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Geographies of relational coordination in venture capital firms

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ABSTRACT

Venture capital (VC) firms are crucial actors in entrepreneurial ecosystems. Through the development towards a digital economy, they have gained further relevance, which caused the VC industry to diversify in terms of business models. This article offers a new heuristic to study the VC industry by developing a classification of VC firms. By drawing on a framework of different dimensions of relational distance in investment relations, different types of relational coordination are identified by comparing VC firms in Germany. The types of VC business models are found to produce relational geographies of investing as they relate with their portfolio startups in different ways. A relational perspective on VC thus provides the opportunity to step beyond pure territorial approaches on VC.

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Venture capital; relational distance; business model; entrepreneurial finance

1. Introduction

Driven through the widespread adoption of new technologies and new means of communication, digitalization is having profound economic impacts. Somewhat hidden in the shadow of the newly emerging platform business models and corporate giants, venture capital (VC) firms act as financiers and enablers of these massive shifts by providing capital and support to new and fast-growing companies (Langley & Leyshon, 2016). Venture capital firms can thus be considered as a significant driving force in entrepreneurial clusters (Ferrary & Granovetter, 2009; Saxenian, 1994) and beneficial for regional development in general due to their inherent role as intermediaries between different domains of regional economies (Zook, 2005). Despite this, relational geographies of VC have hardly ever been discussed prominently in economic geography as Wray (2012a) observes. Instead, most debates have been focused on territorial dimensions of VC investments such as spatial concentration of VC firms (Florida & Kenney, 1988; Klagge & Peter, 2012), patterns of investments (Florida & Mellander, 2016) and regional equity holes (Martin, Berndt, Klagge, & Sunley, 2005) or the spatial proximity required between investors and investees (Fritsch & Schilder, 2008, 2012). Considering the inherent relational nature of VC firms business activities, this study follows Wray (2012b) in arguing for a relational understanding of VC. Instead of simply asking where VC is invested, the

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more relevant question is how VC firms produce relational geographies of investments. The empirical use of individual firms' investments used in this study makes it possible to distinguish different forms of relational coordination applied by VC firms. This is a necessary extension to the literature since the VC industry is generally heterogeneous in terms of business models and strategies (Christensen, 2007) and has diversified further in recent years along with its involvement in digital businesses.

In recent years, several attempts have been made to classify the newly emerged actors in entrepreneurial finance (Block, Colombo, Cumming, & Vismara, 2018, Moritz, Block, & Heinz, 2016). This literature, however, lacks a relational conceptualization of VC. Still, it can serve as a starting point to analyze the relational geographies produced through new types of VC firms. The aim of this study is thus to contrast those types by how they relate to their investees and to evaluate if different geographies emerge out of these relational strategies.

In line with that, this study aims to make two main contributions: First, it is argued that by acting as financial intermediaries, VC firms capitalize inter-firm relations and various dimensions of relational coordination are therefore an important part of their business model. It is empirically shown that most of the recent changes in the industry are caused by new ways of how VC firms relate with other actors, notably their investees. Second, by analyzing the new venture capital business models (VCBMs) from a perspective of relational distance, it is shown how different types of VC investors rely on relational proximity to mediate spatial distance between themselves and their portfolio startups.

Empirically, this study is based on a business model classification, performed on a sample of VC firms in Germany that share institutional conditions. The paper proceeds as follows: First, the importance of relational coordination for VC firms is illustrated. Second, the methodological framework of identifying types of VC business models is laid out. Third, a reference VC business model is delineated, which acts as the smallest common denominator for all types. Fourth, a classification of VC business models is proposed and fifth this classification is analyzed regarding the relational geographies produced through a different use of relational coordination in the VC industry.

2. The relational dimension of venture capital

Previous research has not only emphasized the relevance of VC firms as agents of development within innovative clusters but also stressed the relevance of relations and networks for VC investors. Especially using the prominent example of the San Francisco Bay Area, several contributions have explained how VCs actively cultivate and capitalize on social embeddedness in industry networks (Hall, 1998; Thompson, 1989; Wray, Marshall, & Pollard, 2011; Zook, 2005).

Accordingly, Ferrary and Granovetter (2009) identify VC firms as a backbone within a heterogeneous network of economic actors in Silicon Valley and attribute significant importance in knowledge spread and accumulation to them. These authors, therefore, agree on the spread of entrepreneurial and industrial knowledge to be a significant part of VCBMs, which in turn makes them crucial actors for regional economic development. The regional dimension of VC in terms of the spatial proximity between VC investors and their portfolio startups has been debated fiercely with different findings from case studies in different regions. On the one hand, numerous studies have found both VC firms' office

locations and investments to be concentrated in space (Chen, Gompers, Kovner, & Lerner, 2010; Florida & Kenney, 1988; Florida & Smith, 1993; Martin et al., 2005). This has been explained with a reluctance of VC firms to invest outside their home region (Mason, 2007) caused through underlying social networks and transaction costs (Sorenson & Stuart, 2001). On the other hand, these findings were based on empirical work concerning the VC industries of the United States and the United Kingdom, while Fritsch and Schilder (2008, 2012) find spatial proximity to be less important with investors often using joint investments ('syndicates') to attenuate negative effects of long-distance investments. Similarly, Griffith, Yam, and Subramaniam (2007) report declining importance of spatial proximity for investors in Silicon Valley.

While the debate on the relevance of spatial proximity between VC investor and investee remains inconclusive (Wray, 2012b), recent studies have analyzed the geographies of VC investments from a relational perspective. As financial intermediaries (Florida & Kenney, 1988; Gompers & Lerner, 1999) VC firms are per definition located between different corporate networks. Central to their ability to make successful investments under extremely risky circumstances is a high degree of embeddedness in flows of tacit knowledge (Zook, 2004). Thus, VC investing does imply a high degree relational work by relating to financiers, external partners, investees and other investment firms within syndicates (Wray, 2012b). The process of establishing close ties with their investees (hence 'relational coordination') is an important part of VC firms' business models for three reasons: First, VC investments require intensive knowledge exchange between investor and investee, since the investor needs to closely govern its high-risk investment to reduce asymmetric information (Jones & Search, 2009). Second, most VC firms aim to provide expertise as part of 'value-added services', which have gained relevance in newer forms of VC (Block et al., 2018). Third, some VC firms also have non-financial interests in knowledge exchange with their investees, such as corporate VCs, which invest strategically in fields related to their parent company (Maula, 2007).

While the importance of networks and relational engagement for VC investors has been pointed out multiple times (Babcock-Lumish, 2005; Hochberg, Ljungqvist, & Lu, 2010; Zook, 2004), few studies shed light on how different types of investors handle inter-organizational relations. The few exceptions so far show a far more nuanced picture of how relational geographies of VC unfold. In an empirical study on English VC firms, Wray (2012a) finds VC firms embedded in both regional and wider networks, using relational proximity to foster their investment prospects. Using data from German VC firms, Klagge and Peter (2012) show how VC firms relate to numerous partners throughout one deal, while the configurations of proximity and distance vary greatly while dealing with different partners. It was found that tight relations with partners such as lawyers require spatial proximity, relations with less important service providers were handled without requiring spatial proximity (ibid.). In a case study on private equity and VC firms in the UK, Jones and Search (2009) find private equity investors' control over their investees strongly influenced by the relational distance between investor and investee. For them, power relations are at the core of this relation and investors aim to foster various forms of proximity to influence their investees in the desired way. In conclusion, the existing literature suggests relational coordination to be very important for VC firms since they need to influence their investees.

As Wray (2012b) points out, research on the relational characteristics of the VC industry and its geographies has been rare so far. Further, even the few existing studies (c.f.

Babcock-Lumish, 2005; Jones & Search, 2009; Klagge & Peter, 2012; Wray, 2012a) rely on a simplified heuristic of VC investing as they hardly acknowledge the diversity of how VC firms act. This becomes increasingly problematic since recent years have seen a drastic diversification of entrepreneurial finance in general and also VC specifically (Block et al., 2018). The relevance of this ongoing diversification in entrepreneurial finance can also be sensed in the number of special issues being published on the topic in recent years (Block et al., 2018; Bruton, Khavul, Siegel, & Wright, 2015). Forms of VC investors that have emerged in the previous ten years, for example, include seed accelerators (Miller & Bound, 2011) or company builders (Scheuplein & Kahl, 2017). Further, different sorts of governmental VC funds have been implemented widely to address funding gaps (Cumming & Vismara, 2017). Considering these developments, it seems necessary to develop a more complex heuristic to analyze the relational geographies of VC firms. This study thus aims to address this gap by analyzing how different forms of VC are based on different ways of practicing relational coordination, in turn producing different geographies of VC investing.

3. Relational coordination: a framework to analyze venture capital business models

In a review on spatial research on VC, Wray (2012b) suggests complementing this literature with research on relational distances, instead of just reiterating questions on the physical distance between investee and investor. This study aims to follow this lead by empirically contrasting different ways in how VC firms relate to their investees. This is based on the observation that VC firms' can be distinguished by the way they coordinate relational distance as part of their business model. The term 'relational coordination' is henceforth used to summarize the governance of relational distance between VC firms' and their investees. Through contrasting different modes of relational coordination, this study aims to work towards an enhanced heuristic for studying the relational geographies of VC.

Relations between different organizations have become a central topic in economic geography (Bathelt & Glückler, 2003; Jones, 2013). A fiercely debated topic in this context is the configuration of relations through the multi-faceted dimensions of relational distance (Ibert, 2010). Relational distance can be used as a concept to understand 'the extent of cultural diversity in social relations' (Ibert & Müller, 2015, p. 182). It is based on the insight that while various dimensions of non-geographic proximity such as organizational, institutional, cognitive, cultural, social or technological proximity can be beneficial for the success of collaborations (Knoben & Oerlemans, 2006) also the absence of these proximities can be valuable, since the resulting tensions can spur innovation (Ibert, 2010). Since proximity and distance should not be understood as a simple dichotomy (Ibert & Müller, 2015; Rutten, 2016), both proximity and distance are here considered part of a multi-faceted framework of relational coordination, which firms use to facilitate dense social interaction.

3.1. Business models as comparative heuristic

To empirically implement a comparison of how VC firms handle relational coordination, this study contrasts those elements of VCBMs that are relevant for the relation between

investor and investee. Since the aim is to explicitly remain open to new forms of VC, an open and exploratory approach was chosen over a narrow case study design. Contrasting business models as an analytical perspective provides exactly this (Mason & Spring, 2011) since a focus on individual organizations brings the benefit of splitting up the black box, which an industry or field is for the outsider, while also promising a certain degree of exploratory openness. Despite being a relatively uncommon method in economic geography, a comparison of business models can be a useful method to understand relational geographies produced through corporate action (Baden-Fuller & Morgan, 2010; Burt, Johansson, & Dawson, 2016).

The value of using business models as a heuristic to understand companies' action is according to Baden-Fuller and Morgan (2010) in serving as carriers of generalization necessary to compare heterogeneous firms and contrast variation. Therefore, the business model is not only a promising conceptual tool to analyze individual firms or units (cf. Burt et al., 2016; Casadesus-Masanell & Ricart, 2010), but the ability to aggregate corporate logics and actions makes it especially suitable to recognize patterns within and between industries through classification (Baden-Fuller & Mangematin, 2013).

Therefore, attempts to classify business models within individual industries are far from new in the management literature. Lambert and Davidson (2013) even identify classifications of different business models as one of the core contributions the concept has brought so far. Especially the early use of the concept has been focused on understanding how new forms of revenue generation interlock within digital economies (Zott & Amit, 2010), while the concept has also been introduced to more traditional industries (cf. Pereira & Caetano, 2015; Sorescu, Frambach, Singh, Rangaswamy, & Bridges, 2011). These classifications usually use several different categories or design elements (Zott & Amit, 2010) to distinguish different types of business models within an industry or around a shared topic. In this study, a business model classification is used, which relies on business model design elements concerning VC firms' relational coordination and hence their outward relations. Recognizing its performative character (Doganova & Eyquem-Renault, 2009), the business model is used here not as a formal characteristic of a firm, but instead as purposeful formatting of firms, which determines corporate action. This implies an interdependence of VCBMs and how they structure their relational coordination. Having described why a comparison of business models was chosen as an empirical strategy for this study, the remainder of this section describes the empirical approach in detail.

3.2. Relational coordination in a reference venture capital business model

The reference VCBM presented in this section is based on an extensive review of academic literature on the topic. It represents the smallest common denominator not just of the firms in the sample used here, but of VC firms in general. As argued above, relational coordination is the key to VC operations and thus this description focuses on why, how and with whom VC firms relate. Common to all VC firms is that they act as financial intermediaries since they are actively redistributing flows of financial capital. In short, VC firms thus provide equity investments to young and fast-growing firms or 'startups'. Although they share certain characteristics, 'classic' VC investors should not be confused with merchant private equity investors in the buy-in or buy- out markets (Landström, 2007).

VCBMs can be distinguished, however, by investment goal, investment approach and investment target (Block et al., 2018). In a relational understanding, these points can be translated into why an investment relation is established, how it is maintained and with whom.

- **Investment goal** – The source of the invested capital determines if there are additional goals aside realizing profits through equity investments. Most VC firms are organized as VC limited partnerships (Cumming, Fleming, & Schwienbacher, 2007), in which general partners (individual investors) manage the capital provided by limited partners (financiers). VC firms typically raise the capital they invest beforehand, in contrast to merchant private equity investors, which usually finance large parts of their investments through debts (Clark, 2009). As only few VC firms are publicly listed, the most common stream of investments comes from private markets, where capital is raised through limited partnerships (LPs) with institutional investors such as insurances and pension funds (Berlin, 1998; Landström, 2007). Some VC firms attach their investments to additional goals. Corporate VC firms operate with diverse learning goals, reaching from general market monitoring to using investments as external R&D strategy (Maula, 2007). Investors of public VC funds have additional investment goals such as regional development or fostering specific industries (Da Rin, Nicodano, & Sembenelli, 2005).
- **Investment target** – The other capital market VC firms operate in, is that of redistributing their funds to emerging firms. By definition, all VC firms share the target of investments being young and fast-growing companies (Landström, 2007). Although there is high variation in industry, age, and size of the firms targeted, all VC investments can be considered high-risk investments, with a sizeable ratio of investment failing to return any profit. To contain the risk of investment, the target companies are examined carefully in a due diligence process, often involving third-party knowledge (Klagge & Peter, 2012). Financial returns are sought through 'exiting' investments i.e. the liquidation of company shares either through an initial offering on public capital markets (IPO) or through the acquisition of the portfolio startup through a third party. In most market segments, private acquisitions dominate, but IPOs tend to yield higher returns (Gompers & Lerner, 1999) with prominent VC backed companies such as Facebook or Spotify posing the possibility of incredible yields for early investors.
- **Investment approach** – VC investors keep their share in portfolio startups for a relatively long time (typically between five and ten years), especially compared to the fast pace of trading on public markets. During this time, investors and investees are tightly connected for two reasons. Control is exerted on portfolio startups through the voting rights acquired with the companies' equity (Lerner, 1995). Jones and Search (2009) show power relations to be a substantial part of equity investments, while the nature of power relations certainly varies with the stages of company growth. Aside from influencing the development of investees through influencing the decisions of the board, VC investors try to aide corporate growth and therefore minimize their risk by exerting operational assistance to their portfolio startups. Often dubbed as 'value adding' (De Clercq & Manigart, 2007) or 'smart investing' (Sørensen, 2007; Sørheim, 2012), previous research has put special emphasis on benefits of investor's reputation (De Clercq & Manigart, 2007), their ability to draw on extensive networks (Hochberg

et al., 2010) as well as tacit knowledge transferred between investors and investees (Zook, 2005). Composition and degree of 'hands-on investing' vary greatly within the sample and determine the biggest differences between distinct VCBMs.

Albeit all companies in the sample share these three parts of VCBMs to a certain degree, there is also significant variation visible.

4. Research design

The data collection followed the reference VCBM described in the previous section, which is the smallest common denominator of all VC firms analyzed empirically, which then are contrasted in which points they deviate from the model. This follows Weber's (1922) understanding of 'reference types' as being useful to contrast specific social phenomena so that the gain of knowledge is achieved through being able to differentiate between empirical observations and heuristically used reference types. All deviating design elements of VCBMs identified here can be subsumed in one of the three domains specified in the previous section.

4.1. Sampling

This study is based on a sample of VC firms in Germany. The case of the German VC industry was chosen for several reasons. On the one hand, the spatial structure of VC in Germany is rather decentral (Klagge & Martin, 2005), while on the other hand, Berlin, Munich and to a lesser extent Hamburg and Cologne are among the pre-dominant hubs for VC activity in Europe (Kraemer-Eis, Signore, & Prencipe, 2016). Further, the German VC industry has changed significantly in recent years, both in terms of size (only about one-third of the firms in the sample were older than ten years in 2015) and in terms of geography, as more VC activity has focused on Berlin recently (Scheuplein & Kahl, 2017).

The sample was drawn by gathering all sorts of private equity investors from both membership data of industry associations and lists published in industry journals and reports in late 2015 (344). From this, those investors focusing on private equity or merchant VC as well as a small number of firms, on which not enough data could be gathered (see Table 1). Further, banks and informal or angle investors were excluded. All resulting $n = 178$ individual firms thus fit the reference VCBM and are headquartered in Germany. It was aimed to capture the German VC industry as completely as possible.

In a second step, a unique dataset on VCBM design elements on all firms in the sample was collected by hand: First, alternative goals of investment were considered. While a return on investment as the goal of investment was assumed in each case, in some cases, further goals are involved, as with corporate investors.

Table 1. Sample size and composition.

	n
Private equity investors found	344
Of which: Only VC investments	202
Of which: Sufficient information	195

4.2. Data collection

Second, all current and former portfolio startups as targets of investment were evaluated for each VC firm. By considering data from the German company registry and the industry database Crunchbase and VC firms' and portfolio startups' websites, data on firm demographics and industry was collected. In total, the data set included $i = 3759$ investment relations with $p = 2846$ portfolio startups, scattered over a huge variety of industries and locations. Third, design elements describing the approach of investing were collected by screening the companies' own websites and some additional sources where possible. The latter included slides or videos of presentations, journalistic reports concerning, blog entries and official data from company filings and registers. The procedure used to collect qualitative data on VCBM design elements was that of an iterative heuristic. Every additional VCBM design element had to be a deviation from the 'norm' in form of the reference VCBM delineated in the following section. For those added to the dataset, an entry including a brief description was added to a codebook. While being less efficient than checking boxes in a pre-defined survey, this approach brought the advantage of starting with a blank sheet, adding sensibility to novel or less eye-catching characteristics and therefore catering to an exploratory approach. The final data set includes twenty binary variables on VCBM design elements, of which four describe goals, seven targets and nine approaches to investments (Table 2).

4.3. Data analysis

In a final step of the analysis, the dataset of $n = 195$ companies X $m = 20$ design elements was analyzed further. Instead of classifying individual companies, the aim of further analysis was to identify patterns in the dataset on VCBM design elements. For this, a correlation

Table 2. VCBM design elements that have been collected as variables for further analysis

VCBM design elements	Criteria	*m*
Goal		
Corporate investor	Owned or funded by corporation	37
Development fund	State- owned or sponsored with regional development goal	24
Charitable goals stated	Social or environmental goals stated	3
Thesis or mission statement	Conceptional foundation for investments	57
Target		
Mostly early stage	85% or more pre-seed/ seed rounds	69
Mostly growth stage	85% or more scale-up rounds	16
Mostly business model based	85% or more of portfolio are startups with digital business models	84
Mostly patent based	85% or more of portfolio are startups based on patents	40
Mostly international	85% or more of portfolio outside of Germany	33
Mostly regional	85% or more of portfolio in one region	59
Mostly spinoffs	85% or more of portfolio are university/ research institute spinoffs	24
Own entrepreneurial initiative	Portfolio companies are established in-house	17
Approach		
Several offices	More than one office	35
Mentorship programme	External mentorship provided	17
Staff provided temporarily	VC provides staff for investee	15
Office space provided	Office space provided for portfolio companies	38
Temporal relocation of cohort	Portfolio companies relocate there temporarily	13
Permanent relocation	Portfolio companies reside there permanently	24
Media presence invested	Advertising space as part of investment	4
Organizes events	Pitch events or demo days	18

analysis was performed by calculating the mean square contingency coefficient or phi coefficient (r_φ) for each combination of the fifteen VCBM design elements. The phi coefficient is the method of choice since all variables are binary (the design element is part of a VC firm's business model or not). This method is similar to the Pearson correlation coefficient, as r_φ ranges from −1 (full incongruence) to +1 (full congruence). Although the resulting matrix is mostly sparse and several variables do not yield any correlations, some clear patterns emerge and will be described in the following section.

5. Results: variations in venture capital business models

Figure 1 The results of the correlation analysis described in the previous section imply possible several variations of VC business models in the sample. This section will describe the differences between the nine classes of VC business models identified here, while the following section will pick up the case of relational coordination again. The differences discussed here are based on empirically evident differences of relational coordination found between VC firms in the sample. Instead of creating a set of 'boxes' each individual VC firm can be placed in, it is meant to be an enhanced heuristic to conceptualize VC and to better understand its geographies. Each of the seven patterns identified here represents

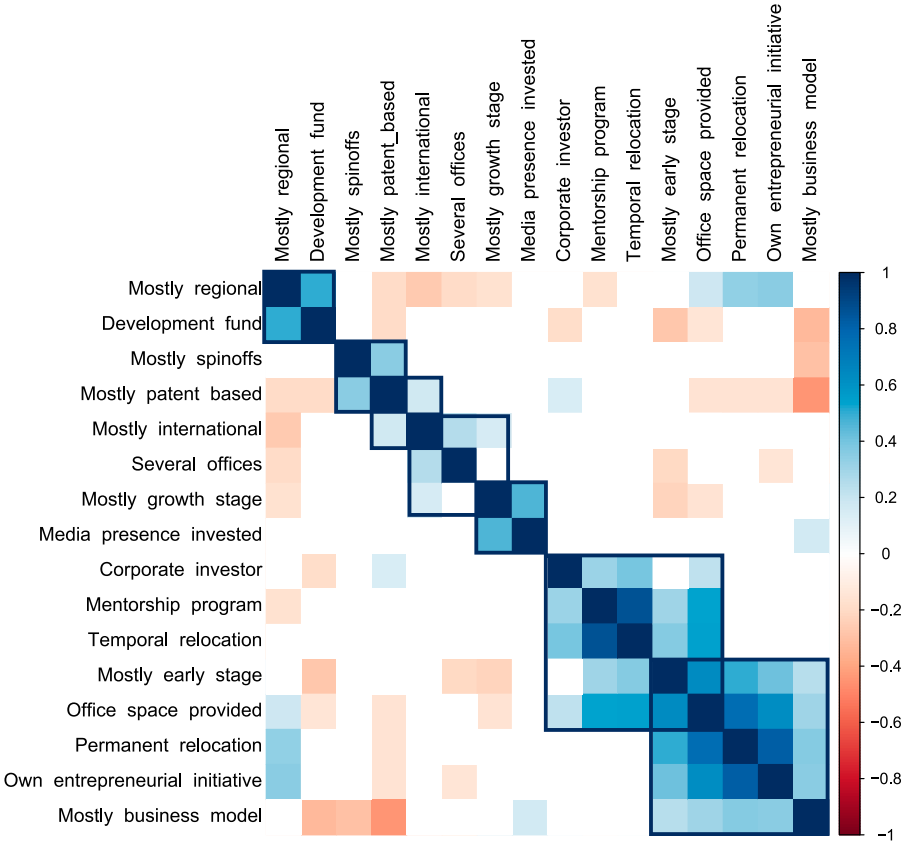

Figure 1. Results of a correlation analysis using a phi correlation. *r*? Ranges from −1 (full incongruence) to +1 (full congruence). Those variables with no significant *r*? Were left out.

an abstract generalization of groups identified through a sorting algorithm (see Figure 2). While all ($n = 195$) firms in the sample feature the reference VCBM described in the previous section, many deviate from the reference model, albeit in different ways. On the other side, however, many VC firms do not deviate much from the reference business model (see Figure 3).

5.1. Incubation: seed accelerators and company builders

The main divide separating two different models of VC is that between business models based on different forms of '**incubation**' and those that do not so. The difference concerns the practices of interaction between investor and investee after the investment decision has been made. Firms practicing 'incubation' rely on very close spatial proximity to their investees, often the latter are required to be located even in the same building. Hence, this group of VC firms includes (corporate) accelerators, incubators, company builders and operational VCs. The differences between those concepts are gradual and not clear in each individual case, however, all have in common that value adding is accompanied with direct influence on the portfolio startups' development. The degree of influence attempted on investees, with the goal of controlling the development of incubated portfolio startups according to established 'recipes' connects both 'incubation' business models.

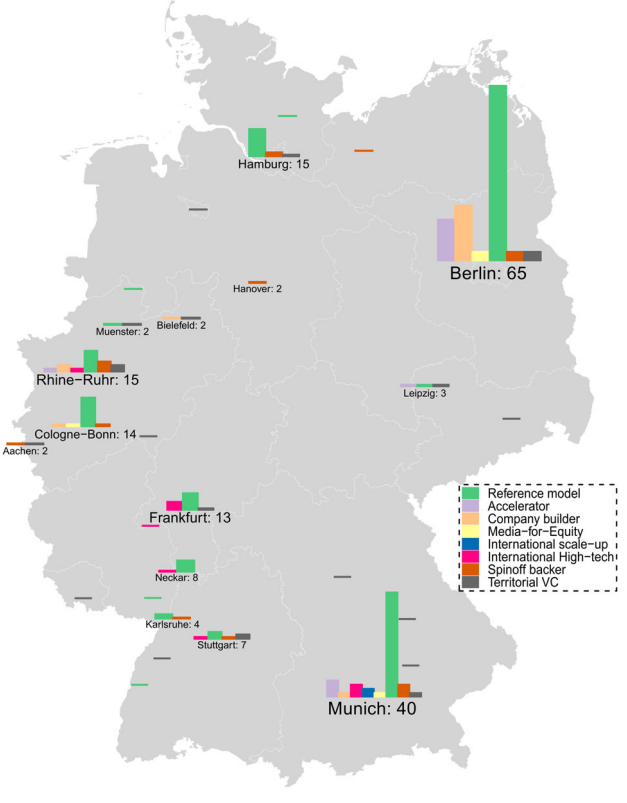

Figure 2. Distribution of different VCBMs in German metropolitan regions. Types are colour-coded and cities with just one firm in the sample are not labelled.

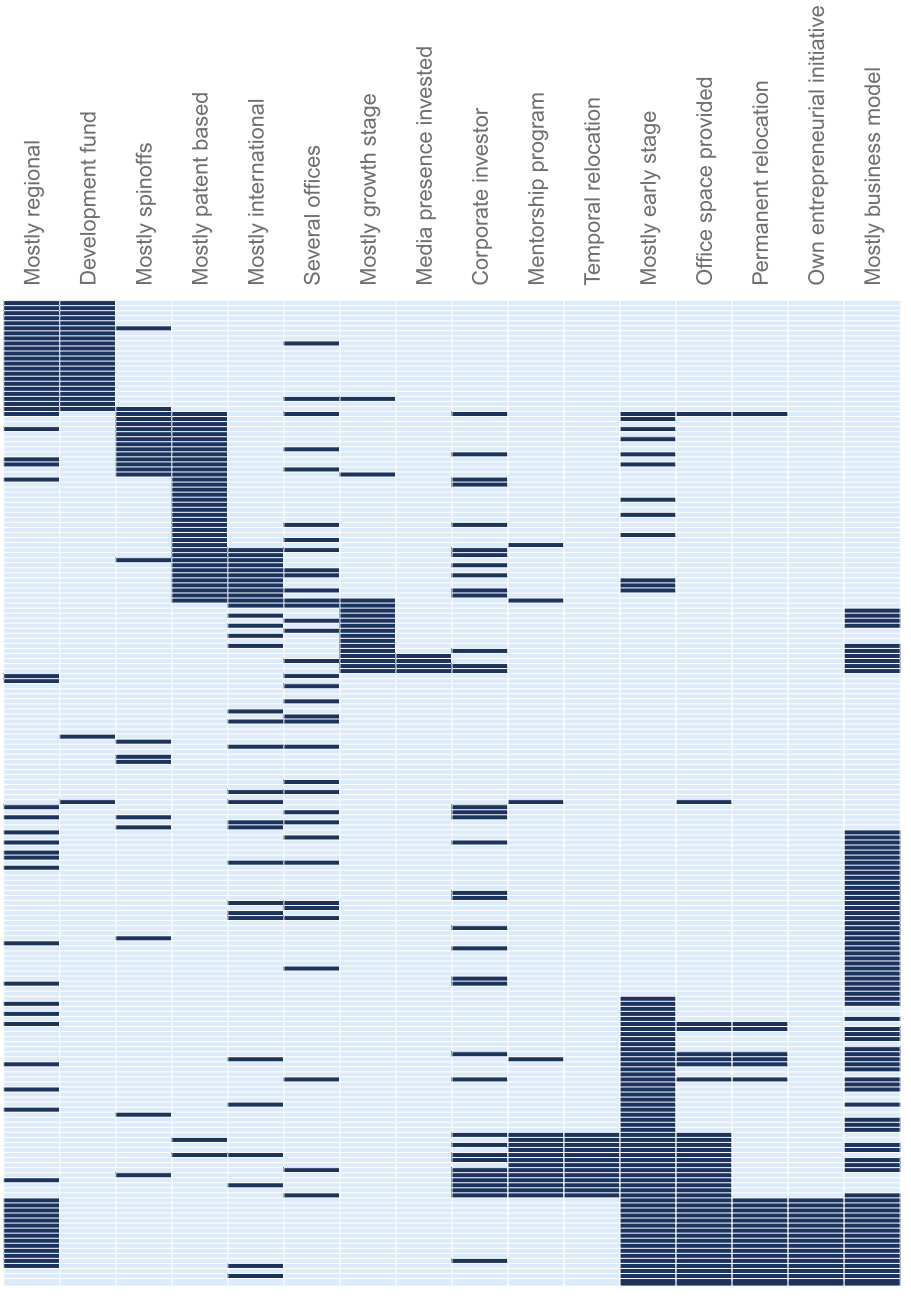

Figure 3. Design elements with significant correlation values. Each row is a unique VC firm and each column represents one VCBM design element. The pattern resembles the correlation heatmap in Figure 1, but also shows the incidence of each design element.

These 'recipes' include standardized methods of interacting with investees, often to several portfolio startups at the same time. Business models following this mode have invoked the notion of 'startup factories' (Miller & Bound, 2011). With (corporate) seed accelerators and company builders, two patterns emerged rather clearly out of the correlation analysis.

While long-known incubators are ancestors of these models (Miller & Bound, 2011) few of the VC firms in the sample can be described as incubators in a narrow sense.

Seed accelerators rely on temporal co-presence by offering three to six months programmes as part of their investment, during which batches of investees relocates simultaneously. During the programme, value adding is provided through close mentoring and access to industry partner networks. After tight interaction during this period at the site of the seed accelerator, where the investees' teams share offices and undergo intensive training and mentorship sessions, the seed accelerator only relates to the company as a regular shareholder and the investees relocate back to their initial locations. Seed accelerators are a very dynamic field with rapid dispersion (Brown, Mawson, Lee, & Peterson, 2019) and various subtypes have been identified (Pauwels, Clarysse, Wright, & Van Hove, 2016). Most (10 out of 13 in the sample) seed accelerators are financed by corporate partners and thus are a special case of corporate VC. Arguably, the close cooperation between mentors (often from corporate partners) and investees during the programme can serve open innovation interests quite well.

In contrast, the interaction between **company builders** (alternative terms for this models include 'operational VCs' or startup studios) and their investees is not limited to such fixed timeframes. Instead, they are founded within the organizational environment of the VC firm (company builder) or founded elsewhere and 'absorbed' as early-stage startups (operational VC) and then in each case nourished for a long time in-house. Value adding then includes transferring specialized staff and business knowledge to their investees, according to the needs at the present stage of the investees' development. While other VC firms get their deal flow via screening large numbers of applicants, company builders internalize even the most original entrepreneurial act and actively combine internally developed business concepts with hired talent, thus internalizing all phases of organizational development the investee goes through. In most cases, external VC investments are used to facilitate the growth of the investees after reaching a certain stage, however. The role of portfolio startups in this setting is thus less one of 'investee' but one of 'subsidiary' being actively developed to be sold after a long period of engagement (Scheuplein & Kahl, 2017). Through focusing on specific digital industries and growth patterns, the investments are similar in their organizational trajectory and can be scaled quickly.

5.2. Growth-focused VC: media-for-equity and international scale-up VC

The important role of VC investments for growing firms in the context of the rise of the digital economy has already gained scholarly attention (Langley & Leyshon, 2016; Zook, 2005). While large VC investment rounds have been crucial to financing the rapid growth of new behemoths in digital markets like Facebook or Airbnb, the success of these investments has brought unprecedented growth for the VC industry itself. Hence, there is a small but relatively coherent group of VCs, which primarily invest in mature but still fast-growing companies in digital industries. Two types of 'growth-focused' VCBMs feature in the results of the correlation analysis: 'media-for-equity investors' and 'global scaling VC'.

Media-for-Equity is a very specialized niche of VC investing. The few (four in the sample) VC firms practicing media-for-equity investments, do not only invest financial

capital but provide their investees with advertising space for TV adds or even outdoor advertising to quickly grow their customer base. This approach is only suitable for startups with business-to-consumer business models during their growth phase. Those VC firms practicing it are often related to corporates from the media industries, although a correlation to CVC did not prove significant in the analysis, due to the small number of media-for-equity firms.

International scale-up VCs are less specialized both in terms of industry and geographic focus. They invest larger sums in later financing rounds and only handle startups with already grown organizational characteristics. Their portfolios include investments in several regions or even continents and they are larger organizations with several offices themselves. These firms are the enablers of the rapid scaling of startups with digital business models on a global scale. Further, these VC firms are among the largest in terms of balance sheets in the sample, as growth investments are significantly larger than early stage investments.

5.3. Patent-based VC: spinoff backers and international high-tech investors

Most VC firms specialize broadly in a certain field or industry. In the sample, VC firms focusing on digital industries and business model innovations ($n = 84$) dominate clearly over those focusing on patent-based innovations (40), such as in life sciences, software, electronics. However, two types of patent-based VCBMs, who somewhat represent the traditional way of VC investing, could be identified in the sample.

Global High-tech VCs rely on a rather narrow industry specialization such as 'electricity generation' or 'nanotechnology'. This narrow industry focus is coupled with less geographical constraints so that the investments are often scattered globally. This category also includes a number of corporate VC investors, especially from the pharmaceutical industry. By narrowly investing in industry segments relevant to their respective parent, they keep in touch with promising new drugs developed by startups. If the drug or technology has proved its potential or steered around major hurdles on the complex approval procedures, the startup is often fully acquired by the corporate (Livi & Jeannerat, 2015). The strong focus on specific industries goes along with no geographic investment preferences so that most portfolios of VC firms following this business model are scattered globally over regions relevant for their respective industry.

Spin-off VCs typically invest in early-stage startups, which have emerged as spin-offs from universities or research institutes. While this group is somewhat heterogeneous, they all repeatedly invested in spinoffs, often stemming from the same universities or institutes. Besides a few technical universities and some large corporations, especially the German extra-university research institutes such as from the Fraunhofer Society or Leibniz Association feature prominently often as the origin of their investees. Few of these companies follow a regional investment strategy, but rather specify on a field or industry or are somewhat affiliated with one or several of the institutions mentioned above.

5.4. Territorial VC

Territorial VCs do not distinguish themselves by target industry or investment stage, but rather by investment geography. While several of the other types heavily rely on local

investments, these firms are constrained to invest within a certain territory. They are usually either purely governmentally funded or public-private-partnerships with most of the capital in the fund being public. Thus, they act with a clear political aim of regional development and innovation policy, mostly avoiding close industry constraints. Many governmentally funded VC funds invest to counter regional equity gaps (Klagge & Martin, 2005), but some follow other strategic goals, however, such as promoting specific technologies, spin-offs (see above).

6. Different aspects of relational coordination in venture capital business models

In the results presented above, VC firms have been grouped by considering those aspects of their business models, which concern relational ties. It clearly emerged that there are significant differences in VC firms' investment goals, investment targets and investment approaches. This section discusses the findings on these three dimensions of relational coordination from a relational distance perspective.

6.1. Investment goals – intentions of relational coordination

As pointed out in section three, from a relational perspective, the investment goals determine the reason of establishing investment ties. While as investors, all VC firms always intend to gain financial profits out of their investments, some VC investors pursue further goals that imply high degrees of relational proximity. This applies especially to corporate VC firms, which have been found to aim for external knowledge gains (Maula, 2007). Therefore, corporate VC firms act as a specific type of innovation intermediaries (Howells, 2006), whose specific goals, however, depend strongly on their corporate context. In all cases, certain embeddedness both in their corporate parent company and in their startup field of interest is necessary. The former is achieved through organizational proximity (as membership in a joint organization, Balland, 2012), with many corporate VCs either being a direct subsidiary or even a department of their parent company. Further, the individual partners often have long-time careers in the company. To achieve relational proximity with startups that is necessary to realize knowledge gains, several strategies have been identified in the sample. Some corporate VCs operate several offices in different regions considered interesting for their respective field and thus rely on spatial proximity. Many partners in corporate VC units have academic credentials and experience in their field and are thus able to cognitively relate to their peers in startups. In the case of corporate seed accelerators, mentors are drawn from corporate partners, who then relate very closely with their mentees and thus develop social proximity (mutual trust and knowledge, Balland, 2012).

6.2. Investment targets – agenda of relational coordination

Most if not all VC firms utilize a certain degree of cognitive proximity (a shared knowledge base) by focusing on investments in familiar knowledge bases (Balland, Boschma, & Frenken, 2015). However, significant differences in how cognitive proximity is constructed

have been observed, which imply a rather strict divide between investors in startups built on digital business model innovations compared to startups built on patent-based innovations. On the one hand, the general partners in the former category often have recent entrepreneurial backgrounds themselves, and thus have first-hand knowledge with the process of building and scaling digital startups. On the other hand, VC firms investing in fields like life science or electronics rather rely on general partners with scientific degrees and long experience in their respective industry.

A new and radically different approach to investment target choice is that practiced by 'company builder' VC firms. Here, the entrepreneurial initiative is started by the investor itself and an 'entrepreneurial team' subsequently hired, while the VC remains the dominant shareholder (Scheuplein & Kahl, 2017). This approach implies a high degree of organizational proximity, which is retained to nurture the portfolio startups with hands-on support until they reach a certain size. This allows both for easy transfers of knowledge and for control over all strategic and operational aspects of the startup. Some VC firms apply this model to quickly establish and grow firms with digital business models in multiple national markets at the same time. Since they both already have in-house experience with such global scaling operations from previous ventures and tight control over their portfolio startups, they can implement such complex organizational development relatively quickly to gain advantages in winner-takes-most markets such as food delivery apps.

While surprisingly few VC firms in the sample invest only in one region, most investments are done nationally and only few investors do international investments on a larger scale, and even for those, virtually all invest in the global North. This points to a high relevance of basic institutional proximity (shared norms, regulations and values). The importance of institutional proximity has already been highlighted in previous research (Tykvova & Schertler, 2014). The importance of institutional proximity exceeding the basic levels of nationally shared norms and regulation can be assumed for 'spinoff developers', as these VC firms mostly interact with startups started by former scientists.

6.3. Investment approaches – the procedure of relational coordination

Different approaches to how value is added once an investment decision is made can be separated especially by intensity and temporality of interactions. While post-investment interaction represents a major part of most general partners' workload (up to 60% of their time according to Landström, 2007), there are differences in how these relations develop over time between different VCBMs. It can be assumed, that in more traditional investment relationships, especially social and cognitive proximity increase over time in a co-evolutionary logic (Balland et al., 2015), as investor and investee collaborate and learn from each other. Newer types of VCBMs can have different dynamics, however. So are seed accelerators based on very intense but temporal interactions right at the beginning of the investment relation. Over the course of a programme of three to six months, the investor and several investees collaborate very closely and share temporary spatial proximity. During this period of intense collaboration, social and cognitive proximity increase rapidly. After the programme, the degree of interaction immediately decreases. On the other hand, seed accelerator programmes are also an example, in which relational distance is leveraged to create knowledge and thus is a beneficial asset (Ibert & Müller, 2015).

Further, 'company builders' interact intensively during the early stages of their portfolio startups by relying on tight organizational, cognitive and spatial proximity. As their portfolio startups grow and mature, the intensity of the interactions is gradually reduced. The cognitive proximity declines, as the portfolio startup builds its own specific knowledge base and after a successful growth period it also needs its own office space, thereby reducing spatial proximity. Curiously, most company builders are in Berlin (see Figure 3). Since Berlin has developed into the predominating centre of startup activity in Germany in recent years (Acs, Stam, Audretsch, & O'Connor, 2017; Scheuplein & Kahl, 2017), this suggests that social and institutional embeddedness within an 'entrepreneurial region' (Saxenian, 1994) is a relevant asset for these complex operations.

The significant variations of how relational coordination affects all three dimensions of VCBMs imply a more complex understanding of how the geographies of VC investing emerge. The following section follows up with this by projecting the implications of these findings to different aspects of the geographies of the VC industry.

7. Conclusions: relational coordination and the geographies of VC investing

To summarize the implications of the findings presented in the previous section, this section applies the findings presented above to explain three different facets of the geography of the VC industries: office geographies of VC firms, spatial patterns of portfolio firms and entrepreneurial ecosystems.

First, several aspects of office geographies of VC firms can be explained by different considering different dimensions of relational coordination. Corporate VCs are an interesting example in this regard, as most of those, who invest in patent-based industries, are located at the site of their parents' headquarters, while corporate seed accelerators are mostly located in startup agglomerations. While for the former the relevance of organizational proximity to their corporate parent outweighs, the specific business model of accelerators affords a location in a different region. Interestingly, most of the different types of business models have their own geography of office locations (see Figure 3). While territorial VCs are rather evenly spread, although often located in administrative centres. Other types follow geographies of industrial agglomeration: Spinoff backers can be found in regions with high research outputs, while international high-tech investors are located in or close to industrial clusters in southern and western Germany and media-for-equity investors are located in media clusters like Berlin, Munich or Cologne. The highest regional concentrations of VC firms are in and around Berlin and Munich, but while Berlin as a relatively new startup cluster features many 'new' types of VC firms, such as company builders and seed accelerators; Munich also hosts larger and more internationally focused growth funds.

Second, the results indicate that spatial distance between VC firms and portfolio startups does matter but can be mediated in different ways. While a mediation of spatial distance through syndication has been found in previous research (Fritsch & Schilder, 2008), two VCBMs in the sample indicate further strategies to mediated spatial distance. The portfolios of international high-tech investors are scattered around the globe. However, they invest in very narrow fields of specialization and thus can mediate spatial distance through cognitive proximity. Further, the startups participating in seed accelerator

programmes relocate from different regions, to which they return after the programme. While the VC running the programme is still an investor, the intense collaboration during the temporary proximity is sufficient to mediate spatial distance afterward.

Third, the notion of 'regional entrepreneurial ecosystems' (Malecki, 2018; Stam, 2015) implies studying entrepreneurship as a local or regional phenomenon. However, only a fraction of the VC firms in the sample invests exclusively on a regional base. This has implications not only conceptional in that entrepreneurial ecosystems do not stop at regional borders when it comes to funding, but also for real or perceived regional equity gaps. By acknowledging the possibility of out-of-region funding, one strategy to overcome regional equity gaps could be to enhance relational proximity with investors from other regions. In other words: building up relational proximity to potential investors might be a strategy to overcome lacking geographical proximity to investors. Further, seed accelerators with their model of tempo-spatial proximity add a new mechanism to overcome regional equity gaps, since temporary relocation to an accelerator programme in another region can be used to build up connections there.

This study demonstrated how the business models of VC firms differ in how relational coordination is handled in terms of investment goals, investment targets and investment approaches. As the three examples presented in the previous section show, the geographies of VC investing are products of complex relational processes, which in turn are shaped by different VCBMs. The heterogeneity of business models, which has been detected by empirically analyzing the German VC industry, defies simplistic generalizations about VC firms. Especially in the context of ongoing changes in VC (Block et al., 2018), a multi-dimensional heuristic of VCBMs is necessary to explain the geographies of VC, as only a perspective on relational coordination reveals the full differences of how geographies of VC investing are produced. However, this approach is not meant to be a stable classification of VC business models. Instead it provides a relatively open heuristic to explore the geographies of VC from a relational perspective. If applied in other regions with different institutional contexts, surely other forms of VCBMs will be found.

Different types of VC firms should be considered as 'fits' for different niches within entrepreneurial ecosystems, which might even imply further specialization. However, the geographies of investments of different types of VC firms are not necessarily regional but instead can range from very local to global. Further research, therefore, should not only focus on how different types of VC firms relate with other stakeholders, but also how they fit into the framework of regional economies. Also, new forms of entrepreneurial finance such as ICOs need to be included in the picture.

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