available artefacts and processes can be found in the application domain.

(c) The design science pillar includes the building and evaluation activities, which typically involve multiple iterations. Often, an innovative artefact is built on existing solution elements, which are then combined, analysed and possibly DK-improved.

Across those three pillars, Hevner (2007) identified three core research cycles for conceptualizing and establishing artefacts in real-world applications: the relevance cycle, rigor cycle and design cycle (Hevner *et al.*, 2004; Vom Brocke, Hevner & Maedche, 2020).

The "relevance cycle", which lies between the environment pillar and the design science pillar, strives for requirements in the contextual domain of the problem under study. It will provide inputs to the design science framework, while aiming to explain the use of artefacts and their acceptable criteria. Then, the developed artefacts are introduced into the contextual environment. This cycle contains individuals, groups or any other stakeholders involved in the system. Results of the tested area will determine whether further iterations of the relevance cycle are necessary in the context of the design science research project. The artefact can have weaknesses, (e.g., in applicability or performance) that could limit its functionality in practice. Another reason for further iterations may be incomplete or missing input. The artefact may still be able to fulfil the given requirements but may exhibit inadequacies to address the given problem. Another iteration may then be feedback from the environment that reconsiders the requirements that are actually needed. The "rigor

cycle", which lies between the knowledge base pillar and design science pillar, includes available literature and academic methods to create artefacts and knowhow-based tools. It makes a contribution to the prevailing establishment of artefacts in the design cycle, which is placed within the design science pillar. The design cycle lies at the centre of DSR. This cycle runs in iteration between the central design artefact, process building, evaluation activities of the research and feedback refinements. Many researchers have often said that the design cycle generates design alternatives, which are then evaluated against other alternatives until a satisfactory requirement level is reached. Those requirements come from the relevance cycle and the rigor cycle. Accordingly, the design cycle experiences a rather high dependency on the other two cycles, although it holds some independence during the actual execution of the research project. It is important to maintain a balance between efforts for the creation versus evaluation of the artefact. For a design science project to be successful, the three cycles are to be available and uniquely identifiable, and the design cycle must go through several iterations before it enters the relevance and rigor cycles.

3.4.1.3 DSR process

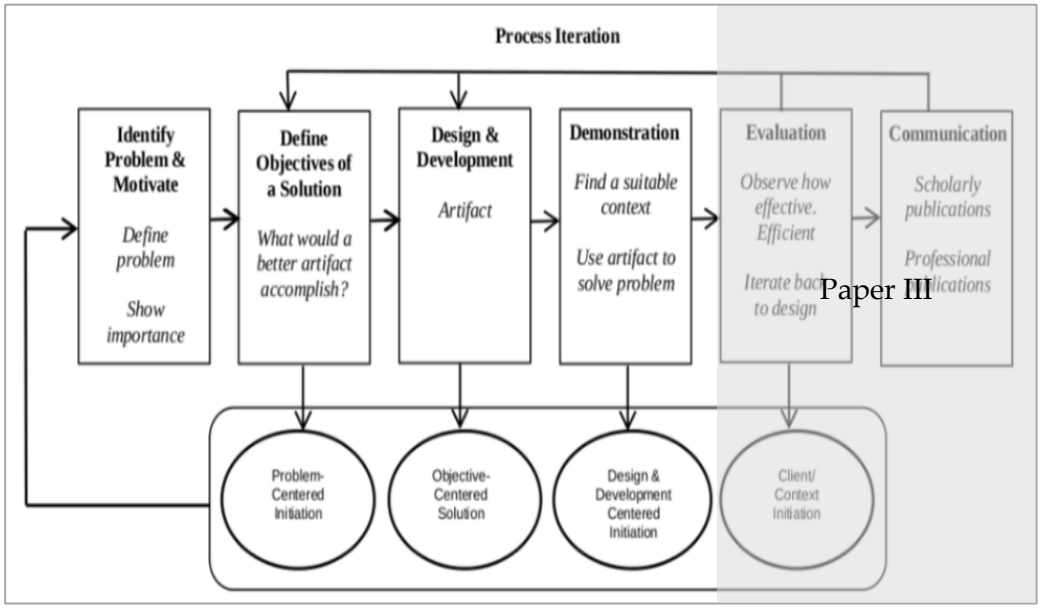
The usage of DSR can be found in several process models; Peffers *et al.*'s (2008) model is the most commonly applied (Peffers *et al.*, 2008). This DSR process approach to develop an artefact is illustrated in *Figure 5*, which comprises a six-step approach:

1. Identify the problem and motivation.
2. Define objectives for a solution.
3. Design and development.
4. Demonstration.
5. Evaluation.
6. Communication.

Those six steps are then connected to four potential entry points:

- Problem-centred iteration.
- Objective-centred iteration.
- Design- and development-centred initiation.
- Client and/or context initiation.

Figure 5: DSR approach



Source: Peffers *et al.* (2013).

Leaning on the DSR foundation and, in particular, on the design cycle, the DSR process applied is outlined in detail in Chapters 5.5. and 5.6. The evaluation and communication steps, as well as the client/context initiation, are only described and then deepened in Paper III, which comprises the CVN evaluation study. A brief outline of how the evaluation took place is presented in the next section.

3.4.2 Evaluation

Continuous iteration and a final evaluation are vital parts of successful artefact development. According to March & Smith (1995), the development of artefacts is instantiation and is to be assessed by certain evaluation parameters (March & Smith, 1995). Those are threefold: (1) efficiency, (2) effectiveness of the artefact and (3) its effect on the end users, which, in this case, are the CV program stakeholders. These parameters are operationalized, meaning that rather abstract concepts are put into tangible observations. This is done through detailed questions on the product-user fit, the artefact design, scope and the design specifications. However, at this stage of the artefact development, an initial evaluation was conducted using the approach of Sonnenberg and vom Brocke (2012), which involved gathering constant feedback throughout the design cycle (Sonnenberg and vom Brocke, 2012). I then adopted this approach for Paper III, where a detailed analysis

and assessments of the two CVN artefacts, the framework and the return-on-innovation tool, are made.

3.5 Artefact development

3.5.1 DSR foundation applied in general

In applying the DSR three-cycle perspective on CVN, the two artefacts that were to be developed were aimed toward practitioners, which could lead to recognition of the relevance cycle through close collaboration with the CV industry. The underlying reasoning is to understand and address the real needs of corporations within CV activity while considering the prevailing environment and the application domain. Accordingly, I sought close collaboration with several CV programs through interviews and informal talks to evaluate the phenomenon at hand and all its technical and operational requirements (relevance cycle). CV programs hold a very international background and cover a wide range of industries. The corporations that I collaborated with include PM Equity (Phillip Morris Venture arm), Shell Ventures, Samsung Catalyst Fund, Axa Venture Partners, Deutsche Bank Corporate Venture Capital, Siemens Healthineers, Nestlé and Bertelsmann Investments. In addition to working closely with companies conducting CV investments, I sought to embed the artefacts in the existing knowledge base (rigor cycle) so that they can both meet corporations' current needs and contribute to future research. Currently, the present relevant literature and theoretical foundations indicate that the existing knowledge base is insufficient to meet the requirements (see requirements and design principles). Therefore, bringing together the needs of practitioners in an advanced research area and the prevailing knowledge base was key. As a result, I first used the identified needs and given knowledge base as a foundation for the artefacts, which were then continuously iterated, tested and evaluated until the derived requirements were met (design cycle).

3.5.2 Requirements and scope

I started with investigating the urge for solutions that can provide companies with a guideline in the form of a framework to establish and operate CV investments in the best possible way and to create transparency and measure the added value generated during the process. Such solutions are designed to help key stakeholders in a CV program make data-

driven decisions with the ultimate goal of establishing CV spillovers for the corporate parent, which ensures long-term competitiveness and survival.

The conducted semi-structured interviews, which were held with eight CV programs from very diverse industries and regional backgrounds (see interview list overview in appendix *Table 9*. The CV programs ranged from rather old programs to recently established ones and held very different mandates and objectives. This scope was particularly chosen to cover a wide range of requirements while considering the specifics of individual industries, regions and mandates. Accordingly, the interviews confirmed the identified need for such CVN solutions. They revealed that each CV program has gone through the same process of determining how to properly launch and operate a CV program. The programmers were continuously facing obstacles to meeting set objectives and a changing ecosystem and demands. The CV programmers who were interviewed also expressed the strong need for a tool to harvest the value-add generated, which is not fully possible yet or transferable from other companies. Many programs have struggled to survive and justify their existence on a constant basis. I found that there are many isolated solutions available, but none cover the overall CV program process as one interconnected ecosystem that is applicable throughout the same industry or region. Academia has emphasized the need to better understand how CV programs can achieve their objectives and thus remain competitive and survive over the long term, while scholars have increasingly called for tools to capture and measure CV's strategic impact.

Practical requirements (PR) were developed along the recognized need for data-driven solutions using a development process that was similar to Meth *et al.*'s (2015). Requirements were developed in 1:1 online meetings and corporate-oriented, practical studies that dealt with individual CV elements. PR are listed in Table *4* for the CVN-Framework and CVN-Cockpit.

Theoretical requirements (TR) were developed from the literature review, which aimed to cover previous discovered research gaps to establish CV program survival and make its impact more tangible and justified. TR for the CVN-Framework are represented in *Table 5* and the TR for the CVN-Cockpit are presented in *Table 6*. The practical and theoretical requirements were summarized into overarching design principles for both artefacts, respectively.

3.5.3 Artefact #1: CVN-Framework

When applying the DSR process that was developed by Peffers *et al.* (2008), the first step is the identification of the problem and the motivation accompanied by the problem-centred initiation. As outlined in the theoretical background and the DSR foundation section, the ever-changing environment requires companies to become more entrepreneurial for their long-term viability (Dushnitsky and Lenox, 2006; Abernethy, Dekker and Grafton, 2020). CVC is thus seen as an external vehicle to increase a corporation's innovation and strength for its competitive advantage and future survival (Ceccagnoli, Higgins and Kang, 2018; Röhm, 2018b). Yet, a comprehensive and coherent practical tool that can optimally establish, manage and terminate a CV program is lacking; corporations need a tool to improve current and new CV programs that positively impacts sustainable competitive advantage and leads to long-term existence. The problem of this absence and its relevance to corporations' needs means that companies are often not able to meet the expectations and aspirations set by highlighting the benefits of CV investments for the company's leaders. Many companies are also often unaware of their inability to properly respond to internal and external changes, which can jeopardize the benefits of a CV program that contributes positively to the parent company's business. This indicates a lack of understanding regarding how to best operate a CV program to take advantage of its various benefits while converting its purpose into benefits for the corporate parent. The motivation, then, is to have a tool that provides a framework for CV programs and thus insights into how CV investments can be initiated, implemented and best used. This means providing guidance on how to profile and design a CV program or readjust one according to the ecosystem it is in and understanding which CV program elements are needed and how they are interconnected and interdependent and offering guidance to run the CV program or terminate it successfully. The underlying motivation of the CVN-Framework is, thus, to offer guidance to make the best use of CV investments for the corporate parent.

The next step in the DSR process is to define objectives for a solution that can be complemented by objective-centred solutions**.** This goes in line with the previously mentioned practical and theoretical requirements, which basically meet the set objectives. The overarching objective for the solution is to address the scientific and practical issues raised in ensuring that continuing CV programs better fulfil their CV charters, increase

their survival rates and thus realize the promised impact on the corporate parent. To achieve this, all stakeholders involved must improve their understanding of how best to structure and run a CV program to achieve the set objectives within a given mandate. The practical requirements that underline those objectives are identified within the "relevance cycle" and are listed in *Table 4*. The theoretical requirements identified by literature within the "rigor cycle" are presented in *Table 5.*

Table 4: Practical requirements of the CVN-Framework and CVN-Cockpit

PR, #	Requirement description
PR1	The artefact should be standardized for all different types of CV programs, different industries and regional backgrounds.
PR2	The artefact should be applicable to new and established CV programs.
PR3	The artefact should be flexible to grant specifications across CV programs and to handle dynamics and interdependencies.
PR4	The artefact should be easy to use for all stakeholders involved and should be considered a "non-bureaucratic" tool guide.
PR5	The artefact should be embedded throughout an organization to ensure its effectiveness.

Table 5: Theoretical requirements of the CVN-Framework

TR, #	Requirement description	Relevant source(s)
TR1	The artefact should describe and cover influencing factors of CV investments.	Kann (2000)
TR2	The artefact should indirectly relate to CV value creation and program success to better understand and avoid recurring CV failure and add value to corporate performance.	Dushnitsky & Lenox, (2006); Keil *et al.,* (2008) Hill & Birkinshaw (2008; 2012); Teppo & Wüstenhagen (2009); Fischer (2019)

Using terms that I derived from these specific practical and theoretical requirements, I defined "ease of application", "profundity and breadth" and "value contribution to corporate performance" as the overarching design principles for the artefact per March and Smith (1995). The tool was considered easy to use if there are no bureaucratic obstacles or

unnecessary complexity and if the interests of the stakeholders involved are taken into account and being reflected and emphasized (PR4). The tool was also seen as profound and broad when having a rather flexible instrument that can capture rather generic and specific CV programs characteristics is possible (PR3). As there are currently only isolated solutions on how to set up and run a CV program, a generalizable, standardized tool that will not miss the dynamics and interdependencies of an overall CV program has been requested (PR1). The CVN is to be embedded throughout an organization to ensure its effectiveness (PR5).

The next step covers design and development, which were supplemented by the design- and development-centred initiation. The CVN-Framework consists of four phases: (1) profiling, (2) designing, (3) operating and (4) harvesting. It contains 18 CVN fields, which are all interrelated and interdependent, and covers the overall CV program lifecycle to apply to all types of industries and/or regions (PR1). The CVN-Framework should be viewed as an iterative process that continuously provides input to previous, subsequent and other CVN elements. All of the framework's elements are interconnected as they provide and receive input from each other (TR1). Additionally, the CVN-Framework should be viewed from the perspective of the CV program as a whole, as well as from the perspective of individual projects within a portfolio during the last two phases (the operations and harvesting phases). The CVN-Framework should be applied to new CV programs and current CV programs for optimization (PR2).

(1) Profiling Phase

In the beginning of developing the CVN-Framework , the profiling phase, I asked corporate management about their motivation and the present problem to be solved, as well as the intended objectives and the expectations that their CV investments were supposed to fulfil. The CVN-Framework is intended to provide a guide for answering questions concerning what CV profile to install, what project sponsors are needed, what their key roles are, what financial resources to cover and what business advancement strategy to pursue. Altogether, by answering all those questions with the support of the CVN-Framework , the CV mandate was created and lay the foundation for the phases to follow.

Concerning the *CV profile,* which is the first element for corporate management to consider, literature and practice have demonstrated that four CV profiles are currently predominant: strategic renewal, financial returns, innovation and culture. This does not mean that if one profile orientation is present, then the other orientations are not. The literature simply states that a particular direction is predominant. Accordingly, the CVN-Framework encourages management to clarify which CV profile orientation should be targeted according to the objectives set. The "Know Your Profile" instrument was developed to better practically support outlining a CV profile's dominant direction (see explanation of function and application in the CVN-Cockpit – Phase I).

Based on the CV profile set, the next step for corporate management is to determine the promoters involved. The promoters are to be chosen from three main areas: stakeholders from the corporate parent, the CV team and outside stakeholders such as external personnel due to co-investments or a present advisory board. Upfront corporate management has to be aware that the promoters to consider strongly depend on the CV program's structure and governance – i.e., the organizational and legal structure. This means, in the case of an independent CV program entity, that the stakeholders from the corporate parent are less significant and less involved in a balance sheet CV program, which might even depend on certain business sponsors, which are often selected business entities that takes on the responsibility of helping ventures grow and integrate their knowledge or services into a company. However, for simplicity reasons, no matter what structure or governance is present, all eligible promoters are covered in the CVN-Framework . Promoters from the corporate parent can be top management such as the CEO, CFO and other key C-level members. Then there are promoters from the business units, which can also act as business sponsors and represent the various business areas of the company; they, therefore, might have a significant role in driving or incorporating certain CV investments. At last, there is the investment committee (IC), which is set up by a group of high-ranking corporate personnel, whose primary authority controls the final decision concerning the deal sourcing and governs the CV program portfolio. Quite commonly the head of a CV unit takes a position in the IC. Promoters from the CV team comprise the head of the CV team and its operational team, which often comprises investment professionals and portfolio development professionals. The size of a team depends on the

CV program budget available and the portfolio approach that was chosen. In addition to the corporate parent's promoters and the CV team promoters, there are often outside stakeholders to consider, such as external personnel who become involved due to co-investments or an advisory committee (CV). An AC is not always present, but some CV program teams prefer to involve a select group of professionals, especially in the context of business sourcing and portfolio management. These are usually external experts, but they can also come from the parent company (e.g., experts from the R&D department).

Next to the CV profile and promoters, decisions have to be made by the corporate management, which CV program budget to choose. The amount of the budget, its availability and duration determine the CV program as it sets the overall financial possibilities for the implementation of a CV program. At this point, it is very important that the budget is consistent with the objectives and expectations, while the source of the budget must be in line with the structure and governance to be chosen (which is outlined in the designing phase). The amount of the budget can range from $50,000 or even less to over $1billion or more and depends on several factors such as, again, the structure and governance in place, the industry, the size of the parent company and the importance it places on the CV program, to name just the most important factors. Budget availability can then take the form of a lump sum, a balance sheet or an evergreen investment amount. That is to be decided by the management. This is accompanied by the budget duration, which can be either short-term or long-term, which is reflected in the selected orientation of the CV profile. As a rule, predominantly finance-oriented CV programs tend to be short-term, while strategically oriented ones tend to be long-term.

In line with the budget, the corporate management is to decide on the business advancement strategy, which means that decisions must be made about whether to make investments close to the core business to stabilize the parent company's main business or whether to favour investments that hold distance to the core to secure new markets, technologies and customers.

Overall, adding up the CV profile, the promoters, the budget and the business advancement builds the CV mandate, kicking off the designing phase. The corporate management should view the CV mandate as an elaborated foundation that sets the future path of a CV program and should always be consulted in all decisions and evaluations. All

future CV program elements are to be aligned with the CV mandate to guarantee the greatest CV program success and fulfil the objectives set by the corporate management for the CV program.

(2) Designing Phase

After the profiling phase, corporate management should address areas such as organizational structure, governance (including reporting), team composition, communication (including cultural aspects), the underlying CV ecosystem and the portfolio approach in the CVN design phase. Those elements do not have to take place exactly in the order written but should be followed for convenience. The targeted outcome of Phase 2 is a clear definition of the CV program.

As previously highlighted, the structure and governance of a CV program are very significant elements as they set the course in the process. Corporate management has to decide which of the three prevailing CV modes to follow: (i) the pop-up CV, (ii) the corporate-driven CV or (iii) the independent CV (see *Figure 13* in appendix). The first option, the pop-up CV, is usually a one-time investment, such as an ad hoc investment. Often, such a structure serves as a strategic commitment to the parent company without seeking a specific financial return. This CV activity is funded by the corporate balance sheet and there is no dedicated CV team but rather individuals who adhere to a specific timeframe. There are no standard procedures nor are there any standard systems as this form of structure is basically built on a case-by-case basis with no long-term intent. The second option is the corporate-driven CV. The focus of CV investments is either on a specific business unit (or business units) and its strategic agenda (i.e., its focus area and region) or corporate strategic value propositions that affect all business units. CV programs under the corporate umbrella are financed by the balance sheet, with the annual budget managed through an agreement with the so-called business sponsor (the business unit). But it can also be a dedicated budget for innovation purposes (e.g., in the form of an evergreen budget). Compared to the pop-up CV, this is a permanent, more long-term structure that often follows the timeframe of a specific business strategy. Personnel are hired and compensated as a formal internal team and operate according to the parent company's standard systems and procedures or new procedures that are specific to the CV program.

The last option to choose from is the independent CV. Its structure and governance offer the most autonomy and flexibility. The independent CV can be an independent subsidiary or even a completely independent entity. CV investments are made along strategic value theses (business area or region) but are not necessarily in line with the strategic agenda of the parent company. Investments are long-term in nature. Processes and systems are CV-specific and are often set up individually with their own KPIs for the particular CV program. The team is often employed by the CV subsidiary or unit rather than the parent company. Typical VC-like economic conditions prevail, such as the 2-20 rule, so that employees receive a base salary and carried interest, among other rewards.

In general, reporting needs to be adapted to the chosen structure and governance mode. This means, for example, that in the case of a company-driven CV, reporting is very closely linked to the company, most likely to a specific BU; in the case of an independent CV program, reporting remains within the self-sufficient unit or entity, with the head of the CV unit or entity acting as the top reporter and the management of the parent firm acting as the informative counterpart.

When considering more detailed possibilities for legally structuring a CV program, corporate management can choose between two main options: an independent entity or a corporate unit. In the case of an independent entity, which corresponds to organizational structure (iii), there may be multiple limited partners (LPs) or only a single LP in terms of the corporate parent. In the case of a corporate entity, an indirect investment can serve as an LP commitment or a direct investment, which can then come from the balance sheet or a dedicated fund. For investments in the balance sheet, there are three options: committed funding, annual financing or an evergreen investment, which states that the value generated must be returned. The options described are listed in *Figure 14* in the appendix. Which mode – organizational or legal – is most appropriate is highly individual but depends primarily on the mandate sought, the desired CV profile, the available budget and, finally, industry-specific regulations. Overall, the CV structure and governance mode can vary over time along the CV program maturity, as well as along the progress of the ecosystem that the CV program is located in. Thus, corporate management has to constantly consider whether the type of CV program being striven for or currently practised and the resources and opportunities available meet the set expectations and needs. With the support of this

framework, regular plausibility checks can be conducted to avoid discrepancies and the consequent failure of realizing the set objectives and the established CV mandate.

Once management has decided how to build the CV structure and governance, the team acts as the heart of every CV program and must be selected and managed with care. The size and background of the team must be taken into account, and the entire recruitment process, compensation and incentive structures and the location of the team must be determined.

The CV team's size is affected by the CV structure and governance that are chosen. There is usually a CV head, one or more investment professionals and one or more portfolio development professionals (senior and junior), as well as some analysts for support. The number of employees responsible for sourcing ventures and developing the portfolio depends to a large extent on the corporate parent's size and the amount of funds available, which results in the portfolio size. As is quite often the case in the beginning of installing CV investments, staff are "borrowed" from other units.

CV team recruitment is usually done within the CV department or entity and only occasionally by the corporate parent for cost reasons. Recruiting needs to be taken very seriously as recruiting for a CV program competes with the VC world, where very lavish compensation is offered that is often not feasible in a corporate VC. Compensation arrangements are often aligned with company standards, which can lead to the loss of potentially highly qualified, skilled and motivated staff in the event of a takeover as these standards are not competitive and do not allow staff to be retained in the long term. This brain drain is quite severe as it can make a CV program vulnerable to the loss of key players, especially when it is a rather small program, and it can be quite difficult to find replacements. Many experts have advised allowing for CV market standard compensation and according incentive structures. In case carried interest cannot be implemented, other incentives should be used to compensate employees accordingly. In the case of the CV team, the corporate management must also consider the staff's background. An ideal team should hold a strong mix of corporate and venture experiences as cultural clashes are very often severe obstacles to CV program success. Finally, the location of the team must be determined. Management must decide whether the CV team should remain close to the corporate parent and thus be more approachable or whether a more remote, independent

location is desirable, which is often the case when an independent organizational structure and CV program exist as separate entities. There is also the question of whether the CV team should stay close to the invested ventures or close to the parent company. Both options have advantages and disadvantages and are handled on an individual level but should be discussed.

In line with the team comes communication. The team's communication style and tools must be defined. In terms of the cultural differences between the corporate world and the entrepreneurial world, the communication style of a CV program very often resembles that of entrepreneurship with rather flat hierarchies and informal interactions. Communication tools can be leveraged by corporate standard tools but also enhanced by the introduction of additional tools, which may be needed and more appropriate for the CV investment process. In general, one has to differentiate between internal and external communication. Internal communication includes communication within the CV corporate environment, while external communication includes communication with other investors, consultants and others, as well as the company. Appropriate handling procedures must be taken into account. Regular direct communication between the CV program team and other investors is recommended.

Networks are just as important to establishing a CV investment program as the ecosystem in which the CV program is located and expected to continue to thrive. Management must consider potential ecosystem influencers that will impact the CV program and how those factors will evolve over time. The ecosystem will most likely consist of a number of parties, such as corporate investors, individual venture capitalists, venture capitalists, experts, institutions and many others. They are all connected by a network and work to promote entrepreneurship and innovation through collaboration and competition. History has proven that the stronger a network is, the more robust the ecosystem will become as there is mutual support present, which makes it possible to overcome knowledge gaps and skills. Nevertheless, management always has to keep the CV mandate as its first priority instead of following trends. As CV activities serve to drive innovation at the parent company so that it can continue to grow and remain competitive in the long term, CV must be firmly embedded in the parent company's strategy. CV must also be aligned with internal undertakings, such as R&D activities, to achieve the best

outcomes for the parent company. A balance between outside-in and inside-out innovation is required. Belonging to an ecosystem requires constant adaptation, which leads to increased complexity, especially in terms of decision-making, regulatory compliance and bureaucracy in general. This means that CV programs and their corporate counterparts simply must be aware that belonging to an ecosystem can come with a critical trade-off. It is advisable to collaborate with other CV programs, appoint executives to corporate boards, maintain positive relationships with other key CV supporters and hire CV staff who bring valuable connections to CV activities and have experience with entrepreneurship and networking. However, it is important to remember that information on CV is notoriously unbalanced. Therefore, management has to ensure information transparency and communication by constantly tracking and talking about the CV process.

After management has worked out the CV structure and underlying governance, built the CV team, implemented communication tools and systems and is reasonably aware of the surrounding ecosystem, they must choose the portfolio approach. Which investment phase and in which area one should invest and which ticket size one prefers are of fundamental importance. Regardless of which investment stage will be targeted, management must decide how much risk they are willing to take in comparison to the promising returns and the investment amount. For more developed ventures, higher returns can be expected – but this also requires a higher investment amount. In accordance with the risk, the targeted CV mandate is to be considered a priority in relation to the objectives and expectations set for the CV program and the parent company. Accordingly, the business area and advancement in which to invest and the region in which to search for ventures should be based on the established mandate. Additionally, management must then decide which ticket size to focus on. There is the "small ticket size" option, in which multiple investments can most likely cover a broader spectrum, and the "large ticket size" option, in which only a few investments are possible, but deeper knowledge and impact can be expected. Which approach is chosen depends, in turn, on the mandate in place.

(3) Operating Phase

In the operating phase, which takes on the two installation phases that cover profile and design, the foundation for best CV investment practices is put in place to focus on

sourcing, portfolio management and collaboration. Shared resources and syndication further drive a CV program, which results in CV value-adds.

Venture sourcing is primarily in the hands of the CV team, which is either actively seeking companies or passively approaching the CV program. The greatest challenge here is making a selection from the huge number of potential ventures (2,000 per year on average), with a 99% rejection rate being common. Hence, a pre-selection takes place either along a systematic screening process (defined KPIs for filtering) or a more individual screening (e.g., according to a specific focus). This is followed by due diligence (DD) according to typical criteria such as finance, commercial aspects, legal aspects, technology and, more recently, sustainability. Finally, there are cross-connections between the BUs and service lines and a point of contact with subject matter experts (SMEs; e.g., from the R&D department). This follows the IC to decide on both the existing and the venture pipeline to be explored. Throughout the DD process, the IC negotiates terms and conditions as it must determine the risk to be assumed and the expected venture strength. How and what value is to be extracted must be discussed and decided before the deal is closed, and action must be taken within the mandate given. An engagement letter and term sheet, separate from the budget, must be prepared and agreed upon as a final outcome of the sourcing. Overall, the sourcing process takes about 2 to 3 months but may take longer for more complex matters, especially if there is a major discussion on the proof of concept at the beginning. Sourcing is followed by portfolio monitoring and development, which can either be leanly structured or very intensive in terms of collaboration with ventures.

Collaboration within the portfolio context primarily concentrates on the collaboration between the CV unit and the ventures. However, the collaboration with BUs and other external parties and the management's involvement is of higher importance. Depending on the mandate, collaboration with ventures can be active, meaning they receive active support in their operational process. Support can take the form of access to experts in the corporate network, access to partnerships and suppliers, access to consumer networks and established infrastructure and access to marketing and PR. There may be support for hiring talent or more specific advisory services such as skills advice or, in the form of a board seat (i.e., a representative of the CV team or senior management who sits on a company's board and brings valuable insight and experience to the table). These shared

resources and syndication must be agreed upon when the contract is signed. In contrast to active cooperation, passive cooperation essentially only concerns the financially added value of minority shareholdings. A seat on the board of directors may be available to such shareholders, who usually fulfil an observing and sometimes advisory capacity.

Overall, the operational phase is the most dynamic phase, but if the CV program is set up well, it is a very straightforward phase. It should be noted that there are always three perspectives to consider: the perspective of each individual investment, the perspective of the entire portfolio and the perspective of the total CV program over the defined timeframe. The decisive factors in each case are the CV's added value that is generated, and the contribution made to the CV program and the parent company (TR2). This process is further elaborated in Artefact #2.

(4) Harvesting Phase

Finally, the harvesting phase focuses either on the completion of a single CV investment and the entire CV program or on the continuation of both if follow-up investments are desired and the CV program, as such, is simply continued. The most important outcome of the entire life cycle of a continuing CV program is the performance effect that is supposed to flow back to the parent company, which is detailed in Artefact #2. The CV program should demonstrate its benefits and its positive impact on the competitiveness and long-term survival of the corporate parent. The added value created by CV investments should not only justify its current existence but also further enhance its impact.

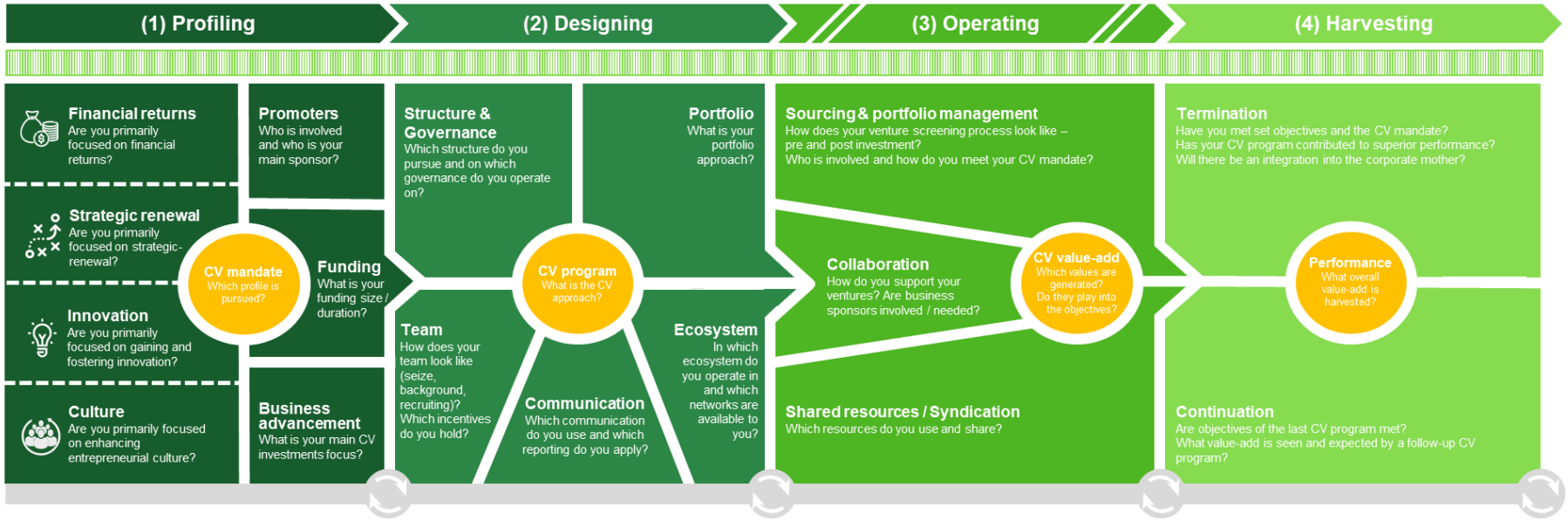
In terms of completing a single investment, it is critical that the CV program continuously tracks its process over time and constantly aligns its performance with the set objectives and the given mandate. When determining the portfolio approach during the design phase, it is very important for management and the CV team to focus not only on the initial investment amount of a venture but also on possible follow-up investments that can be made at a later stage. These follow-up investments most likely even exceed the initial investments, especially if the same number of shares is to be held. If a venture investment turns out to be very significant for the corporate parent, mergers and acquisitions sometimes take place in which integration options have to be worked out in

advance; however, this is not always the case. If neither of the two options is asked for, the venture investment is simply terminated at the end of the investment period.

As for the overall CV program, as a program is designed for a specific period during the profiling phase, very often, a next-generation CV program is initiated shortly before the first program's completion. This is the case especially if the objectives of the current CV program have been achieved. The follow-up program is usually even more extensive or has a specific regional or thematic focus. The entire process of launching a CV program begins anew with the definition of the CV mandate, profile alignment, and the like. Negotiations and discussions on each element of the CV program phases need to be conducted from scratch, especially due to the involvement of potential new promoters and the ever-changing ecosystem.

An initial concept draft for the CVN-Framework is presented in Figure *6*, which sums up the design and development of the CVN-Framework . This is followed by the demonstration of the artefact, which is presented using case studies in Paper III, which incorporated the artefact to solve the problem at hand. The evaluation and discussion of the artefact are important parts of Paper III. The evaluation measures the extent to which the artefact provides a solution to the stated problem, and the objectives are compared to the actual observed results of using the artefact in context. A decision is then made regarding whether to return to the design and development step either to improve the efficacy of the artefact or to proceed to the communication part, in which all problem aspects and the designed artefact are shared with the stakeholders involved. These steps are also discussed in Paper III. In general, Paper III focuses on evaluating the artefact concept in practice to test and further improve the artefact and anchor it in the business environment in the best possible way.

Figure 6: Corporate Venturing Navigator



3.5.4 Artefact #2: CVN-Cockpit

Along with the unresolved dilemma of CV survival and the inability to successfully set up and operate a CV program (Hill & Birkinshaw, 2014; Prokop, Huggins & Bristow, 2019), there is also an absence of tracking and measuring strategic value and the process of the CV program as such (Chiang, 2018). This lack of transparency and traceability of CV investments is a major problem as CV programs offer no way to track the success of investments or tweak certain aspects if they are not performing as they should. Therefore, a practical tool to decipher the overall innovation return is needed. When they are unable to display or track the performance of their CV portfolios, companies often find themselves in a situation where they need to justify CV investments without "throwing money out the window" (Huang & Madhavan, 2020) simply because they are not able to share the progress and value created by the program. Therefore, the motivation to establish transparency and better communication about the process and the opportunity to optimize the CV program are very strong. Accordingly, this problem and motivation lead to the artefact that concerns the objective of developing a sound academic approach to achieving financial and strategic value through CV investments. The goal is to provide a comprehensive understanding of the mechanisms behind achieving expected CV performance to make CV programs more robust and deliver the value promised to the corporate parent. The artefact thus holds the ultimate implication for achieving improved or promising CV operations as it is supported by data-driven decision-making and better insights into the CV investment neural system. CV performance goals can be realized as the financial and strategic returns on innovation are made transparent and tangible. The practical requirements that emphasize those objectives are reflected by the “relevance cycle” and are presented in *Table 4*. The theoretical requirements, which are identified by the literature on the “rigor cycle”, are represented in *Table 6.*

Table 6: Theoretical requirements of the CVN-Cockpit

TR, #	Requirement description	Relevant source(s)
TR1	The artefact should be a reproducible approach to measuring the strategic value for widespread adoption of these methods.	Chiang (2018)
TR2	The artefact should represent a more complete picture of CV investment.	Napp & Minshall, (2011)
TR3	The artefact should be easy to apply with minimum effort (minimal manual involvement) to guarantee great application in practice.	Bassen *et al.* (2006)
TR4	The artefact should improve corporate decision-making to better leverage the benefits of synergistic CV investments.	Kann (2000)

After deriving appropriate terms from these specific practical and theoretical requirements, I defined "coverage of the big picture", "ease of use" and "broad application" as overarching design principles for the artefact per March & Smith (1995). The artefact is considered easy to apply if there are no bureaucratic obstacles or unnecessary complexity and the interests of the stakeholders involved are taken into account, reflected and highlighted (TR3). The challenge in this case is to adequately understand the individual CV elements of sometimes specific CV programs, despite their ease of use. As only isolated solutions for capturing strategic value added are currently available, a generalizable, standardized tool has been requested, but it must not miss the dynamics and interdependencies of an entire CV program.

Once the problem, motivation, objectives and corresponding requirements were established, the next step that followed was design and development, which was complemented by design- and development-centric initiation. The CV cockpit concept encompasses several tools and levels and aims to take a reproducible, holistic approach that makes all CV values measurable (TR1; TR2). Overall, the cockpit comprises the cockpit sheets (the CV specs) for each phase and different tools that can help stakeholders and the CV team facilitate and improve the CV processes throughout the CV program cycle. CV decision-making is to be facilitated and simplified to better reap the benefits of synergistic CV investments (TR4). Then there are two levels to examine: the investment

level and the portfolio level, with the benchmarking level acting as a third perspective for future enhancement.

(1) Cockpit Phase I

The Cockpit Phase I contains the “Cockpit Specs I” and the tools “Know Your Profile” and “The Onion”. The “Cockpit Specs I” was designed to help CV teams and other stakeholders develop a clear understanding of the different options and choices to be made at each stage. It highlights the available options and clarifies interrelationships and dependencies within a phase and beyond. Accordingly, in Phase I, deciding the direction of a CV profile is the first action to be taken. Objectives are to be clearly stated and ranked in order of importance. Information on the budget must be filled in, starting with the amount, time horizon and availability. Then, the stakeholders to be involved are to be named, especially stakeholders from the company management, as well as any potential sponsors, if applicable. Finally, business advancements must be made clear (i.e., which CV investment direction is to be targeted, whether that is core business, adjacent businesses, or new business areas, if not a mixture of these). In summary, a very clear and structured overview of the elements of Phase I of a CV program and, in particular, the preferred CV preferences are provided (see appendix *Figure 9).*

The "Know Your Profile" tool was designed to provide CV stakeholders with a support instrument to define their predominant CV profile orientation. The tool has two layers: the input layer and the output layer, which is also known as “the spider web” (see appendix Figure *10*). In the input layer, the four most common directions (strategy renewal, financial return, innovation and culture) are indicated along with their underlying objectives. Each objective is to be scored on a scale of "0" to "2," with 0 meaning <<no importance>>, 1 meaning <<certainly importance>> and 2 meaning <<important>>. The total points are then added to obtain a score that indicates the tendency of the profile. Dual direction is possible but rather unusual and should be bypassed to avoid conflicts. As a result, a visualization of the CV profile is provided in the output layer.

According to the CV profile type chosen, the investments must be mapped with the support of “The Onion” tool along three investment options:

- Core business areas.

- Adjacent business areas.
- New business areas.

Investments in core business areas have little distance from the corporate parent and inside-out innovation. Investments in adjacent business areas have medium distance from the corporate parent and inside-out and outside-in innovation, while investments in new business areas are the furthest distance from the corporate parent and have outside-in innovation. What needs to be considered is the risk level. The risk increases when:

- investments are further away from the core business due to missing knowhow on the business area and increasing uncertainty about the investment environment.
- the further innovation originated outside the corporation due to an increasing loss of control.

  Regarding the selected CV profile direction, it is necessary to decide how business development should be designed and what level of risk is acceptable. This tool presents potential options (see appendix *Figure 11*).

(2) Cockpit Phase II

The Cockpit Phase II contains the "Cockpit Specs II" and several tools such as the "Organizational Structure Modes" and the "Legal Structure Modes", as well as the "RACI" tool.

Analog to the "Cockpit Specs I" in Phase I, the "Cockpit Specs II" act as a guideline for making decisions during the design phase. The first decisions to be made concern the organizational and legal structure (e.g., autonomy vs. integration or subsidiary vs. within the company). Then decisions about the budget, fund or balance sheet and the size of the budget are required, which are typically followed by establishing the reporting line and general handling decision-making. All of these decisions must be reconciled with each other and with the chosen CV mandate. This step is followed by the determination of co-investors, as well as whether they are desired and whether they can lead. This also involves the number of board mandates, the members of the investment committee and possible advisory committee and, finally, compliance and other governance factors.

Regarding structure and governance, there are two additional tools at hand. First, the "Organizational Structure Modes" instrument (see Figure 13), which details the various

possibilities that were mapped out during the design phase, such as the ad-hoc CV solution, the integrated CV solution and the self-sufficient CV solution. Second, the "Legal Structure Modes" tool (see appendix Figure *14*) describes the two main options for the CV program: the independent entity and the corporate entity (subsidiary) with all its sub-options. These two tools should enable management and the CV team to better understand the options available to them and the resulting degrees of freedom and design.

Decisions about the team are also required: the size of the team, the desired background (e.g., corporate or entrepreneurial), the recruitment process (e.g., by the CV unit or the company), the compensation structure (e.g., corporate vs. VC structure) and other incentives for initiation need to be determined. Furthermore, the location of the team needs to be decided to create transparency and awareness.

As the team plays a very important role in the CV program, a specific tool, the "RACI", was developed to help CV stakeholders better understand the responsibilities within the CV process (see appendix *Figure 15*). The project leadership, the project team and the business units or other functions are assigned corresponding responsibilities that relate to the various phases and tasks that need to be completed. The responsibilities include the roles "R: Responsible", "A: Accountable", "C: Consulted" and "I: Informed". The desired outcome of using this tool is the development of a clear picture of the involvement and roles of each stakeholder group.

After the decisions have been made about the structure, decisions must be made about the communication. The management and the CV team need to decide on the communication style (e.g., hierarchical or flat) and the communication tools to be used (e.g., additional tools and channels to those of the parent company, such as channels and tools for interacting with start-ups). Internal and external communication also have to be distinguished, while decisions on the reporting form and timing are required.

The next point in the Cockpit Specs II is the ecosystem. The aim is to clarify which networks are available and should be used and which ecosystem attributes, such as centrality, should be assessed. The development of ecosystem relationships should then take place, which can comprise personal ties or business connections. This can then potentially play a critical role in the success of the CV program. Management needs to

clarify what expertise is available and accessible, among other ecosystem factors that could be important.

The final section of the Cockpit Specs II is the portfolio approach, which should be determined in accordance with the selected CV mandate. The decisions within the portfolio approach cover the following factors: the number of companies to invest in; the industry, sector and stage to focus on depending on business advancements that were decided on previously; the number of investments to choose in line with the available budget; the instruments (stakes) that are preferred (e.g., minority investments, pure collaborations, strategic alliances, etc.); the holding period for the ventures and the USP to offer to them; and other factors. The overall Cockpit Specs Phase II can be found in *Figure 12*. In addition to the specification aspects defined for Phases I and II, the specs and milestones for the subsequent phases must also be discussed and determined in the rollout plan to enable implementation.

(3) Cockpit Phase III

The Cockpit Phase III contains the "Cockpit Specs III", which cover the deal flow and portfolio management, the collaboration, shared resources and syndication and the capture and measurement of CV value that is generated (see appendix *Figure 17*).

The first step of this phase involves determining the screening process. It can be either active or passive venture sourcing, thesis-based, topic-based or based on the business-advancement agenda of the parent company as indicated in the CV mandate. Screening can span multiple stages and require certain approval mechanisms that must be applied. The duration of the screening process and the dynamics of portfolio development and monitoring also require management decision-making.

Collaboration with ventures, BUs, management and other parties requires a set framework. Collaboration with ventures includes potential board or observer seats, access to partnerships and networks and R&D or technical expertise, as well as finding co-investors, other types of financial transactions, marketing and PR. Collaboration with BUs and management in general may include sharing information about the needs and development of the business, regular updates on the development of the portfolio or

possible steps to integrate the ventures and financial or general participation in the progress of the CV.

As part of the collaboration, decisions need to be made about potential shared resources, such as whether to have access to partnerships and supplier/customer networks, access to R&D and technical expertise, access to infrastructure, access to marketing and PR and recruitment support, information about capabilities and opportunities and threats, knowledge flows, or training on certain topics and skills.

The main outcome of the cockpit is then to capture and measure CV's added value. Therefore, evaluation elements need to be selected, such as the tracking tool, frequency of reporting, form of reporting, reporting tools, certain robustness checks (such as the alignment with established objectives and mandate) and other evaluation aspects that are specific to an industry or region. An initial design for measuring CV value was developed as part of the tool "Value-Add Generator". CV value generation has to be looked at from three perspectives, the single investment, the portfolio and the benchmark. The first two were set in focus for this tool. Lens 1 is the generated CV value "per investment" that provides insight into the objectives set, prioritized and achieved and illustrates the evolution of CV investments over time. Lens 2 is the generated CV value "per portfolio" that demonstrates how CV investments feed into overall CV portfolio goals. The evolution of the overall portfolio, and thus the generated CV value, is viewed over time. Lens 3, CV value "as a benchmark," is included but left outside the cockpit. The idea was to simply illustrate the CV return-on-innovation development from the benchmarking perspective against other CV programs. An overview of the lenses is provided in *Figure 16*. The Value-Add Generator then describes the five subsequent steps of how value is generated. (i) Objective standardization of an investment: Along the CV profile, the priority objectives pursued are displayed and ranked in order of importance. (ii) Objective prioritization: The objectives, which are ranked by importance, are then weighted upward to bring them into better proportion. This approach was chosen because some of the CV directions contain more possible targets than others. (iii) Objective measurement: Objectives are measured along three options: conditional measurements (yes/no), monetary (EUR) and non-monetary measurements (numbers). These are supported by measuring the enablers that contribute to the achievement of the defined objectives. Enablers include the budget, skills

and capabilities, business and business unit collaboration, and management and other party involvement and are measured using planned vs. achieved outcomes and additional specific information (those are listed in more detail in the cockpit specs for Phase III in appendix *Figure 17*). (iv) Investment development: This step presents an overview of all risk parameters (investment size, phase, etc.), the objectives sought, the mechanisms used, and the progress made in creating value in the form of a dashboard. (v) Adjustments: At last, the CV value that is generated contains the adjustment part, which is the iterative ongoing loop of validating the initial objectives that were set.

(4) Cockpit Phase IV

Finally, the Cockpit Phase IV with its "Cockpit Specs IV" embraces the evaluation of the CV program and involves the decision-making for the next steps (see appendix *Figure 18).* These can be threefold: the termination of the CV program and, at a more detailed level, the termination of the venture investments; the continuation of the CV program with follow-up investments; and the integration of the venture into the parent company. The direction can be set at the beginning of the CV program's launch by specifying whether integration is the ultimate goal. The cockpit sheets and the value creation generator are largely identical to those from Cockpit Specs III; the only difference is that here, the final decisions and the measurement of specific investments and the portfolio are made and evaluated instead of the development of the CV program being recorded and measured toward set objectives.

The CVN-Cockpit , which covers the entire CV program lifecycle, should be viewed as an iterative process that continuously provides input to previous, subsequent and additional CVN elements. All individual cockpit phases are interconnected and provide and receive input from each other. The CVN-Cockpit was designed to be applied to new and ongoing CV programs for optimization, the creation of value-add transparency and measurability along the program. Detached from the cockpit phases and the tools provided, the CV cockpit is to be viewed through a two-layer architecture. Accordingly, this involves the following factors:

(i) Return-on-innovation per investment.

(ii) Return-on-innovation per portfolio

Overall, the first two phases can be viewed without a perspective differentiation as the decisions made in those phases are independent of the individual investments and the entire portfolio. However, a distinction must be made in Phases III and IV as the phase elements apply to each individual investment but must also be considered for the overall portfolio as a whole. Certain mechanisms and dynamics apply to the two perspectives.

The first draft of the concept for the CVN-Cockpit is presented in Figure *6*. This is followed by a demonstration of the artefact, which took the form of case studies in Paper III that used the artefact to solve the problem at hand. Evaluation of the artefact and communication about it are important parts of Paper III. The evaluation measured the extent to which the artefact provides a solution to the stated problem, and the goals were compared to the actual observed results of using the artefact in context. A decision was made regarding whether to return to the design and development step to enhance effectiveness of the artefact or to proceed to the communication part, in which all aspects of the problem and the designed artefact are presented towards the stakeholders. These steps are also addressed in Paper III. In general, Paper III focuses on evaluating the artefact's concept in practice to test and further improve the artefact and anchor it in the business environment in the best possible way.

3.6 Discussion of the artefacts

3.6.1 Target audience and intended usage

CVN's primary target audience is companies that either already have a CV program in place or are thinking about implementing one. There are no restrictions in terms of industry or regional reach. In particular, target customers include parent company management, business unit managers, innovation departments, business development and strategy departments, support functions such as human resources and finance, the CV unit or independent units that include the CV manager and operational team and SMEs. The SMEs may come from within the company or outside it. Other external parties that are part of the CVN's target audience include law firms (regarding the contractual part), VC players (regarding co-investments), ventures, and the start-up ecosystem as a whole. Rather

insignificant target groups are governments and universities, which have also started to conduct corporate venturing activities but have not been targeted directly with the CVN.

Overall, the CVN, the framework and the cockpit should be used before the start of a CV program and during the development of a CV program (PR2). The target audience has demanded a standardized tool for all different types of CV programs, with different industrial and regional backgrounds (PR1), while the CVN should be flexible to allow requirements across CV programs and to deal with dynamics and interdependencies (PR3). Companies have asked for a tool that is easy to use and does not impose high bureaucratic hurdles (PR4); such a tool should be embedded throughout an organization to ensure its effectiveness (PR5). Companies see the greatest benefit of the CVN as continuing to create value for the parent company, fostering business innovation and securing the company's future *raison d'être*.

3.6.2 Validity of the application method

Considering the first iterations of the CVN, I summarize and discuss the benefits and the market needs for the two artefacts, which were originally derived from the practical and theoretical requirements in advance of the in-depth evaluation in Paper III.

First, the overall goal of applying the DSR method in this paper was to produce an artefact (in this case, two artefacts, the CVN-Framework and the CVN-Cockpit) that would be thoroughly evaluated before its implementation in the real ecosystem where the problem must be solved. As described by March & Smith (1995), key contributions of this approach include the activities of discovery (making or proposing scientific claims) and reasoning (testing scientific claims for validity) in the natural sciences. Those are separate from (but concurrent with) the activities of building (constructing an artefact for a specific purpose) and evaluating (determining how well the artefact works) the artefact using design science (March & Smith, 1995). Such a distinction was later revised by Hevner *et al.* (2004). This required relevant and rigorous research but may have also led to ambiguity about how to view theory development and validation in DSR. In addition to DSR, the ABV and BTF offered further insight into enabling and explaining CV and its effectiveness on the corporate parent. The application of the ABV provides an explanation for corporate behaviour, particularly management attention, as companies seize, decipher and focus on

novel opportunities while arguing that attention is not synonymous with success. However, drawing on the BTF provides the necessary answers as it explains management's reactions and thus the company's responses to performance feedback. Consideration of these two theories was paramount to developing an artefact that could create and enable an optimal CVN.

Second, both the CVN-Framework and the CVN-Cockpit have come under increasing demand in recent years, which highlights the need for and lack of satisfactory research studies. This paper demonstrates that existing research is unclear and incomplete on how best to build, operate and terminate a CV program and achieve value for a parent company. Several researchers have highlighted that the continuation of CV activities is conditionally guaranteed as many CV programs have failed and have not contributed to business performance and growth as expected. Simultaneously, initial approaches that were made by scholars or island solutions that were developed by corporates were not yet sufficient or implemented as general practice. Initial discussions with companies, therefore, highlighted the current, challenging problems of CV programs. These companies perceived the CVN as a useful tool for overcoming existing shortcomings. The CVN-Framework and CVN-Cockpit have attracted considerable interest from companies as they have the potential to become a "best-in-class" solution (i.e., a single-source solution that encompasses a common and coherent approach to set-up and operation, thus enabling, in particular, the capture and measurement of value generated along the process and the systematic execution of CV programs).

I therefore conclude that the *Corporate Venturing Navigator* that has been presented is a valuable and significant move towards a practicable and essential solution, although the current version needs further development to reach full market readiness. Proper evaluation and iteration have not been covered in this paper as they are the focus of Paper III, which comprises the evaluation study. This is a matter of observing how effective and efficient the two artefacts are and then feeding them back to the design for improvement. The final step is communication and complete embedment in the business environment. The following section outlines the current limitations and future areas of research regarding the tool.

3.6.3 Limitations and future research directions

This study was affected by several limitations that require further research. First, the most important limitation stems from the inherent methodological decision to make a trade-off between research breadth and research depth. The qualitative study focuses on the available academic research, which tends to be fragmented, if not partially contradictory, while relying on collaboration with a handful of CV programs to provide practical insights into otherwise closed decision-making processes and data. This also limits the breadth of the study. As a consequence, the artefact development phase, including the derivative of practical requirements, was largely dependent on the perspective of the collaborating firms, and generalizability should be viewed with caution. For this reason, the evaluation study, Paper III, should place great emphasis on extensive evaluation iterations of the developed artefacts in the form of dedicated case studies to ensure the external validity of initial exploratory results. In line, biases may have been present up to this point as the companies involved in the development process may have had a limited view of certain requirements. The application scope should be expanded to cover more industries and regions. In particular, industries such as financial services and pharmaceuticals are subject to more complex regulations and have different or additional requirements, but certain regions such as highly regulated countries may also have very different requirements than others.

Second, the development and iteration periods of the artefacts was short and should be prolonged. As previously indicated, the CV program goes through different maturity stages throughout its set period. This lens was not considered in the artefact development phase and requires further research, especially regarding the CV Cockpit artefact that captures the value generated during the CV program development.

Third, a key benefit of the two artefacts is the growing database for the further and better standardization of processes as specifics are uncovered and as certain dynamics and mechanisms become known. This holds true in particular for the CV Cockpit, which was designed to capture and measure CV value-adds that are generated. Further improvement on the strategic measurement KPIs is seen as beneficial and needed. This call for further research accompanies the development of a technical, automated tool that is fed and evaluated by an underlying, growing database. At this stage, the artefacts are only available as an initial theoretical concept but would be more useful and add more value to

organizations as a dynamic, technical tool with, for example, a dashboard to depict the specifications of a CV program, its development and its contributions to the corporate parent. For future consideration, the technical tool could even be used as a benchmarking instrument that presents industry, regional and general competitor benchmarks that relate to certain CV program aspects. This would lead to greater transparency throughout the entire CV market, Shortcomings in innovation progress could be easily identified, and improvements could be easily initiated, which would benefit the overall CV ecosystem's development. Other considerations for the future include analysing past and present data and using the function of forecasting the future of CV activities to create even more scope for improved planning and adaptation and, thus, increased CV investment activity.

3.7 Conclusion

In this paper, I have developed two artefacts, the CVN-Framework and the CVN-Cockpit to provide a practical guide for setting up, managing, closing and calibrating CV activities while adding value to CV program development. The CVN-Framework serves as a useful blueprint for efficiently and effectively launching and operating CV programs to take business innovation to the next level. The CVN-Cockpit makes a valuable contribution in this context as it is one of the first tools that not only enables transparency within the CV program process but also makes the value generated measurable and thus ultimately more controllable. As a result, the comprehensive and coherent CVN provides a deeper understanding of the underlying dynamics and mechanisms with particular distinction regarding the specifics of the different CV activity phases. The CVN approach helps improve current and new CV investments by identifying pitfalls and future policy issues and enabling management to better deal with internal and external forces of disruption and change, thereby achieving positive impacts for sustainable competitive advantage. This is enabled by the CVN-Cockpit, which has the capability to decipher the return-on-innovation for both financially and strategically oriented CV practices. New management insights on CV advancement led to better self-assessment capabilities for financial and strategic value creation. Insights into the impact and origin of CV-added value impulses were created, and weak points were identified. Current barriers and future opportunities that were identified

through the created transparency regarding CV value creation can be made visible and put into practice. An enhanced academic understanding of CV operations is expected to contribute positively to business performance. By developing the artefact, I have contributed to the further application of design science research while referring to the theories of ABV and BTF as both theories in combination provide profound explanations of when CV practices are required, how a particular CV effect can be realized and what pattern of organizational attention influences firm survival.

Overall, the research question "What (additional) value can be added to a CV program by applying the CVN?" can be answered by the CVN's contribution to reducing inefficient capital allocations, resolving the need for the justification of CV investments, and improving the survival of the CV program and its value contribution to the corporate parent. The combination of the CVN concept and the adjacent CVN evaluation study in Paper IIII has the advantage of bringing scientific concept findings into practice while further validating and improving them for optimal practical application.

4 Paper III: Corporate Venturing Navigator – Evaluation along case studies

Research Summary: In this paper, I evaluate the self-developed *Corporate Venturing Navigator* (CVN) and its two artefacts, the CVN-Framework and the CVN-Cockpit, by putting the CVN under the microscope in practice. I assess the CVN with practice partners to validate the identified current problem with CV programs, the CVN phases and element characteristics and dynamics that were developed and the CVN's usability, as well as to consider additional input. The goal is to gain further scientific insight into the creation and operation of corporate venturing with a focus on capturing and measuring value. The results reflect additional expertise in optimizing CV investments, further justifying their existence and usefulness.

Managerial Summary: What is the best way to implement and operate a CVN program in practice, while justifying the investment for the parent company? I evaluate the self-developed CVN in practice by assessing the application of the CVN-Framework and CVN value measurement throughout the process. The goal of this CVN evaluation is to confirm the relevance and applicability of the created artefacts in practice with a focus on better illustrating the benefits of implementing a CV program for the parent firm. I also intend to deepen and broaden the CVN with additional practical insights by leveraging academic research to improve its practical application.

Keywords: corporate venturing; design science research; behavioural theory of the firm; problemistic search; Corporate Venturing Navigator (CVN) Framework; CVN return-on-innovation

4.1 Introduction

To synthesize Paper II, the Corporate Venturing Navigator (CVN) concept is translated into practice and validated through an evaluation study. The theoretical CVN concept was designed to be applicable to future CV investment optimization of all kinds, especially the strategically oriented ones. The CVN aims to provide an easy-to-use tool that can be used to achieve expected CV investment performance and growth, thus making a positive contribution to a company's innovation strategy to become competitive and to secure its existence in the long term. The CVN, which was designed in *Paper II,* consists of two artefacts: the CVN-Framework and the CVN-Cockpit. The former artefact, the framework concept, aims to establish a comprehensive and coherent tool to best set-up, manage and close a CV activity while demonstrating the underlying mechanisms and dynamics of the overall CV investment lifecycle. The latter, the cockpit concept, aims to extract and evaluate the value of either the overall CV investments or an individual start-up investment or collaboration at any given time. The decoding of CV returns on innovation has been called for by various scholars and practitioners in the past (Napp and Minshall, 2011; Chiang, 2018). CV investments up to and including today have low performance rates (Hill & Birkinshaw, 2014) that have put CV programs at risks as low survival rates are present. Difficulties in seizing strategic returns on innovation, besides the financial ones, have been highlighted (Chiang, 2018). Corporations have invested great amounts of money in CV activities, but as emphasized by Allen and Helvert (2007) and their fellows, there is doubt about the creation of economic value for the investing corporation overall (Allen & Helvert, 2007; Huang & Madhavan, 2020). This reality can be attributed to corporations' missing capability and means to properly set-up and run CV investments as a proper framework with guidelines is missing.

Furthermore, corporations are currently unable to properly understand or state where value through CV investment is created or how it can be properly measured. Up to now, the majority of CV investments have been measured with financial KPIs, such as the internal rate of return or multiples, regardless of whether an investment is strategic or financial in nature (Chiang, 2018; Röhm *et al.*, 2018a). Therefore, many corporations are not knowledgeable about the development of their CV investments and thus are unable to detect pitfalls and deficiencies that require future improvements (Napp and Minshall,

2011). Corporations struggle to deal with internal and external changes and disruption, which is a common phenomenon and required competence of the 21st century.

This evaluation study aims to validate, deepen, and optimize the impact of CV investments through the CVN as well as through decoding CV returns on innovation. The question of *"What (additional) value-adds can be achieved for a CV program by applying the Corporate Venturing Navigator?"* will be picked up and further elaborated, and the effectiveness of the CVN artefacts evaluated. Best-in-class concept application and feedback was provided in the form of semi-structured interviews. Profound, exceptional insights from science, which are to be further developed and enriched by insights and validation that were identified through practical application, are to be anticipated. Corporations should fully understand their CV investment practices while being empowered to better intervene and manage their CV activities. Heightened self-assessment capabilities are to be expected, and the CVN can be used to enable a corporation to make the best use of its CV investments, which should result in enhanced CV practices and corporate performance. Corporations are finally able to capture and measure strategic value created through CV investments in addition to the purely financial value-adds, which is a promising development that can bring CV to the next level of application.

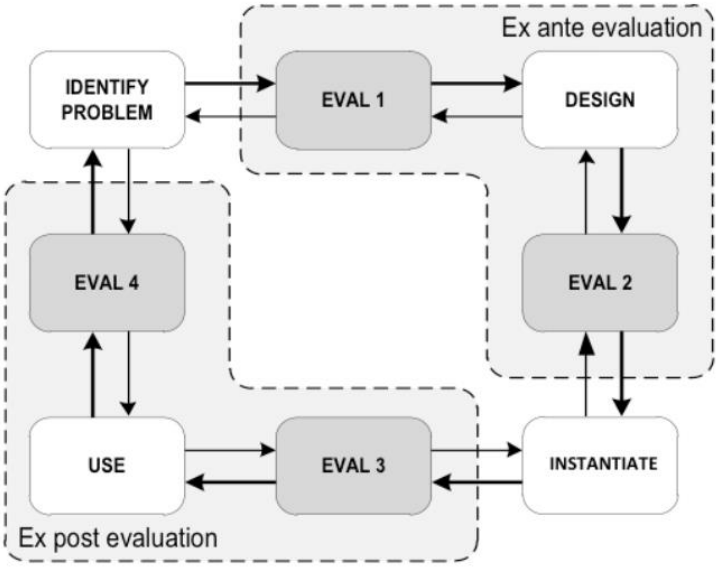
4.2 Research methodology

4.2.1 DSR revised

DSR has evolved in many ways over the years, and particular attention has been paid to assessment activities, which has facilitated the simultaneous and more fine-grained assessments of in-between steps in design development. As demonstrated in Paper II, the DSR process is based on Peffers *et al.*'s (2013) work. Evaluation occurs after the conceptualizing, developing and demonstrating activities but lacks the opportunity to iterate and inform the design early in the research process. Sonnenberg & vom Brocke (2012) identified this deficit by conceptualizing simultaneous evaluations along different aspects of the design (Sonnenberg & vom Brocke, 2012). They elaborated on previous work that describes DSR activities within the overall DSR development by stating that

each activity leads to intended artefacts in various ways and, therefore, holds potential for accompanying (or formative) assessments. The advantage is risk mitigation (Venable, Brocke & Winter, 2019) as early feedback loops on the smallest steps allow the incorporation of new insights into the design process. More specifics and a stronger focus on individual aspects are also made possible in this way.

Figure 7: DSR process evaluation



Source: Sonnenberg and vom Brocke (2012).

To illustrate, Sonnenberg & vom Brocke (2012) identified four evaluation steps (Eval 1 to Eval 4) that are part of the DSR process and cover the identification of the problem, the design, the concept and the application, which is illustrated in *Figure 7.* The four evaluation steps contain the following:

- **Evaluation 1**: Assessing the problem identification against the criteria of importance, novelty, and feasibility.
- **Evaluation 2**: Assessing the solution design against the criteria of simplicity, clarity and consistency.
- **Evaluation 3**: Assessing the solution implementation against the criteria of ease of use, consistency with real-world phenomena and robustness.

- **Evaluation 4**: Assessing the solution used; the criteria include effectiveness, efficiency and external consistency.

The timing of the evaluation, whether ex-ante or ex-post, is to be distinguished during the process. While ex-ante evaluations are performed before artefacts are instantiated, ex-post evaluations occur afterward (Venable, Brocke and Winter, 2019). Throughout the evaluation process, there are constant feedback loops that run in the opposite direction of the DSR cycle.

4.2.2 Application scope

The two artefacts developed in Paper II, the CVN-Framework and the Cockpit, are evaluated in this paper using four semi-structured expert interviews that were conducted via Zoom and lasted around 45 minutes each. *Table 10* in the appendix provides an overview of the companies in focus, which are Axa Ventures, PM Equity, Hitachi Ventures and Bertelsmann Investments. While selecting the interviewees and companies, I intended to cover global CV programs with different industry and regional backgrounds for generalization reasons. I also decided to revisit some of the previously approached companies to gain insights into the evaluation (e.g., Axa Ventures and Bertelsmann Investments) but also decided to approach new parties to gain a neutral, fresh perspective on the artefacts developed (PM Equity and Hitachi Ventures; see *Table 10.* For simplicity reasons and to gain more specific insights and a more in-depth evaluation, one corporation was interviewed about a specific CVN phase of the CVN-Framework . This means that each company addressed one of the four phases in more detail, while each company provided insights into the current problem identification, the requirements for a CVN and additional input. I used this approach to gain more specific insights per phase and to go deeper into the content accordingly.

Regarding the CVN-Cockpit , no division along the development phases of the CV program was deemed appropriate, and the entire process was evaluated with specific emphasis on Specs III and IV (the CV program operations).

4.3 Artefact evaluation

4.3.1 Artefact #1: CVN-Framework

To find answers to the research question, I evaluated the effectiveness of the CVN-Framework . The evaluation covered the assessment of the problem identification and underlying motivation of the CV program members who were interviewed, the objective definitions and requirements, the artefact design and development and potential future developments for the best practical implementation. When designing and developing the artefact, I addressed each element of the CVN-Framework to obtain feedback and suggestions for improvements.

Problem, motivation, and objective definition

As a general result, I can confirm the high relevance and necessity of the *Corporate Venturing Navigator* Framework as all the interviewees affirmed its necessity. This need was distinguished through two perspectives: new programs and established and running programs.

Looking at new programs, most, if not all, of the CV programs that were interviewed emphasized that the introduction and initial operation of a CV program is fraught with difficulties. The interviewees stated that it is difficult to gain and maintain management support and commitment from the beginning and that it is also difficult to convey the returns on investment of CV values and the added value to the parent company. Additionally, the interviewees noted that there is a lack of initial expertise and skills, positive communication, the right culture and reliable and informative benchmarking (platform/source) that could otherwise be used to gain insight into operational and performance data and easily validate the CV program process. The motivation for implementing the CVN-Framework was validated by the fact that both CV program teams and management are seeking a better understanding of CV elements, their interrelationships and dynamics and the improvement of transparency and the capturing of CV value that is generated. All CV program teams either have experienced or still experience difficulties in measuring strategic, innovative or cultural value. This value is threefold and reflected in the value of the CV program investment, the spillover effect on the corporate parent and the spillover effect on the ventures. Although the target CV

programs that had been running for some time had experienced a high learning curve and thus had less need for a framework, the teams often faced the challenge of re-justifying their CV programs when there was a change in leadership or key stakeholders or an external disruption such as the Covid-19 pandemic. The framework has also proven useful in providing a simple periodic review of the program assessment. consequently, the framework can be explained as a beneficial tool that can be used to create a better mutual understanding of the mandate and its underlying objectives to better manage expectations.

When examining the requirement catalogue (see *Table 4*), I found that PR1 through PR4 had been validated but that PR5 had been partly discarded and adjusted. PR1, which calls for a standardized CVN-Framework , was verified, especially as CV programs want to tap into new or additional CV programs or funds with a differentiated industry or regional background. PR2, which states that the CVN-Framework can be applied to new and already established CV programs, also held true, as described previously. However, the evaluation of a new CV program is outstanding and requires future research. PR3, which claims that the CVN-Framework is flexible enough to allow specifications across CV programs and to cope with dynamics and interdependencies, was underlined as very important as no CV program today is seen as a one-size-fits-all solution. PR4, which emphasizes that the CVN-Framework can be easy to use for all stakeholders involved with the artefact, was considered a “non-bureaucratic” tool guide. This rejects PR5, which calls for the CVN-Framework to be embedded throughout an organization to ensure its effectiveness as this would most likely have the opposite effect. Instead, the framework is seen as a simple and streamlined tool that is not time consuming and is independent of corporate bureaucracy and politics.

Design and development

First and foremost, I was surprised that all four profiles were rated as important during the profiling phase. Financial returns were highlighted as basic or hygiene factors. I came to the realization that financial returns need to be considered from three perspectives: the perspective of investment returns for the CV program in the form of IRR or multiples; the perspective of financial returns for the BU; and finally, financial returns for the ventures. Without financial returns, CV programs could not justify their

commitments to ventures because they would not prioritize their growth. Then there was the strategic orientation, which was highlighted as particularly important. The original idea of pursuing CV in addition to R&D and M&A activities was developed to promote and generate future business growth. This can be enabled by strategic CV investments that promote innovation, competitiveness and long-term survival. In contrast to a strategic focus, financial returns are a necessity as CV programs are not an appropriate tool for capital investment because returns are not relevant to shareholders in comparison to parent company returns. Other aspects can provide even greater added value, but this was not yet fully seen and realized. This is consistent with capturing the CV contribution to an innovation strategy or any cultural impact. The added value for the culture of entrepreneurship and, thus, for more risk-taking and the avoidance of the "not-invented-here syndrome" was hardly transparent and also not measurable. This underscores the necessity and urgency of the Cockpit artefact. Overall, one could say that the widespread "financial vs. strategic alignment" debate has become obsolete with these findings as a CV program always contains all four elements with financial returns as its baseline.

Promoters are seen as extremely important as CV is considered a people business. Several interviewees emphasized that a CV program is usually written down one way and operated another. Accordingly, stakeholder management is key, and top-down buy-in is especially necessary to ensure the success of a CV program.

The topic of funding was and still is very controversial. Most companies lack a clue as to what budget is appropriate for their intentions. I was told that funding depends on the size of a company, as well as the planned CV governance and structure. But again, there is the question of raising funds or raising money from the balance sheet (lump sum or recurring, etc.). There are many aspects to consider, and companies are often confused as to how best to proceed.

With regard to business advancements, a rewording was suggested: “business growth strategy”, which stated the direction and destination that a corporation aims to achieve through its CV investments. Generally, most investments start close to core business activities but develop over the years toward more adjacent business fields, which reflects the initial CV goal of generating growth and competitive advantage.

The CV mandate was deemed appropriate, although, as noted previously, the interviewees stated that it should be considered with scepticism as CV programs are a people business and frequently develop their own routines.

Regarding the design phase, the interviewees commented on structure and management. First, they said that it is of utmost importance that both are in line with the CV mandate and that both must be set-up in such a way that the intended objectives and expectations can be met. The organizational and legal structures must also be in proportion to the available budget and the required operating costs. Otherwise (e.g., in the context of a CV program as a fund), high operating costs in comparison to the available budget would make a CV program unprofitable. Accordingly, the structure and governance often depend on the size of a company. If one considers the various organizational models provided, they will see that these models resemble the classic structure in a very simplified form but do not exist in this way in practice. Several hybrid models are available, so one is rather unlikely to encounter a similar CV program structure and governance twice. However, the decisive factor for all CV models is their independence from the corporate parent, which allows them to run successful CV investments with spillover effects.

Team-related aspects were confirmed through the interviews and highly emphasized as very crucial for venturing success. Other contributions concerned training and location. Regular training for both CV internal and corporate personnel was considered necessary to ensure qualified staff held a mutual understanding. One CV program member even had their CV staff spend a year going through various corporate units to understand the mechanics of the company's business and be prepared. Having a team on the ground where the investments are made was highlighted as very beneficial as trust and local knowledge about local characteristics and dynamics is of great importance for venture scouting and operating success.

In harmony with the team, communication is key. One of the most critical aspects of developing the entire CV program is a lack of mutual understanding, one-sided expertise and information streams and unclear goals, as well as undefined expectations. All stakeholders involved pursue a sliding, if not quite broad, agenda that includes different intentions that are based on different incentives. Therefore, communication is key. The CV program members who were interviewed emphasized the need for strong communication

tools that are streamlined, time-saving and easy to use. Communication with external stakeholders such as ventures, other investors or experts must also be regular.

The portfolio was highly discussed as this field is rather complex and specific depending on the industry, regional focus, mandate set, etc. It should, therefore, not be underestimated. I have been told that there is no "one-size-fits-all" solution for this area and that specific regulators must be activated. The two most common approaches are either small tickets that can cover a broader field, scope and limit risk or larger tickets that can gain greater expertise in a few areas while being able to exert or promote an impact on the business overall in that area. Besides, investments along the different stages must be chosen.

The ecosystem and especially the embedding of CV in the program were not mentioned or emphasized as much as the other aspects. However, some interviewees mentioned the ecosystem as a necessary area with a particular focus on the network. Being involved in the ecosystem, sharing the latest trends, developments and obstacles is of great benefit to the entire CVC community and should be fostered more. Overall, the CV program results bubble was found to be appropriate because it outlined the total concept of the CV initiative and explained the entire CV program approach.

The operating phase has been confirmed to be the longest phase of all because it holds the central elements of a CV program. The interviewees emphasized that sourcing and portfolio management are to be run as a VC depending on the structure chosen (e.g., fund or evergreen) and advised against corporate standards at no means. Portfolio management was even referred to as "venture-style portfolio management". In terms of sourcing, the interviewees highlighted soft facts as more relevant than others during DD. What surprised me was the time frame of the sourcing process (i.e., from the first contact with the venture to the signing of the contract). Some CV program members mentioned a period of up to 2–3 months as short and exemplary, while another program member spoke of 2 days to a week for the same process. The sticking point comprises the approval process and the regulatory requirements of the industry, as in the financial services sector or pharma/life science. Discussing the portfolio development and venture monitoring resulted in diverse outcomes as some CV programs had undermined their numerous follow-up investments and active venture care, while others had incorporated a rather lax approach.

Beyond that, however, I confirmed that collaboration is very important. Some of the interviewees noted that CV would not make sense without it as there would be no transfer of knowledge to the corporate parent. I found that this is a critical factor that starts with setting the mandate for the CV program and the investment sourcing while maintaining collaboration to add value to the corporate parent. In case this has not been established, CV operations are not strategic but simply financial. Another critical factor related to collaboration that was mentioned is the "not-invented-here" syndrome. This syndrome describes the tendency of certain business units and key stakeholders to avoid CV collaboration as certain innovations are not self-created. In general, the interviewees emphasized that collaboration should not only be viewed through the corporate lens but also from the company's perspective by asking, “How can start-ups benefit?” As in the VC industry, everyone is interested in the growth of the company, and expectation management is key.

When discussing shared resources and syndication, the interviewees questioned the wording because resource sharing was not always seen as useful in terms of corporate bureaucracy and politics as opposed to agility and speed and needs to be reconsidered. However, synergies are to be leveraged as much as possible along the CV program for both the corporation and the ventures.

As an overall result of the operational phase, the CV added value was confirmed as a desired outcome as it is a generated added value that is transferred to the company to promote growth. Further feedback can be found in Artefact #2: The Cockpit, which addresses this very issue.

The harvesting phase was reflected in the fields "termination” and “continuation". Here, too, the wording was questioned, as was its separation. Instead, the interviewees suggested splitting these fields into "Hold–Divest” and “Exit-Integrate". The natural exit in the event of an IPO of a venture should also be covered. In summary, the "performance" bubble summarizes and concludes the CV program very well. Only the division of perspective between the year and the total duration of the CV program was highlighted, with more detail provided in Artefact #2.

The overall feedback and evaluation of the CVN-Framework revealed that the framework covers very thorough research and a design that comprises all relevant CV

program elements and highlights key dynamics and mechanisms. The interviewees acknowledged that the framework is a valuable contribution to a better understanding of CVs and a guide for setting up, running and closing CV programs, as well as a reflection tool for periodically validating a CV program and achieving set objectives and expectations. Some said that the framework can be used to uncover various myths such as the "strategic vs. financial orientation" debate, while others stated that it helps to make a CV program more flexible and robust concerning internal and external changes. Crucial, however, is the belief in data and data-driven decision-making because they both beneficial and detrimental. The CVN-Framework as such is based on past-oriented decisions, although it was designed to be a future-oriented innovation tool. Moreover, another crucial drawback of the CVN-Framework is that the operation of CV programs is subjective. The interviews with the selected CV program members confirmed that there are often large differences between what is written down and what is actually acted upon. This is not necessarily a barrier to realizing the benefits of the framework but should be considered a critical disruptive factor.

Future development

The interviewees made several positive comments about the structure and the great graphical representation of the Framework, which can be used to illustrate the "big picture" of a CV program's process. The in-depth modern approach was intended to incorporate in-depth information about certain characteristics and key elements and their interrelationships and interdependencies that are part of CV program development. A better mutual understanding of value generation was provided as the transparency and measurability of tangible and fewer tangible benefits were clarified (CVN-Cockpit). However, considerable untapped potential should also be examined, although it should be noted in this context that the interviewees stressed that it is not advisable to make the framework more complex.

Certain aspects were felt to be in need of optimization in terms of further expansion, both in depth and breadth, and were commented on by the interviewees. An important requirement for future development is to further test and apply the concept in practice. While this will be quite involved, it promises to further validate the CVN-Framework . So

far, the concept has been validated by more established CV programs that belong to large companies, new programs and CV programs that belong to smaller companies that have not yet recovered. Upon closer examination of the framework, some of the interviewees suggested that the wording of the first two phrases should be reconsidered and proposed "mandate" rather than "profiling" and "structure and processes" rather than "designing." Regarding the mandate field, the current "mandate bubble" should be changed to a bubble of tangible and intangible outcomes as this differentiation is to be made clear visually right from the beginning. Third, the yellow outcome bubbles in general should differ in size as the outcome increases throughout the process. Fourth, "incentives" were highlighted as key and therefore should have their own section instead of being a subcategory of the "team" section as it is now. Fifth, “training and development” should be highlighted in the framework in the future, as this area is very important to the dynamics of CV programs, as the people business requires mutual understanding and the continuous personal development of employees.

In summary, the CVN-Framework has been validated as a very useful tool that has a positive impact on CV practices.

4.3.2 Artefact #2: CVN-Cockpit

Analogous to Artefact #1, the effectiveness and usability of the CVN-Cockpit was evaluated to find answers on how companies can leverage CV investments to increase innovation and thus business performance. By translating the theoretical concept into practical application, I solicited feedback and suggestions for improvement. The assessment included an evaluation of the problem identification and underlying motivation of the CV programs, the goal definition and stated requirements, the design and development of the artefact and the potential future development of optimal practical implementation.

Problem, motivation, and objective definition

The current problem of the constant need to justify and demonstrate the value of a CV program was acknowledged by some of the interviewees. On the one hand, some emphasized that CV programs in general have problems justifying their value and impact, especially during the ramp-up phase or when a key stakeholder change, or an external disruption occurs. On the other hand, I was told that there are no such problems if management is appropriately committed and if the right attitude prevails regarding CV operations and value enhancement expectations. The motivation and benefits of the CV program are obvious, and as long as the CV program is discussed, it is in business. The key to supporting the management who work with CV programs is to enable them to tell CV investment success stories. To make that possible, even venture founders have been flown in to speak to the board about working together on CV investments by sharing their success stories. Another important aspect in this context is expectation management and positive communication between the corporation, the CV team, the ventures and other stakeholders because value generated is often delayed, especially when it is not financial value, and corporate stakeholders are often impatient. The interviewees advocated for active multi-lateral communication about what the CV program does, who is involved, what its objectives are and how it will progress towards them. Looking at the objectives of the CVN-Cockpit , all the interviewees agreed that capturing and measuring CV value that has been added is very important for both the financial and non-financial value that has been added as the latter has not reached its full potential yet due to limitations on value transfers.

Going a step further into the requirement assessment of the CVN-Cockpit, I found that the requirements were similar to those of the CVN-Framework . The artefact should be standardized but also hold the option for industrial and regional differences (PR1). Thus, I confirmed and formulated the requirement that the artefact must be flexible enough to allow specifications for different CV programs and to cope with dynamics and interdependencies as there is no “one-size-fits-all” solution (PR3). The artefact should, therefore, be applicable to both new and ongoing CV programs and thus provide a useful tool either to set up value capture and measurement along the continuum of CV programs from the beginning or to validate established programs and their effectiveness (PR2). A very crucial requirement that came up was the complexity of the artefact, which verified

PR4, which states that the artefact should be easy to use for all stakeholders and considered a “non-bureaucratic” tool guide. However, regarding PR5, the CV program representatives who were interviewed rejected the idea of embedding the artefact throughout the organization to ensure its effectiveness. They emphasized the opposite: the artefact (i.e., the CVN-Cockpit) should be kept as independent as possible with simple and lean processes and systems. Thus, PR5 was not verified.

Design and development

The general impression of the CVN-Cockpit design was very positive as it brings order to the structure and progress of a CV program. The approach was also praised for its uniqueness and reporting scope. In particular, the fact that the CVN-Cockpit incorporates both quantitative and qualitative perspectives was highlighted as a very valuable contribution to the CV ecosystem. The CVN-Cockpit consists of three main elements: the cockpit function along each CVN-Framework , the specs sheet for each phase and various supporting tools for specific phases. When looking at the Cockpit function within the CVN-Framework , I confirmed that it plays a crucial role in highlighting the framework’s importance in the overall process and in underlining the “added value” generated per phase, which is to be broken down and emphasized. The specs were found to be very beneficial "cheat sheets" that summarize all the compact CV program elements on which decisions must be made and outline various options to help teams get started. Finally, the supporting tools were highlighted as being particularly helpful for management meetings because their illustrations are very simple and easy to understand. To run more in-depth validations, I analysed the three Cockpit elements individually during each CV phase and also as a coherent construct.

During the profiling phase, the outcome that was created and captured as a CV mandate was confirmed through the interviews. A clearly articulated mandate is the cornerstone of a successful CV. However, I was told that there are two mandates that are of concern: the mandate for the CV program (e.g., a strategic mandate for more growth in certain regions) and the mandate for the ventures (e.g., being a good investor). Accordingly, two mandate bubbles were proposed for clear separation. The "Know Your Profile" and "The Onion" tools were evaluated as great approaches to developing the

corporate mandate as they both provide clarity on the profile direction and the strategic growth direction to be pursued. The calculation method of the first tool was, however, perceived as too complicated. A simple outlay of certain tendencies was reported as sufficient. The specs in this regard were perceived as very valuable as all aspects of the profiling phase were aggregated. Overall, I confirmed that the CV added value through refinancing investments and spillover effects, which became visible at later stages, while the CV mandate provides the basis to make this possible.

Building on the profiling phase, the overall result of the design phase was the CV program. Again, the CV value that was generated built on the foundation, the CV mandate, and became visible during the operating and harvesting phases as it was captured and measured. Interestingly, I was told that the structure and management of a CV program often limits value creation because the focus is on systematics. Similarly, I was told that bureaucratization of innovation is harmful because making innovation more efficient kills innovation. CVC is seen as better than R&D because it is more flexible and has more incentives and motivation, and it should stay that way. This goes against the idea of the CVN-Cockpit standardization (PR1) but does align with PR3. Both a degree of standardization and flexibility are reflected in the specs, which were found to be well designed and beneficial. The designing phase included the "team" element, which covers recruitment, retention, incentives and compensation. As mentioned previously, CV is a people-based business in which most processes and developments, if not all, are heavily influenced by its stakeholders' perspectives instead of the written mandate manifesto. Therefore, I developed the RACI system to provide clarity on responsibilities. This tool has proven to be very useful, especially in ensuring and promoting mutual understanding and alignment concerning CV tasks. Simply having an overview of who is responsible for what and who is to act as an information source for certain tasks helps clarify the process. The tool "organizational structure" was somewhat dismantled, as previously mentioned, because the three models presented were perceived as valid; however, this was according to the theoretical view. In practice, they do not exist in this way but rather in a hybrid form. Some of the interviewees suggested developing sub- and cross-models as well as to come up with a benchmarking tool. Regarding the Cockpit specs, the feedback revealed that they are comprehensive and outline all the different options. It might have been helpful to link

the specs to the mandate or more generally to the profiling phase to better identify what impact this has on the decisions to be made in the designing phase (e.g., the available budget for a possible portfolio approach).

The operating phase received the most feedback out of all the phases because the interviewees highlighted it as the crucial phase where CV value is created and initially made transparent. To this end, I spoke with the CV program representatives I had interviewed about the CV value-add generator tool I had developed, which provides a three-tiered perspective. From the outset, the benchmarking perspective was found to be very valuable as there has been no single source of operational and performance data available before, which has caused CV stakeholders to struggle to find answers in the marketplace to justify their actions or to seek advice for their next actions. Moreover, there is not much mutual understanding within the CV program field beyond what CV actually is and how it works. However, the interviewees noted that a large, standardized benchmarking platform would need to be built for benchmarking, which may be difficult due to the individuality of each program as well as the privacy of CV programs. Next, the portfolio perspectives were evaluated as rather interesting but not feasible in practice. I was told that the approach does not work as it is impossible to put various investments with a diverse industry focus that has different lead times under one portfolio lens. Comparing apples with pears does not create any valuable insight. This might, however, not be the case for CV programs that are streamlined in their investments or for the ones that only seek financial returns without a strategic agenda in mind. Concerning the feedback in the individual investment evaluation, I received a very positive response as this approach was recognized as a modern strategy for capturing and measuring CV value. The interviewees said that most CV programs measure CV value by referring to the initial DD of the venture and covering aspects such as technology, market access, novelty, business plan, team and strategic fit. However, the average CV program still focuses on performance as the ultimate metric (e.g., IRR and multiples). There is a constant need to "pay the money back" and achieve spillover effects for the parent company. Basically, measuring CV value is about comparing how much money was invested and how much was gained in the end. However, measuring CV using purely financial metrics means that the impact of CV continues to be misunderstood as if it were being used as an equity investment, and the impact on the parent

company is not being made relevant to shareholders. This underscores the prevailing problem of shareholders being motivated by returns (multiples and IRR), as is the case with R&D. As a result, my approach of not only considering financial KPIs but also converting non-financial measurements into tangible values was seen as very unique and necessary. Some of the KPIs could be found as part of the CV programs that I asked the interviewees about, but mostly only in fractional or aggregated versions. These were, for example, measurements such as the number of markets covered, investments made, or meetings held with ventures, etc. Overall, non-financial KPIs were used more for storytelling, which, in turn, resulted in very positive feedback on the Cockpit as being valuable for making further contributions. Non-financial value in terms of aligning the CV as strategic, innovative or cultural can be distorted during its return, making the creation of transparency, capture and measurement through the Cockpit even more necessary. Therefore, quantitative and qualitative reporting through the Cockpit in general was highlighted as a current need, which is of utmost importance as it demonstrates the ongoing generation of impact. Nevertheless, the Cockpit was found to be quite complex and time-critical, so more simplicity and automation was desired. The Cockpit was proposed as a tool that could be of great use for the CV team and as a supporting visual tool (Cockpit dashboard) for senior management and other board members who are only interested in the overall results and not in the individual details per investment. The Cockpit specs, in this regard, provide a very comprehensive picture of what decisions are to be made regarding sourcing and portfolio management, collaboration, shared resources and the measurement of objectives and the mandate. The need to check for the status of each objective and its achievement over time was perceived as beneficial as this enabled transparency and awareness.

The harvesting phase was perceived to be similar to the operating phase as its final result builds on this phase and leads to CV value creation and performance. In this context, the term "performance", as the outcome is described in the CVN-Framework , was said to be less than ideal as it is only associated with financial returns. The Cockpit specs for this phase were determined to be comprehensive; the interviewees noted that the specs pay particular attention to enablers, which are often forgotten in the process, as a key to achieving the set objectives. This last part of the Cockpit has proven to be very helpful in making decisions about the continuation of certain investments (follow-up investments) or

their termination as not only the financial but also the non-financial perspective is presented and made transparent.

Future development

As mentioned previously, the Cockpit holds great potential for realizing full CV potential, both financial and non-financial, in the near future. This fits best with the growing understanding of how CV needs to be deployed to create the most value for the corporate parent and drive growth and sustainability. I was told that the Cockpit would be best qualified if it were more simplistic and easier to use and could ideally be automated as a digital tool to avoid any extra manual work. This will need further in-depth evaluation to drive the current "minimal viable product" to its next level of practical application. Several pilot rounds with diverse CV programs (e.g., different industry and regional backgrounds, different maturity stages, etc.) were suggested in order to be able to compete against existing method as stakeholders mostly stick to the status quo and their established systems and territory. However, it is quite promising that with the right management buy-in, that should be made possible. The most important aspect of implementing and operating such a tool is highlighting that the tool can enable mutual understanding among all stakeholders involved by outlining the decisions to be made as well as the progress made during the development of the CV program. Therefore, the tool should be promoted not only as a KPI tool but also as a collaboration tool.

4.4 Discussion of the artefacts

The overall objective of this paper was to evaluate the methodological approach used and to validate its practical implementation and application. Against the background of the evaluations, the benefits and the market need and positioning opportunities of the two artefacts, which were originally derived from the practical and theoretical requirements, were summarized and discussed.

Regarding the CVN-Framework , I discovered a great need and a wide range of potential applications as the artefact helps to optimally set up, run and terminate CV programs while making data-driven decisions during the CV program's development. The

evaluation of the artefact revealed a strong match between the general requirements for such a tool and the chosen design, conceptualization and specifications, which reflected the growing need to justify the usefulness of a CVN-Framework . Two distinct starting points for the market positioning of the CVN-Framework were identified: new CV programs and established CV programs. The mechanisms of the framework are still the same, but the perspective is different and so is the marketing of the tool. In both cases, the artefact can be considered a "best-in-class" provisional CV guideline and program evaluation solution. The latest version of the CVN-Framework is similar to what countless CV stakeholders in the industry have benefited tremendously from in the past as they all had to go through their own learning curves and missed opportunities due to their lack of knowledge and skills. Stakeholders require a simple framework that provides support and validation mechanisms so that decisions can be made throughout the program development process, which, in turn, minimizes risks and barriers and accelerates CV development. CV stakeholders have developed their own tools in part over the years because available solutions do not meet specific needs and requirements or are simply not accessible due to the existing "no-sharing ecosystem". Thus, the presented artefact is well positioned as it satisfies the prevailing problem and need in the market for CV programs. All the CV program representatives confirmed this and particularly emphasized its beneficial aspects for new programs. In this sense, the CVN-Framework provides a new way to create a mutual understanding about CV goals, dynamics and mechanisms, as well as expected outcomes, even before the CV program is launched. Notwithstanding, the benefits of the CVN-Framework were not viewed as a stand-alone tool but rather as a guide that will most likely require further explanation and application support, as well as adaptation to existing systems and prevailing dynamics to unfold its full potential. Future pilot applications were recommended for optimizing application and integration.

Regarding the CVN-Cockpit , I discovered even greater demand and a wide range of potential applications as the artefact helps capture and measure the value generated throughout a CV program, which can enable data-driven decisions that can then lead to the best possible CV impact on the corporate parent. The evaluation of this artefact also revealed a strong conformance between general requirements for such a tool and the chosen concept, approach and specifications, which reflects the growing need to justify the

effectiveness of the CVN-Cockpit . Some CV program teams have started their own initiatives to measure financial and non-financial value as they have perceived sole financial returns as not fully representative of the CV program's overall potential. However, as there is not yet a fully satisfactory solution available on the market and various stand-alone solutions are not shared with others, the CV Cockpit was considered a best-in-class value "transformer" and measurement tool as it enables a CV program not only to capture value through the transparency it creates but also to make non-financial value more tangible through new forms of measurement. As a consequence, the CVN-Cockpit enables CV programs to map and track the progress of their CV portfolios and their individual investments by deciphering both financial and strategic value. This makes the justification of CV investments very robust, especially in light of key stakeholder changes or other internal and external disruptions. Improved self-assessment capabilities and the value-add presentation of CV operations enable companies to make the most of their CV investments, which results in improved business performance over the long term. Therefore, I concluded that the CVN-Cockpit represents a valuable and significant step towards a practical and necessary solution, although it requires further development to achieve market readiness. The approach to measuring the value of CV appears to be applicable and necessary for several CV programs. As noted previously, new and established programs, as well as all types of CV programs, are eligible regardless of industry or regional focus. Simultaneously, the most important asset of the artefact is the growing database, which can enable the benchmarking perspective when a certain level is reached.

Overall, the *Corporate Venturing Navigator* contributes to the top three essential functions of a successful CV program as it creates awareness and conditions the program. These conclusions were made with the aid of the CV representatives whom I interviewed:

1) Management buy-in requires a clear mandate.
2) Financial and strategic alignment are needed as both are always present to satisfy shareholders and ventures and to provide strategic spillover effects for corporate growth; both financial and non-financial value must be made transparent and measurable throughout the process to ensure that the set objectives pay off and to ensure a solid CV program.

3) To fulfil the mandate and the objectives set, a corresponding culture must be enabled that includes appropriate incentives with a VC work mode. This is the only way to attract and retain qualified personnel and the only way to enable fast and lean processes. Communication and mutual understanding are key in this context.

4.5 Conclusion

This paper aims to validate the theoretical concept of the *Corporate Venturing Navigator* (CVN) and its two artefacts, the CVN-Framework and the CVN-Cockpit, through an initial pilot test in practice with four selected CV program representatives (Axa Ventures, Bertelsmann Investments, PM Equity Partners and Hitachi Ventures), while critically assessing the applied methodology of concept development, as well as its usability and effectiveness. First, I investigated the identified problem and demand for a CVN for both the Framework and the Cockpit – as well as to what extent the set objectives can be met and made tangible. I validated the CVN's existing and potentially missing aspects to further improve, extend and deepen the CVN. A very critical aspect was the usefulness and value generation that were determined through the CVN application. I also asked the interviewees for any additional input.

The results reveal that both artefacts reflect the need for such a tool according to the problems identified CV programs are currently facing. Through the evaluation, I was able to validate the CVN concept that was developed in practice and enhance it; I was also able to gain further scientific insight into the creation and operation of corporate venturing, with a particular focus on capturing and measuring value to justify the advantages of a CV investment for a corporation.

5 Concluding chapter

5.1 Resuming research gaps and questions

Returning to the discussion that CV, and especially CVC as a dominant form of investment, is gaining prominence while its existence is permanently justifiable, Paper I provides new findings by examining performance spillover effects that are triggered by CVC investments. The research question, *"How can corporates make use of search through CVC activity to improve performance?"* is answered by highlighting the performance spillover effect, which are explained through the problemistic search. I also drew on business strategy, which is a thoroughly relevant topic as most CVC programs today are frequently operating with a predominantly strategic orientation; the strategic impact on corporate performance has only been rudimentarily explored in previous research, which highlights the research needs in this area. The results demonstrate that CVC investments into the corporate's core business have a positive effect on the positive relationship of business strategy and corporate performance in general, even when a firm has performed negatively in the past. These spillover effects that are caused by CVC offer a unique explanation for why certain firms exhibit better and more persistent performance than their peers; they also offer new insights into the problemistic search by supporting the prevailing traditional arguments about the effects of searches.

Papers II and III also build on the current effort to justify the existence of CV investments and highlight their benefits for a company by demonstrating that CV investments are worthwhile. Many individual aspects of CV programs have been researched, but what has been lacking so far is a comprehensive and coherent practical tool for optimally establishing, managing and terminating a CV program as a whole. A tool is needed for new CV programs but also for improving current programs, adapting to their ever-changing ecosystem and achieving a sustainable competitive advantage for the corporate parent. However, capturing and measuring value-adds that are generated is missing yet highly demanded. To address these two research gaps, I developed the *Corporate Venturing Navigator* and its two artefacts, the CVN-Framework and the CVN-Cockpit . In Paper II, I developed the concept, and in Paper III, I conducted an evaluation of the underlying research question regarding *"What (additional) value can be added to a*

CV program by using the Corporate Venturing Navigator?" The results demonstrate that overall, the CVN facilitates better academic and practical understanding of the enhanced self-assessment capabilities and added value of CV investments while enabling companies to make the most of their CV investments, which can lead to better corporate performance in the long run. The CVN-Framework offers current and new programs as a practical guide to building, delivering, and completing a CV program while enabling better response to internal and external changes. The CVN-Cockpit enables CV programs to track and measure their progress better over time and decipher the financial and strategic value that they generate, which justifies the utility and importance of a CV program to the corporate parent.

Overall, all three papers contribute to answering the overarching question of this dissertation of *"How can CV be justified by demonstrating its contribution towards corporate performance?"* Theoretical and practical contributions are explained in detail in the next section.

5.2 Theoretical implications

This dissertation makes several important theoretical contributions to the literature on corporate venturing.

First, I contribute to the ongoing debate about the relevance and justification of CV programs by providing a link to the impact of CVC on business strategy and corporate performance (Huang & Madhavan, 2020). I provide insights into performance spillovers of CVC activities within the core business of parent companies and provide substantial evidence of the existence and benefits of CVC investments through the analysis of CVC value creation (Allen & Helvert, 2007; Huang & Madhavan, 2020).

Second, I examine the role of business strategy and problemistic search, to demonstrate explanations on how performance spillovers occur (Ott, Eisenhardt and Bingham, 2017; Posen *et al.*, 2018). In doing so, I contribute to previous work that examines the relationship between CVC activities and the firm's strategic agenda (Birkinshaw, van Basten Batenburg and Murray, 2002; Covin and Miles, 2007; Hill *et al.*, 2009), but only from a qualitative perspective (Huang and Madhavan, 2020). I make a

quantitative contribution with data by proving that matching CVC activities hold a positive impact on the positive relationship between business strategy and corporate performance.

Third, I contribute to the CV literature by examining how past performance affects spillover effects, which contributes to previous research on how firms respond to poor performance (Duke *et al.*, 2021). Simultaneously, I provide evidence that investing in matching CVC activities is beneficial when a firm underperforms, when however less effective than when firms perform well (Gavetti & Menon, 2016; Angus, 2019). My findings demonstrate that matching CVC activities can positively impact the positive relationship between business strategy and corporate performance when past performance is negative. Aligning CVC investments accordingly is beneficial to making the most of performance spillovers.

Fourth, I contribute to the research on problemistic search by differentiating the degree of search distance from the company's core business through CVC activities and by testing competing hypotheses that presented an argument for and against the traditional view of the search. The results reveal that the traditional perspective of search still proves its validity. Focus search in familiar territory enables faster innovation-oriented strategies with broad knowledge spillovers and access to capabilities as well as efficiency gains that can drive business performance even when past performance is deficient.

Fifth, I make methodological contributions based on a European panel dataset through quantitative research. In the past, most scholars have conducted qualitative research with a strong focus on the U.S. market. Accordingly, this research adds a new angle and perspective to the CV literature and methodological approach.

Sixth, I provide the first theoretical approach to establishing, running and terminating a CV program as a whole, not only for new CV programs but also for current programs to better adapt to the ever-changing ecosystem and achieve sustainable competitive advantages for organizations. To this end, I develop the CVN-Framework , which consists of four phases and eighteen fields. Within the phases, I developed various tools to support the set-up of specific fields, such as the "Know Your Profile" tool. All relevant facts are then aggregated into the CVN specs, which not only capture the most important aspects but also help to generate added value.

Seventh, in line with the CVN-Framework , I contribute to conceptual insights on how to capture and measure financial and strategic value generated, which has been lacking and called for in academia (Chiang, 2018). Therefore, I develop the CVN-Cockpit . This rather sophisticated tool is the first tool to draw on previous academic work to translate CV investments into tangible value from a financial and non-financial perspective. More transparency, improved understanding, room for the optimization of CV programs through targeted interventions and the improved robustness and profitability of CV investments were established.

Eighth, I contribute to the ABV and BTF theory as all three papers provide new insights into the dynamics and effects of CV, which can be applied to both theories. ABV gains insights into the role of organizational attention in strategic decision-making as well as adaptation. However, the BTF gains insights into corporate behaviour in the CV context in response to performance feedback.

Most of these areas also resulted in various practical contributions, which are discussed in more detail in the following section.

5.3 Practical implications

Despite the merits of theoretical implications, practical contribution is made by providing companies with in-depth insights and expertise on the practical awareness of the CV phenomenon under study.

First, I provide new insights into the impact of CV activity on a company's innovation agenda and corporate performance. New input is given on CV program performance enhancement to foster corporate competition and future growth. I provide information on the CV effect on the relationship between business strategy and corporate performance. I expect that this new knowledge will enable management and key stakeholders to better understand the underlying motivations and benefits of CVs and thus to optimally manage and leverage CV spillover effects in line with the strategy to enhance long-term business performance. CV stakeholders should be provided with enhanced awareness and skills to best run CV programs in the future and to be better aware of the potential impact, force, and direction that CV investments have on business strategy and

performance. At the same time, the research results aim to reduce managers' action and reaction uncertainty to promote more strategic learning, technological knowhow, and market understanding. As a result, the efficiency of CV activities and the knowhow and capabilities to enhance corporate performance can be promoted.

Second, I attempt to design a comprehensive and coherent concept for management in the form of the *Corporate Venturing Navigator*, which consists of the CVN-Framework and the CVN-Cockpit . The CVN-Framework is to act as a guideline for leadership and CV-related staff by providing knowhow on how to cope with underlying CV dynamics from designing through closing CV investments. For each phase of the CV activity lifecycle, insights on phase-specific mechanics and obstacles are given, in addition to path-dependencies and interrelations that are highlighted to avoid pitfalls and the absence of expected CV performance. CV stakeholders should be enabled to better deal with change and transformations that are caused internally or externally by making the CV program more robust and successful. I expect a positive impact on the sustainable, competitive advantage and the sustainable performance of the corporate parent. The CVN-Cockpit provides a structure for capturing and measuring the returns on innovation through CV by focusing not only on financial value creation but also outlining strategic value generation. It also enables management to make ad-hoc statements about the individual performance of a particular venture, as well as the overall CV investment. I expect that better self-assessment and self-reflection regarding CV practices would occur, which would optimize the return on CV investments in the future.

Third, the CVN concept is put into practice and validated according to the elements and dynamics that I studied during the concept phase. The insights here help evaluate and further improve the CVN and CV programs and can be used to develop optimal CV performance. New learnings that translate into practice will help create and capture value in the CV lifecycle and lead to tangible innovation returns for corporations.

5.4 Conclusion

In this dissertation, I examine the *raison d'être* of corporate venturing investments to support corporate growth, competitiveness, and future existence. I identify and address that theoretical and practical research findings are highly fragmented and sometimes contradictory, as CV programs are often viewed as failures or even discontinued when they encounter a lack of understanding and unmet objectives.

In the first paper, I provide new evidence on the importance of CV investment into core business fields through performance spillovers, while introducing the significance of business strategy and the idea of problemistic search as explanations for their occurrence. I then evaluate the role of prior performance. Contributions to the CV and strategy literature, as well as the theory of distance search, are made.

In the second paper, I explore the urgent need for a navigation tool that can be used to support the successful launch, implementation, and termination of CV programs, as well as the urgent need to capture and measure the value created during the process. I develop the first theoretical concept for the *Corporate Venturing Navigator* (CVN) concept, which includes the CVN-Framework and the CVN-Cockpit . Contributions to the CV literature and design science research are made.

In the third paper, I validate the established CVN theoretical concept and further enhanced it for best practical application. I assess and refine tool elements, interdependencies, and dynamics for the two artefacts, the CVN-Framework and Cockpit, through practical case studies. I make contributions to literature and practice by introducing new insights into the best CV launch, operations, and value extraction, which can promote innovation in companies.

Overall, I contribute to Corporate Venturing, innovation, and strategy literature by using an unprecedented sample of data and applying familiar methodological approaches in a new domain and creating and evaluating the first *Corporate Venturing Navigator*, which is designed to act a "guide" and "measurement tool." With this dissertation, I intend to contribute to the current CV research debate on the justification of CV as a contributor to corporate performance and to provide guidance to future researchers studying CV for more sophisticated theory development and practical insights.

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Appendix

Figure 8: Conceptual framework

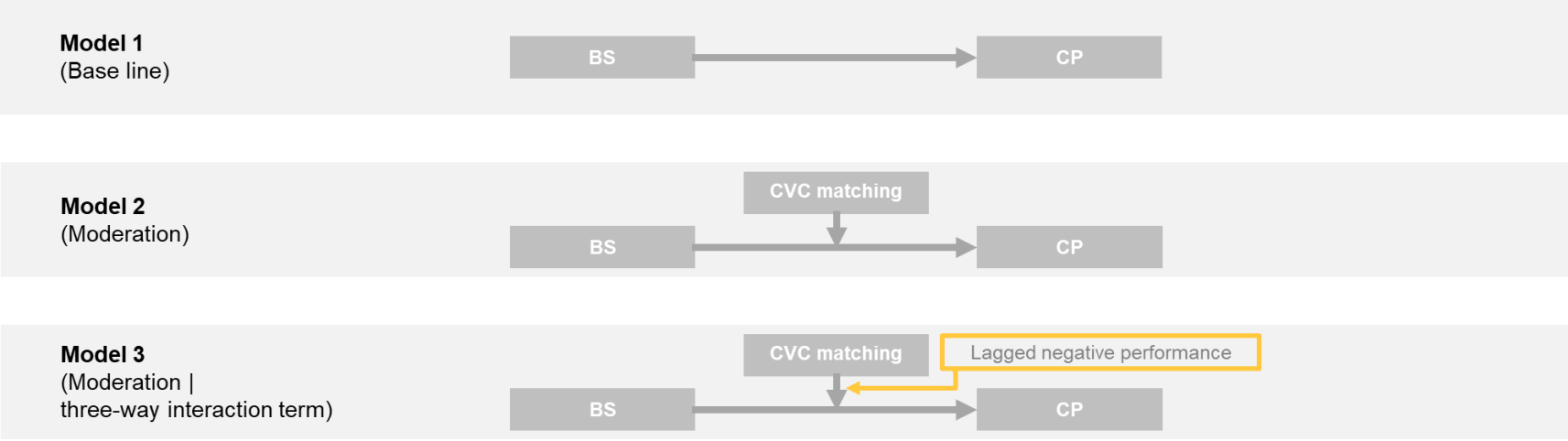


Table 7: Measures

Dependent Variable (DV)	Definitions	Calculation input	Data source
Corporate Performance	Corporate Performance (profitability) by Return on Equity (ROI)	Beard & Dess (1981); Yee, Yeung & Cheng (2010); Quigley & Hambrick (2012); Li & Chen (2020)	Bloomberg

Independent Variable (IV)	Definitions	Calculation input	Data source
Business Strategy	Business Strategy overall (average of the three components: Capital intensity, debt leverage and sales ratio)	Beard & Dess (1981); Quigley & Hambrick (2012)	Bloomberg

Moderators (M)	Definitions	Calculation input	Data source
CVC matching	SIC code corporate matching SIC code CVC portfolio company to differentiate between venture investments into core business of mother company or afar business	Quigley & Hambrick (2012); Röhm et al. (2018)	Obris; Thomson One

Three-way interaction term	Definitions	Calculation input	Data source
Negative Corporate Performance previous year	Inverted corporate performance calculated by ROI	Huang (2020)	Bloomberg

Variables for calculation of Business Strategy	Definitions	Calculation input	Data source
BS Capital intensity ratio	Business Strategy by capital intensity (total assets to total sales ratio divided by the average ratio for all firms in the appropriate industry)	Beard & Dess (1981); Quigley & Hambrick (2012)	Bloomberg
BS Debt leverage ratio	Business strategy by debt leverage (total debt to equity divided by the corresponding average ratio for all firms in the appropriate industry)	Beard & Dess (1981); Quigley & Hambrick (2012); Titus & Anderson (2016)	Bloomberg
BS Sales size ratio	Business Strategy by sales size (firm sales divided by the average sales of all firms in the appropriate industry)	Beard & Dess (1981); Quigley & Hambrick (2012)	Bloomberg

Controls (C)	Definitions	Calculation input	Data source
CVC program age	Existence of CVC program (up to 2019)	Jean, 2017; Röhm et al. (2018)	Obris
Venture portfolio number	Number of investments taken	Keil et al. (2008); Anokhin, Peck & Wincent (2016); Titus & Anderson (2018)	Pitchbook
Corporate size	Corporate size (assets in USD)	Yang, Chen & Zhang (2016); Cabral, Francis & Kumar (2020)	Bloomberg
Corporate age	Existence of corporate (foundation until 2019)	Miller et al. (2013); Yang, Chen & Zhang (2016); Röhm et al. (2018); Ma (2019)	Bloomberg
Industry volatility	Change of corporate performance vs. market performance (calculated by ROA change)	Miller et al. (2013); Yang, Chen & Zhang (2016); Röhm et al. (2018)	Bloomberg
Lagged Corporate Performance	Lagged Corporate Performance calculated as ROE	Quigley & Hambrick (2012)	Bloomberg
Corporate investor status	Status either active or out of business	Hill et al. (2009)	Obris; Thomson One
CVC autonomy	Standardized legal form CVC unit (internal program vs. wholly-owned subsidiary	Yang, Chen & Zhang (2016); Lee, Park & Kang (2018)	Obris; Thomson One
SIC codes	SIC codes (industry coding)	Röhm et al. (2018)	Bloomberg
Year	Year	Quigley & Hambrick (2012)	Bloomberg

Table 8: Robustness analyses and SIC codes

Variables	SIC 2 digits H1a	SIC 2 digits H1b	SIC 1 digit H2a	SIC 1 digit H2b
Business Strategy (BS)	126.5**	82.07***	147.7***	74.67***
	(48.16)	(22.25)	(52.36)	(15.39)
Matching CVC (2 SIC digits)	-3.256*	-1.342***		-1.392***
	(1.702)	(0.462)		(0.453)
Matching CVC on BS (2 SIC digits)	81.42***	38.51***		41.38***
	(14.11)	(6.982)		(5.883)
Matching CVC (1 SIC digit)			-2.991*	
			(1.715)	
Matching CVC on BS (1 SIC digit)			95.23***	
			(18.71)	
Past negative Corporate Performance (CP)		0.616		-0.548
		(0.484)		(0.579)
Past negative CP on BS		11.03***		10.84***
		(1.098)		(1.031)
Past negative CP on matching CVC		-0.879***		-0.747***
		(0.235)		(0.214)
Past negative CP on matching CVC on BS		23.27***		24.05***
		(2.773)		(2.535)
CVC program age	1.414	1.291	1.383	0.966
	(1.004)	(0.912)	(0.984)	(0.756)
Venture portfolio number	0.0282	0.0828	0.0105	0.168
	(0.185)	(0.103)	(0.189)	(0.131)
Corporate size	2.79e-05	1.02e-05	3.48e-05	1.15e-05
	(2.20e-05)	(9.72e-06)	(2.39e-05)	(9.96e-06)
Corporate age	-1.613	-2.264	-1.494	-0.293
	(3.776)	(2.403)	(3.770)	(2.332)
Industry volatility	-0.0135	0.00152	-0.00999	0.00549
	(0.0231)	(0.0216)	(0.0222)	(0.0195)
Past negative CP as control		0.108		
		(0.126)		
CP as control	-0.349		-0.378	-0.625
	(0.275)		(0.256)	(0.389)
Constant	112.0	159.7	103.0	30.03
	(260.3)	(167.6)	(259.7)	(160.2)
Observations	357	357	357	357
R-squared	0.549	0.690	0.541	0.733
Number of Corporates	95	95	95	95

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Figure 9: CVN-Cockpit Specs (Phase I)

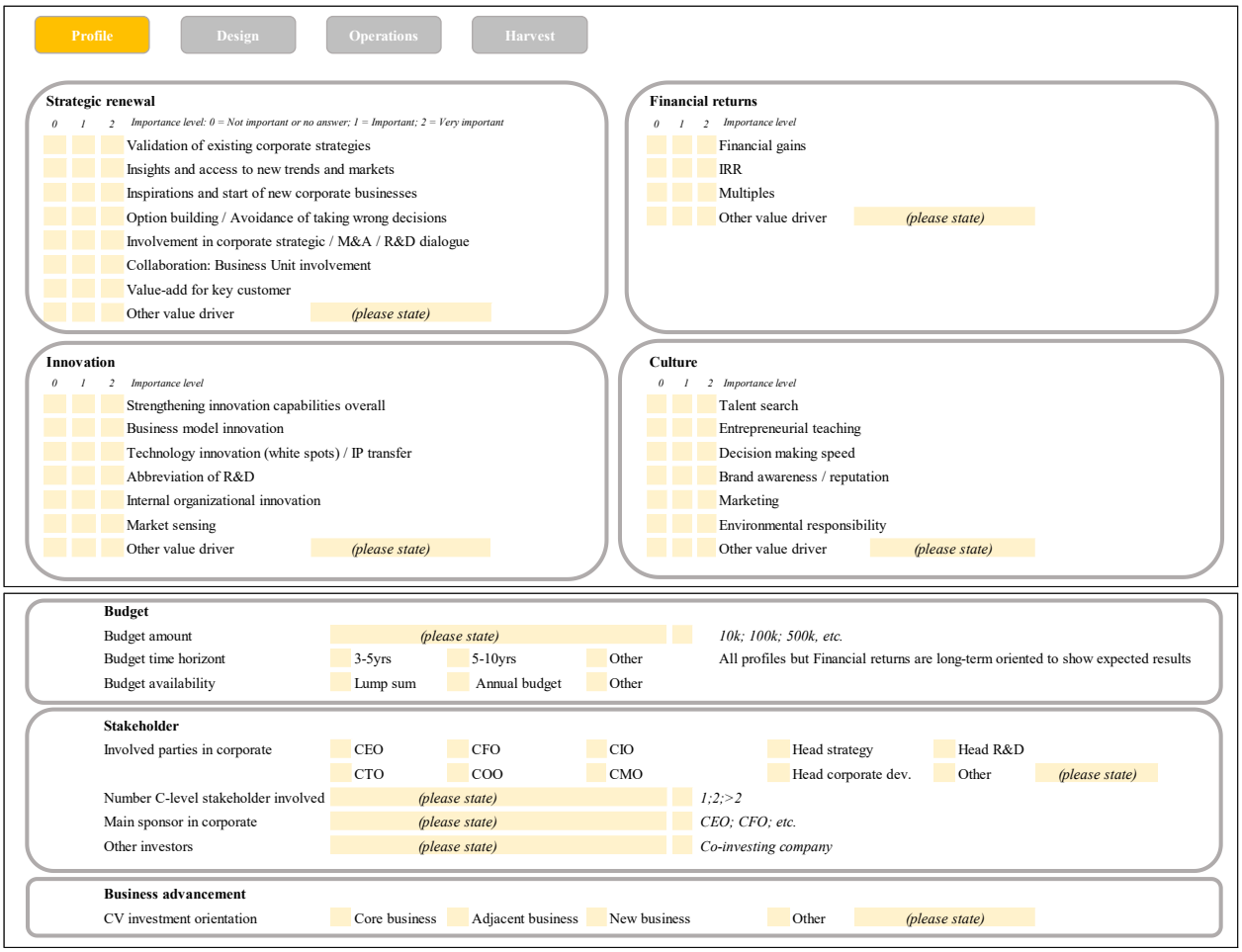


Figure 10: CVN-Cockpit: Know Your Profile

Note: « 0 »= Not important or no answer; « 1 » = Somehow important; « 2 » = Important.

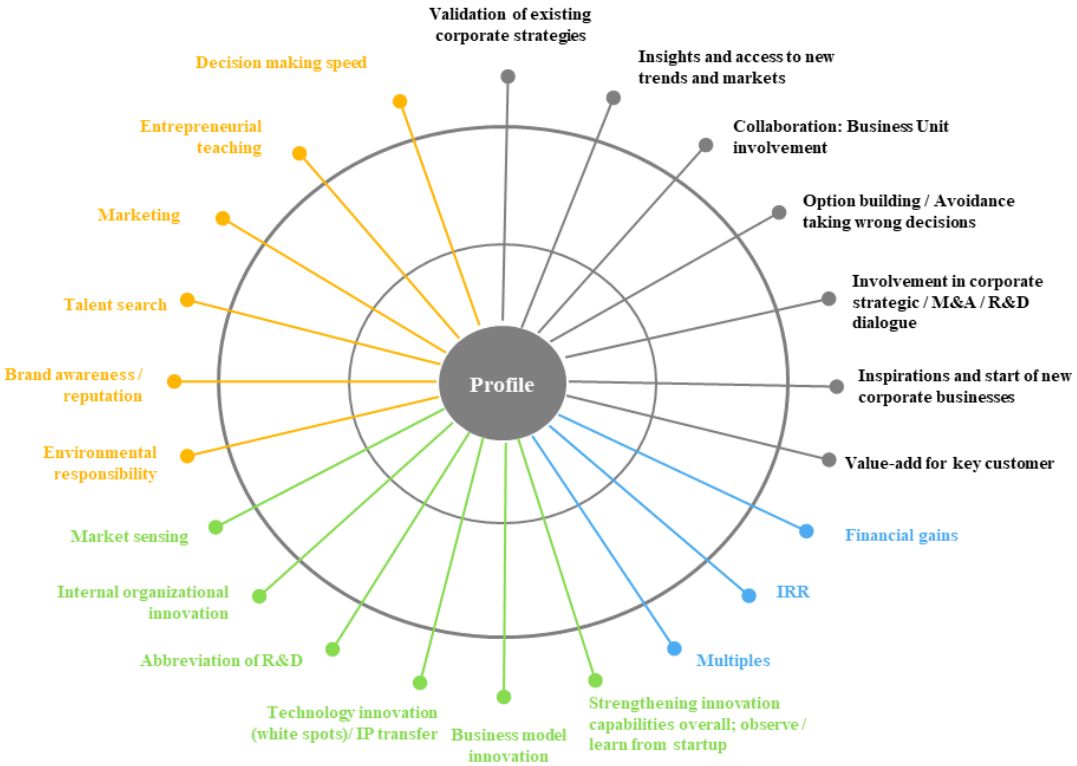


Figure 11: CVN-Cockpit: The Onion

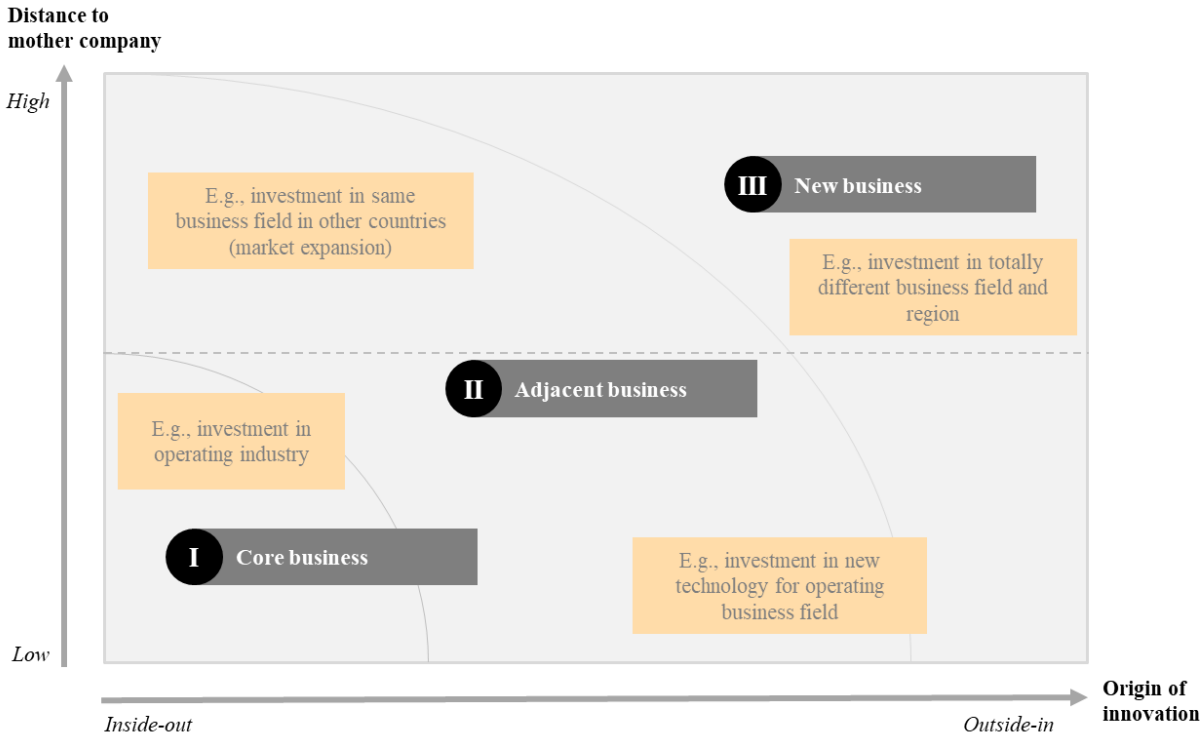
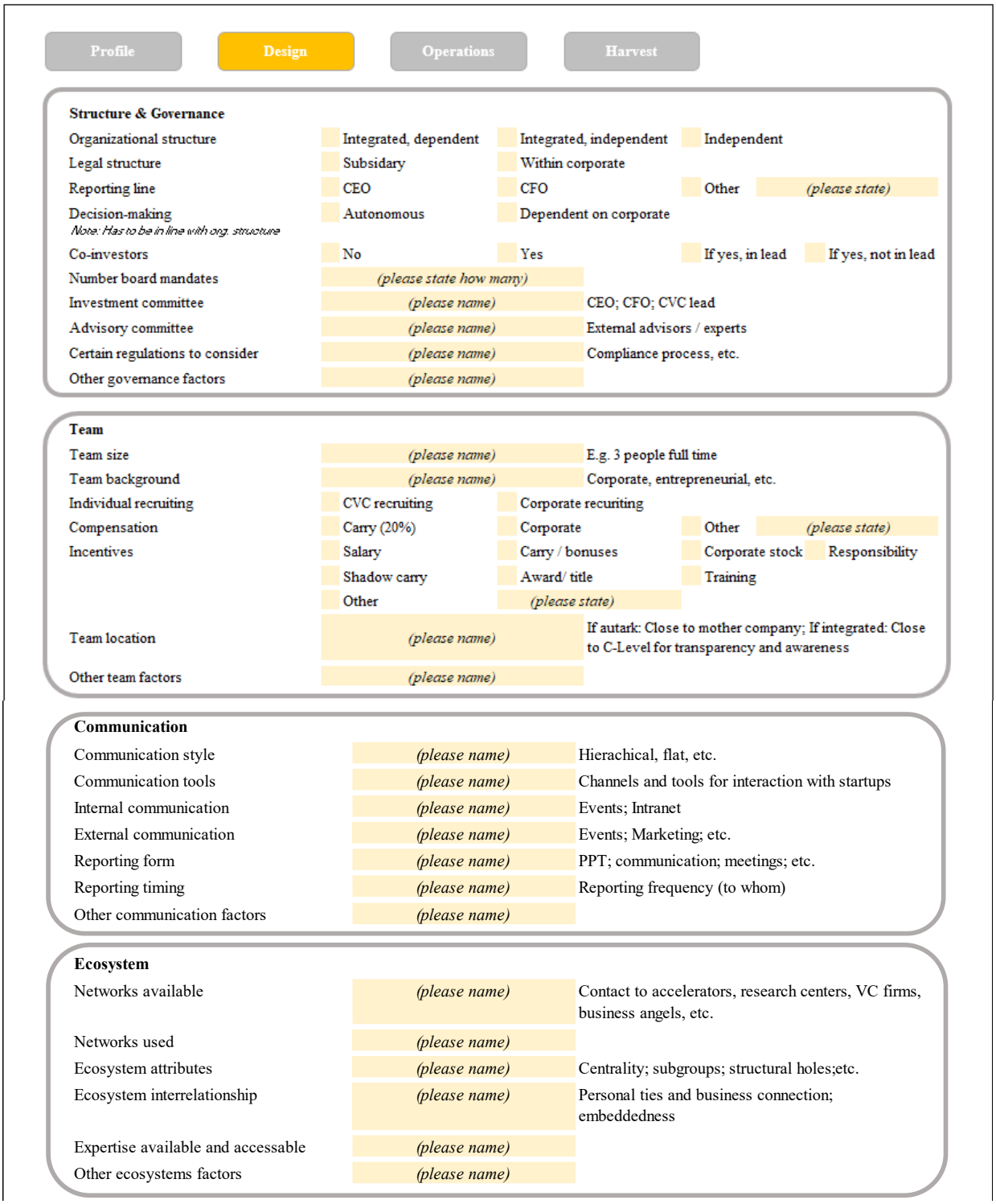


Figure 12: CVN-Cockpit Specs (Phase II)



Portfolio approach		
Focused number of startups	*(please name)*	<5; 5-10; 11-15;16-20;>20
Focused industry	*(please name)*	Automotive; Pharma; Energy; Retail; etc.
Focused area	*(please name)*	GSA; Europe; US; etc.
Focused stage	*(please name)*	Seed; Series A; Series B; etc.
Focused investment sum	*(please name)*	<10k;10-50k;>50k;
Instruments (stakes)	*(please name)*	Minority investment; collaboration only; strategic alliance; etc.
Holding time	*(please name)*	<3yrs; 3-5yrs;>5yrs
USP for startups	*(please name)*	Resources; brand; etc.
Other portfolio approach factors	*(please name)*	

Rollout plan		
Milestone: Profile overall	**Achieved**	**Open**
Profile/ CV orientation set	Achieved	Open
Budget set	Achieved	Open
Stakeholder known	Achieved	Open
Business advancements known	Achieved	Open
Milestone Design overall	**Achieved**	**Open**
Structure set	Achieved	Open
Governance known	Achieved	Open
Team set	Achieved	Open
Communication set	Achieved	Open
Networks set	Achieved	Open
Portfolio approach set	Achieved	Open
Rollout plan set	Achieved	Open
Milestone Operations overall	**Achieved**	**Open**
Dealflow set	Achieved	Open
Collaboration set	Achieved	Open
Evaluation set	Achieved	Open
Milestone Harvesting overall	**Achieved**	**Open**
Termination set	Achieved	Open
Continuation set	Achieved	Open
Performance known	Achieved	Open

Figure 13: CV organizational structure modes

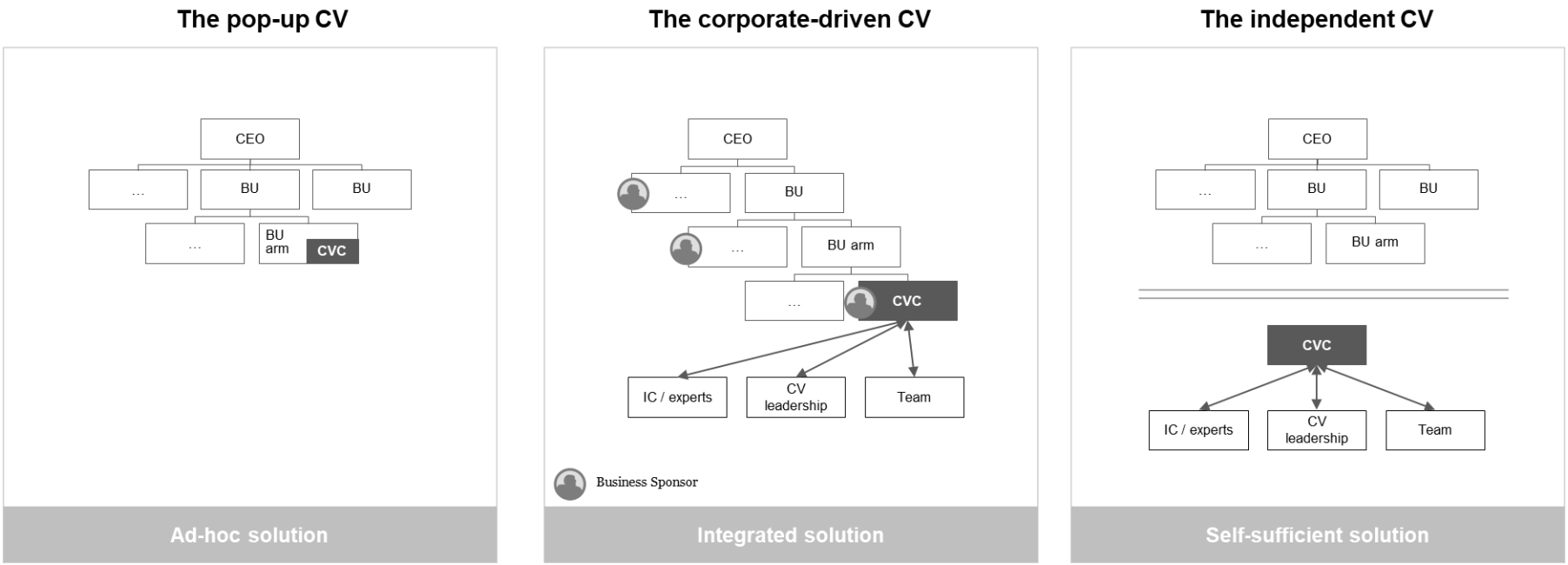
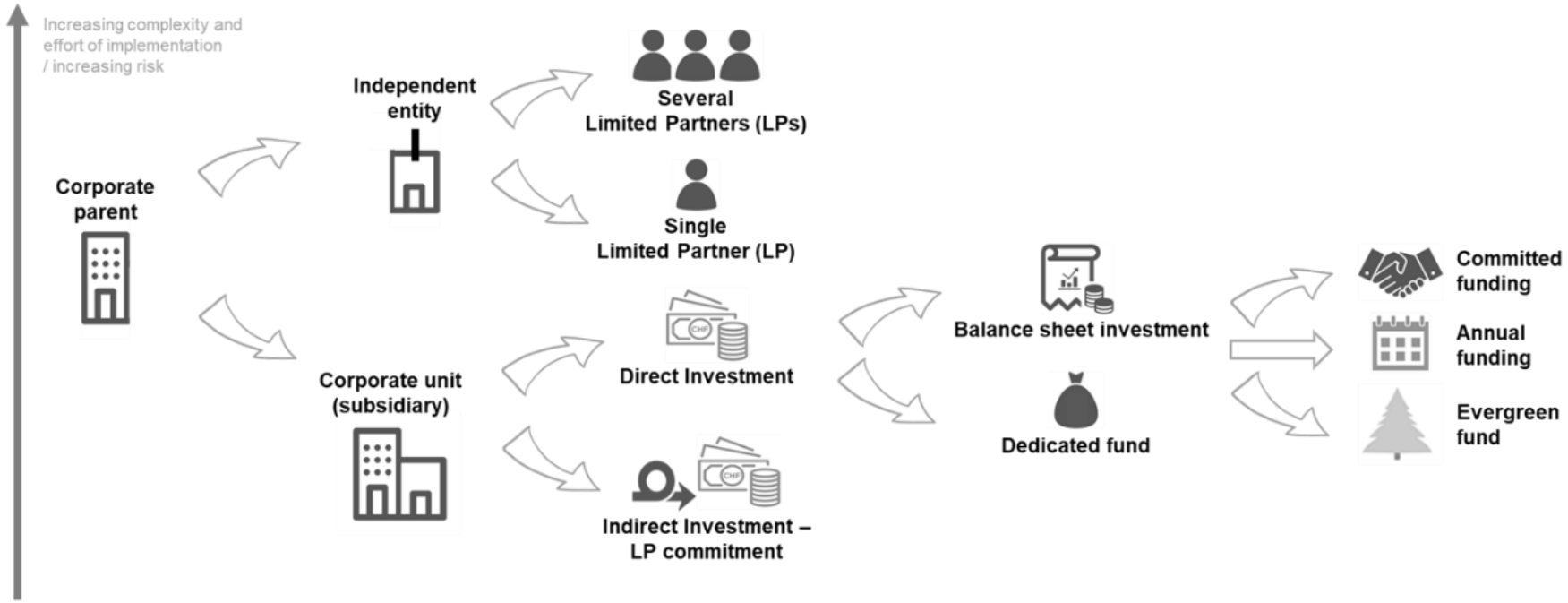


Figure 14: CV legal structure modes



Source: Author's own illustration inspired by a report on 500 start-ups, 2019.

Figure 15: CVN-Cockpit: RACI

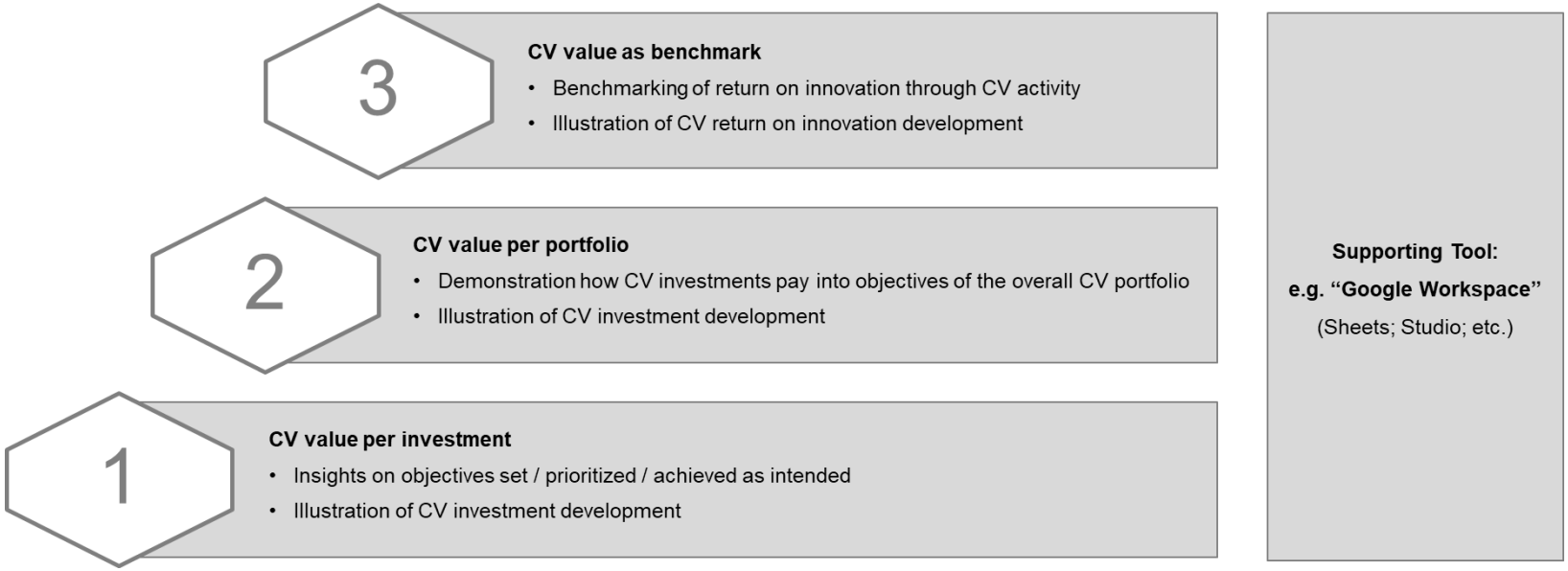
R: Responsible
A: Accountable
C: Consulted
I: Informed

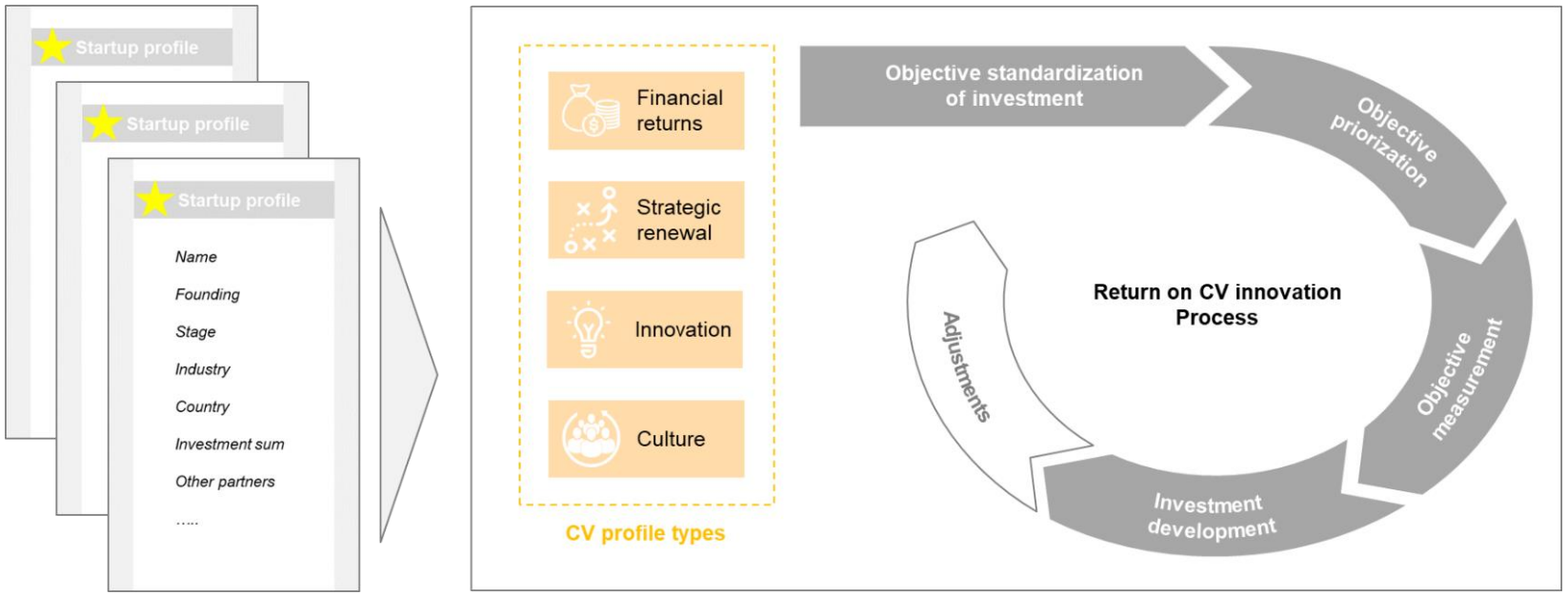
CVC program	Project leadership				Project team			Business Unit(s)
	Executive sponsor	Other executive(s)	Investment committee	Advisory committee	CVC unit leader	Senior invest. professional	Junior invest. professional	BU head(s)
CV program **profiling**								
Defining CV mandate								
Specifying CV objectives								
Determining budget								
Determining promoters								
Setting business advancements								
CV program **designing**								
Set-up structure								
Set-up governance								
Build team								
Install communication systems and process								
Establish ecosystem								
CV program operating								
Investment portfolio strategy / development								
Deal flow sourcing / DDs / business modelling								
Build and manage external networks for deal sourcing								
Reporting and program performance								
Collaboration startups (active / passive)								
Collaboration with BUs / R&D / strategy department								
Events / Marketing								

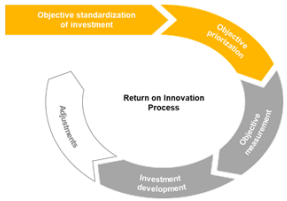
R: Responsible
A: Accountable
C: Consulted
I: Informed

CVC program	**Project leadership**				**Project team**			**Business Unit(s)**
	Executive sponsor	Other executive(s)	Investment committee	Advisory committee	CVC unit leader	Senior invest. professional	Junior invest. professional	BU head(s)
CV program **harvesting**								
Program termination								
Program continuation / follow-up rounds								

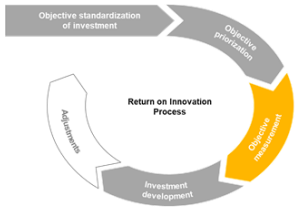
Figure 16: CVN-Cockpit dynamics




Startup profile
Startup profile
Startup profile
Name
Founding
Stage
Industry
Country
Investment sum
Other partners
.....
Financial returns
Strategic renewal
Innovation
Culture
CV profile types
Objective standardization of investment
Objective priorization
Objective measurement
Investment development
Adjustments
Return on CV innovation Process



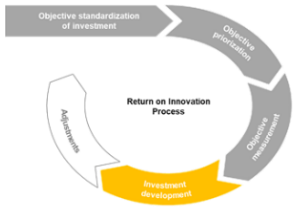
Objective standardization	Objective priorization	Weighting
Market access	RANK 1: e.g. Market access	2x
Market insights	RANK 2: e.g. Tech access	2x
Tech access	RANK 3: e.g. Market insights	2x
Tech insights	RANK 4: e.g. Options	1x
Options	RANK 5: e.g. Tech insights	-
….	RANK XX: ….	….



Prepared objectives
RANK 1: e.g. Market access
RANK 2: e.g. Tech access
RANK 3: e.g. Market insights
RANK 4: e.g. Options
RANK 5: e.g. Tech insights
RANK XX: ….

Matching

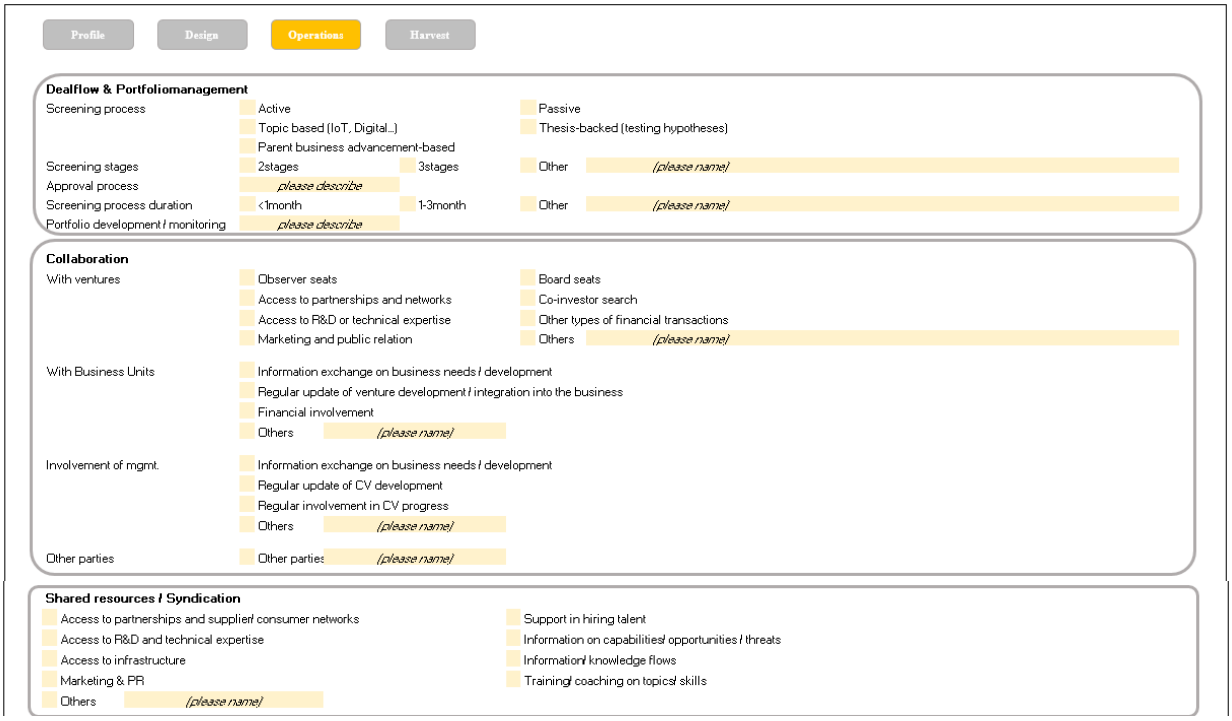
Measurement	
CONDITIONAL 1 - Yes 0 - No	• Milestones met on time • New markets covered • New technologies integrated • Startup engagement • Reputation & brand building • …..
QUANTIFIABLE: NON-MONITARY Ranking 0-5 0 is lowest 5 is highest	• Number new customers / contacts through collaboration • Number of signed contracts and joint agreements • Number dialogues with startups • …..
QUANTIFIABLE: MONITARY In EUR	• Revenue from new introduced products / services • Cost savings through collaboration • Employee Turnover Rate (ETR) • …..



CV Investment progress

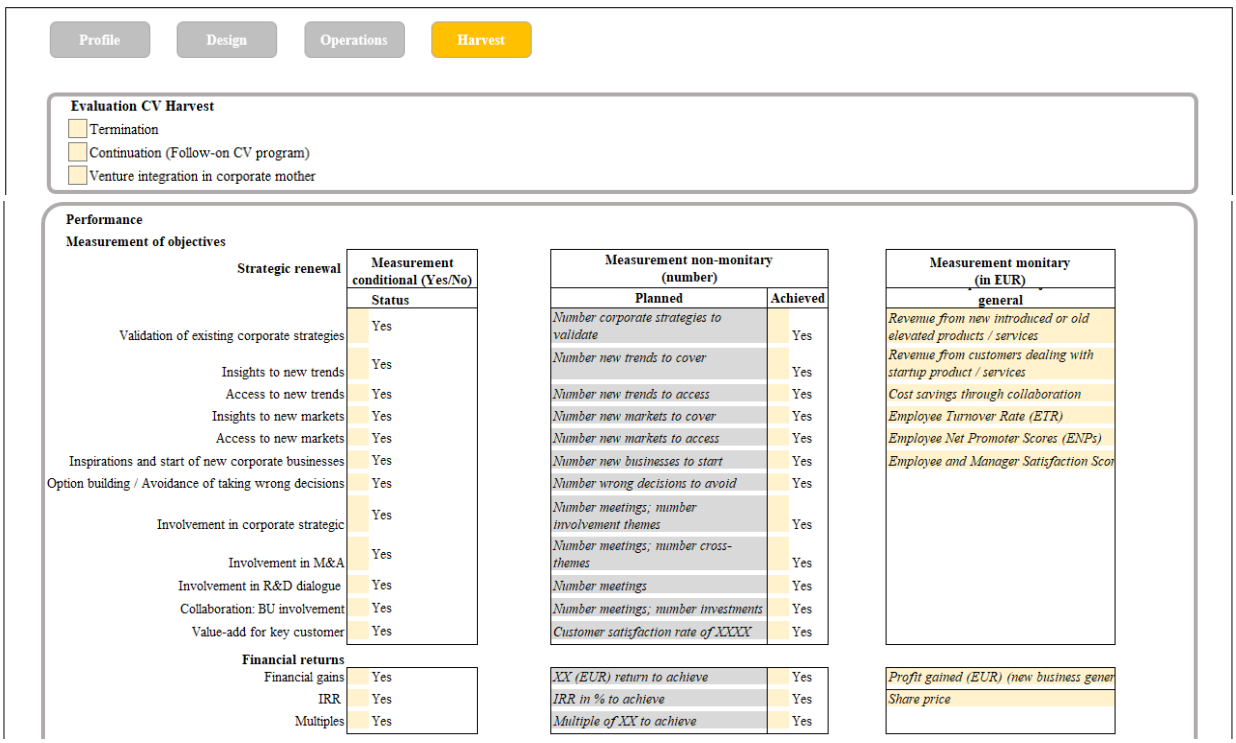
- Overview venture parameters (investment size, stage, etc.)
- Objectives targeted
- Objective mechanism
- Value-capture progress

Figure 17: CVN-Cockpit Specs (Phase III)



Note: Same KPIs for value-add measurement as in Phase IV.

Figure 18: CVN-Cockpit Specs (Phase IV)



Innovation				
Strengthening innovation capabilities overall; observe / learn	Yes	*Number new innovations; innovation cycle time; enablement of new business for the corporate*	Yes	*Innovation rate = revenue share of innovations / total turnover * 100; revenue/profit growth from new products; revenue from new introduced products / services; revenue from old*
Business model innovation	Yes	*Number business model renewals*	Yes	*Innovation portfolio = ABC analysis*
Technology innovation (white spots) / IP transfer	Yes	*White spots to cover; enhancement of existing product developed by the corporation; new innovation*	Yes	*Patent income*
Abbreviation of R&D / M&A	Yes	*Number R&D / M&A actions originating from a CVC investment*	Yes	*R&D saving; annual R&D budget as a % of annual sale;*
Internal organizational innovation	Yes	*Number innovation meetings / active*	Yes	
Market sensing	Yes	*Number markets to screen (selected focus areas); insights to share with BUs*	Yes	
Culture				
Talent search	Yes	*Number interviews; new staff*	Yes	
preneurial teaching	Yes	*Number teaching units and participants; knowhow and skills gap covered; award; number culture*	Yes	*Educational budget used*
Decision making speed	Yes	*Number meetings per project planned; errors made; number culture conflicts; Agility (lean time scales, reduced customer complaints, better*	Yes	*ROI; project budget saved*
Brand awareness / reputation	Yes	*Customer satisfaction; Net promoter score*	Yes	
Marketing	Yes	*Number of startup events hosted / participated; number of netions (social listening for reputation); Number of "likes" / "followers" /*	Yes	*Marketing budget*
Environmental responsibility	Yes	*Number environmental projects; % of innovations that include sustainability goals; % sustainability awareness training penetration; acore energy / emission / emission footprint*	Yes	*Environmental costs or budget; percentage of environmental targets achieved; CSR index*
Measurement of enablers				
Budget		**Planned**	**Achieved**	
Budget used	Yes	*XX amount to use*	Yes	*XX EUR*
Capabilities / Skills				
Top mgmt. support (companywide acceptance of	Yes	*Planned mgmt. representation of CV (events; announcements; etc.)*	Yes	*Income through new IP generated*
Expansion of network	Yes	*Number network parties; specific relationship secured through*	Yes	*Employee Turnover Rate; Employee Net Promoter Score;*
Scouting, startups under review	Yes	*Number startups screened*	Yes	-
Targets evaluated in detail	Yes	*Number DDs*	Yes	-
Investments negociated and signed	Yes	*Number new startups*	Yes	-
Startup used / knowhow or skills incorporated	Yes	*Startups knowhow / capabilities incorporated*	Yes	-
Milestones met on time	Yes	*Number milestones met*	Yes	-
First mover advantage	Yes	*Number one on the market; press*	Yes	-
Risk acceptance	Yes	*Number risk taking; number project failures*	Yes	-
Talent available	Yes	*Number of hires with venture background*	Yes	-

Table 9: Paper II – CVN interview list

Corporate parent	CV arm/Corporate unit	Contact person
Philipp Morris	PM Equity	Managing Director
Shell	Shell Ventures	Managing Director
Samsung	Samsung Catalyst Fund	Managing Director
Nestle	R&D	Head of
Bertelsmann	Bertelsmann Investments	Managing Director
Axa	Axa Venture Partners	Head of
Deutsche Bank	Strategic Projects and Transactions	Head of
Siemens Healthineers	New Business Development	Head of

Table 10: Paper III – CVN interview list

Corporate parent	CV arm	Contact person
Philipp Morris	PM Equity	Managing Director
Hitachi	Hitachi Ventures	Managing Director
Bertelsmann	Bertelsmann Investments	Managing Director
Axa	Axa Venture Partners	Head of

Table 11: List of publications

Research papers:

Reuther, J., Hess, M., Grichnik, D., Vincent, J. (2021). Patience is Bitter, but its Fruit is Sweet: An Alternative to the "When-Where" of Distance Search in Business Strategy and Corporate Venture Capital Activities
Accepted at the 2021 BCERC

Reuther, J., Hess, M., Grichnik, D., Stoeckel, A. (2022). Corporate Venturing Navigator – Conceptual development
Published as a working paper on www.alexandria.unisg.ch in June 2022

Reuther, J., Hess, M., Grichnik, D., Vincent, J. (2022). How corporates rely on search through CVC strategies to improve performance
Published as a working paper on www.alexandria.unisg.ch in August 2022

Reuther, J. (2022). Corporate Venturing Navigator – Evaluation along case studies
Published as a working paper on www.alexandria.unisg.ch in August 2022

Reuther, J., Hess, M., Grichnik, D., Vincent, J. (2022). How corporates rely on search through CVC strategies to improve performance
Envisage submission to Strategic Entrepreneurship Journal in September 2022

Book:

Reuther, J., Hess, M., Grichnik, D., Stoeckel, A. (2022). Corporate Venturing Navigator – The Corporate Venturing Navigator: How corporate dinosaurs manage their survival. A sequential blueprint for corporate innovation through startup collaboration.
In preparation to submit to publisher

Jana Reuther

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Phone: +49 (160) 5855314

Work Experience

02/2022 – today	**Global Corporate Venturing**, London/ UK Global Program Lead, Benchmarking
11/2016 – 02/2022 (Ph.D. leave exemption)	**Strategy& PwC Deutschland GmbH (formerly Booz)**, Munich/ GER Strategy consultant with focus on strategy, digital and innovation

Education

10/2019 - today	**Universität St.Gallen (HSG)**, St.Gallen/ CH Ph.D. Program in Management with specialization in Corporate Venturing / Corporate Strategy / Business Innovation
07/2014 - 11/2016	**CEMS – The Global Alliance in Management Education** **University of Sydney**, Sydney/ AU Dual Master in 'International Management' (GPA 4.0/4.0: Top 10%)
07/2015 - 12/2015	**Fundação Getulio Vargas**, São Paulo/ BR CEMS Exchange Semester (GPA 4.0/4.0: Top 5%)
01/2015 - 06/2015	**Aalto University**, Helsinki/ FIN CEMS Exchange Semester (GPA 4.5/5.0: Top 5%)
09/2010 - 05/2014	**ESB Business School**, Reutlingen University/ GER (GPA 1.6/1.0) **Dublin City University**, Dublin/ IRL (GPA 1.5/1.0: Top 10%) German-Irish Double Degree: B.Sc. in 'International Management' & 'Global Business' **Bachelor Thesis:** Start-Up Chile - A government initiative, which aims to establish Chile as Innovation-& Entrepreneurship-Hub in Latin-America
06/2001 - 04/2010	**Wilhelm-von-Humboldt Gymnasium**, Ludwigshafen/ GER Abitur: German 'A-levels' (GPA 1.8/1.0: Top 10%)

Internships

05/2013 - 07/2013	**Cumplo** (Start-Up), Santiago de Chile/ CL P2P (Peer-to-Peer) Business, Micro-Financing
01/2013 - 04/2013	**Capgemini Consulting**, Munich/ GER Change Management & Communication, Automotive
07/2012 - 09/2012	**Daimler**, Mexico City/ MEX Mercedes Benz Trucks; Marketing, Sales and Promotions
04/2012 - 06/2012	**Fresenius Medical Care**, Sydney/ AU Finance/ Regulatory Affairs/ Marketing, Pharma
08/2011 - 10/2011	**Bosch**, Singapore/ SG Information, Coordination and Organisation, Automotive Aftermarket Asia Pacific
06/2011 - 08/2011	**Porsche**, Ludwigsburg/ GER Strategic Projects, Global Sales Network Development

Business Projects

01/2015 - 05/2015	**Nokia** (CEMS - Business Project), Helsinki/ FIN Integration strategy to overcome the 70% failure rate in Change Management Practices
03/2015 - 04/2015	**Microsoft** (CEMS - Global Management Practice Course), Helsinki/ FIN Acquisition of Nokia's Devices and Services Business
07/2014 - 11/2014	**Deloitte** (Fastrack – Global Award Winning Innovation Program), Sydney/ AU Test, evaluate and design business sustainable innovation ideas for Deloitte
08/2014 - 11/2014	**Suncorp Group** (CEMS – Advanced Strategy Course), Sydney/ AU Consulting on car insurance products for future developments and advancements

Skills

Language Skills	German	Native language
	English	Fluent
	Spanish	Good knowledge
	French	Basic knowledge
	Portuguese	Basic knowledge
Computer Skills	MS Office (Excel, PowerPoint, Word, Outlook)	Good knowledge
	Lotus Notes	Good knowledge
	SAP (R3 & Cats)	Good knowledge
	MySQL	Good knowledge
	Stata	Good knowledge

Honours & Hobbies

Honours

Rotary – Global Grant Scholarship 2014-16
Scholarship with focus on 'Economic and Community Development'

Stiftung des deutschen Volkes
Germany's largest organisation, sponsoring students of outstanding academic achievements

DAAD scholarships: 2010/11 - Mobility Scholarship & 2011/12 - Erasmus
Scholarships awarded to students studying abroad within the European Union

E-fellows scholarship 2010-16
Scholarship awarded to 1% of the German students; founded by McKinsey & Company, Deutsche Telekom AG and Verlagsgruppe Georg von Holtzbrinck GmbH

Hobbies

Zumba & Spinning
Regular performances; certified trainer

Kiva
Micro-lending platform, supporting low-income/ underserved entrepreneurs worldwide

RTT (Rapid Transformational Therapy)
Certified coach; based on neuroscience, RTT® is a pioneering therapy that offers fast, effective results by combining most beneficial principles of hypnotherapy, psychotherapy, NLP, and CBT

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