WHO YOU ARE AND WHO YOU KNOW - A CONFIGURATIONAL ANALYSIS OF THE PERFORMANCE EFFECTS OF VENTURE CAPITAL FIRMS’ CHARACTERISTICS AND NETWORK RESOURCES

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Venture capital (VC) firms not only provide capital to start-ups, but also affect their performance through the careful selection of the target firms and also by monitoring, coaching and providing connections (Gompers and Lerner, 2001). The magnitude of these effects is largely dependent on the social capital available from the VC firms. Consequently, the start-ups’ performance, and hence the VC firm’s performance, can benefit from the sources of social capital, in particular the structural and relational aspects related to the investment deal (Alexy et al., 2012).

Syndication, where more than one VC firm invests in a start-up in the same financing round naturally increases the competencies available for selecting and supporting the target firms, especially when partners contribute different competences or connections. However, cooperating with other VC firms might also introduce agency conflict. Hence, there are relatively few indications of whether syndication alone or its composition can explain why some start-ups out-perform others (Wright and Lockett, 2003; Tykvová and Walz, 2007; Alexy et al., 2012). Scholars have shown that a VC firm’s network resources accrued as a result of past syndication initiatives are clearly beneficial to the deal performance. The track record of a VC firm is captured in its status and the strength of its ties to other VC firms. Those relational characteristics can be associated with power, access to information and reduced agency costs. This may result in stronger screening and value-adding effects (Hochberg, Ljungqvist and Lu, 2007). Furthermore, the value-adding effect is also improved by the links VC firms establish within the syndication network after engaging with a start-up. Despite this interrelation, there are few studies available examining the network resources established after the deal, which is why we place a special emphasis on them in the present study.
However, the characteristics related to the deal and to the VC firm are part of the same phenomenon of VC firms investing in start-ups. Therefore, scrutinizing the effect of single attributes on performance is hardly promising. Instead, the structural and relational aspects of the phenomenon represent subsets of the same set and must be addressed by means that allow for the interdependence of the characteristics. Our study strives to tie up these lose ends by focusing on the attributes of VC firms, the constellation of VC firm types involved in a syndicate (diversity), and their network position prior to, and especially following investment (as determined by status/strength of ties). Specifically, we ask which configurations of structural and relational aspects of an investment deal enhance the potential for success of that deal. To explore the pattern of successful VC deals, we utilize a combination of Social Network Analysis (SNA) and fuzzy-set Qualitative Comparative Analysis (fsQCA) (Ragin, 2008). FsQCA is especially suitable as it rests upon the notion that an outcome can be explained by set-theoretic relations. Thus, to identify whether a case displaying a specific combination of conditions is part of the set that explains the outcome, qualitative reasoning and quantitative techniques are applied. Furthermore, the method acts on the assumption of equifinality, that is, that high performance can be explained by a number of solutions depending on the context, rather than searching for a blueprint for success. We base our analysis on a longitudinal dataset of 333 German VC-backed deals in 2006 and 2007. The performance, evaluated from the VC firm’s perspective, is then observed in 2013.

In fact, we find four different paths to explain high performance, each necessitating the presence of syndication. The ways in which the heterogeneity of VC firm types influences performance are highly context dependent. Three out of four configurations require the involvement of established VC firms, yet one describes a path to high performance without the input of an established VC firm. Our results also emphasize the relevance of studying the position of VC firms within the syndication network both before and after the investment, since that makes it possible to assess the relevance of status and strength of ties in the two periods affecting performance.

**Theoretical Foundations**

**The Impact of Social Capital on Performance**

Since in start-ups, especially in the early phase resources are naturally scarce, actors such as investors being able to provide resources to start-up can assume a fundamentally important role in the shaping and development (Alexy et al., 2012). The returns VC firms receive for providing the urgently needed growth capital, albeit the risk of total financial loss, depend on the performance of the start-ups (Podolny, 2001). Beyond providing the start-ups with financial capital, VC firms have an impact on the target firms prior to the investment by identifying and choosing promising targets for investment, this is referred to as the selection or screening effect. Furthermore, VC firms also nurture start-ups following investment by monitoring, coaching, and providing contacts for the venture, which is termed the value-add or post-investment effect (Gompers and Lerner, 2001). There are different aspects concerning the deal, which influence the magnitude of the selection and value-add effects, and ultimately the performance. We differentiate between structural and relational aspects of social capital associated with an investment deal. The former embraces the characteristics linked to the deal itself, whereas the latter covers the status and strength of ties of the VC firms involved. Thereby, we respond to the call for research by Ma, Rhee and Yang (2013), who emphasize the potential of studying the interactions between investors when attempting to explain performance.
Structural Aspects of Venture Capitalists’ Social Capital

The practice of VC firms joining forces to invest in start-ups is referred to as syndication and is now a structural aspect of investment deals that is common practice within the VC industry. Apart from sharing risks, VC firms also join forces to exchange formal and informal information (Bygrave, 1987; Wright and Lockett, 2003). Syndicates influence performance in two ways, firstly the screening effect will be improved as there is more than one VC firm scrutinizing the market for new investment opportunities and assessing the identified targets (Lerner, 1994). In addition, syndicates of VC firms can access an enhanced bundle of experience and expertise to support the target firms post investment. However, there is little empirical evidence of whether syndication alone is sufficient to explain better performing start-ups. Syndication could equally be a sign of VC firms uniting to address a target firm’s large financial capital needs or to hedge risk. Moreover, as with any form of cooperation, syndicates create costs, associated with management or agency risks, which might lead non-syndicated deals to be more successful (Wright and Lockett, 2003).

Other than benefits from having more than one perspective on the investment, also the composition of syndicates, has an effect on performance. Hopp (2010) has provided empirical evidence, that it is in fact the VC firm’s characteristics that primarily influence partner selection, and thus the composition of a syndicate. Each VC firm displays individual characteristics. The demarcation of VC firm types links ownership characteristics with the motives of the firms, which is closely connected to how much and what kind of effort they put into pre- and post-investment activities. First, there are independent VC firms, raising their capital from other investors and aiming to maximize returns from their investments (Rosenbusch, Brinckmann and Müller, 2013). Secondly, there are Corporate Venture Capital (CVC) firms, who are to a large extent owned by established corporations. Besides increasing returns from the deal, they might also invest with the aim of generating strategic benefits, such as creating synergies or acquiring new technology. CVC firms might also be able to provide more industry-specific knowledge and expertise than independent VC firms (Dushnitsky and Lennox, 2006). Thirdly, there are public or quasi-public VC firms, who are affiliated to the government and might have motives other than maximizing profits, such as regional development. Following Hopp (2010), we also treat VC firms held by a German public banking association (so-called Landesbanken) as public. As Leleux and Surlement (2003) also see an indirect public association of bank-based VC firms, we place bank-based VC firms into this category. The inconsistent evidence on the effect of the type of VC firm on performance, has resulted in numerous calls for research on VC firm types (Tyková and Walz, 2007; Croce, Marti and Murtinu, 2013; Rosenbusch et al., 2013). Moreover, the theory offers two lines of argumentation possibly explaining the ambiguity. On the one hand, differing motives, governance structures, and expertise can combine to enrich the social capital available to start-ups (Alexy et al., 2012). Contrarily, those dissimilarities might also be a source of agency conflict, and so give rise to costs for the syndication partners. According to several studies VC firms with like attributes tend to join forces to avoid this potential conflict (Wright and Lockett, 2003). In conclusion, diversity might either positively or negatively influence the screening and value-add effect.

Structural aspects also deal with whether established VC firms are involved in the deal. More established VC firms, those that have been in the business for quite some time and have gone through the entire fund life cycle, are expected to positively influence the screening and value-add effect. Furthermore, if more established VC firms participate in a deal, it sends out a signal to other investors and to business partners of the start-up, which reduces uncertainty when engaging with
the still new start-up (Ozmel, Reuer and Gulati, 2012). Contrarily, ever since the seminal work by Gompers (1996) that empirically shows that younger VC firms might “grandstand” more established ones, a deal not involving mature VC firms might be at least as successful. That might be explained by the liability of newness that can afflict even VC firms. A firm that is not yet established needs to build a reputation, and to do so it may be less risk averse. The reward for a successful gamble could be a great exit, which would send out a positive signal to the field (Gompers, 1996). This is in line with the study by Shepherd, Zacharakis and Baron (2003) who found evidence indicating that more experience does not necessarily equate with greater success, because beyond a certain threshold, a VC firm’s experience may even hamper the performance of the firms it invests in.

**Relational Aspects of Venture Capitalists’ Social Capital**

Syndication confers social capital benefits merely from the pooling of knowledge of more than one VC firm, but the benefits from social capital can be even larger if the VC firms have conducted syndicated deals in the past. The traces of previous co-investments, in terms of links between VC firms, are understood to be forming a syndication network of VC firms and to capture the relational aspects of social capital (Sorenson and Stuart, 2001).

One relational characteristic refers to the status of a VC firm within the network of VC firms. Podolny (2001) underlines the paramount role and value of status especially in a setting marked by uncertainty, which is especially true for early stage financing in the VC market. The status of a VC firm is relevant to performance in three ways. First, because it is associated with an extensive social network, access to information, tacit knowledge and higher quality that can improve both the screening and the value-add effect. Accordingly, Hochberg et al. (2007) have found VC firms with a greater number of varying dyadic ties in the network to perform better. Secondly, the status of a VC firm sends a signal to stakeholders, such as suppliers or customers involved with the start-up, that serves to reduce uncertainty and hence can contribute to improved performance (Podolny, 2001; Ozmel et al., 2012). Washington and Zajac therefore conclude that “status is [...] naturally connected to privilege” (2005: 294). VC firms with a high status appear more attractive to other VC firms as potential partners and to start-ups. However, apart from the resource and signalling effect, status can also act as a mechanism to create social order. In syndicated deals, the participation of high status partners can then also become a disadvantage, when those partners are dominating decision making and not making full use of the potential of lower-status partners (Ma et al. 2013).

Also the nature of VC firms’ connections is a relevant aspect of social capital. Frequently conducting joint investments with the same VC firm builds up strong ties, and in established relations, information will be more willingly shared (Bygrave, 1987). Strong ties also reduce the costs associated with management and agency risks. The lower costs occasioned when forming syndicates with known partners, should increase the performance, especially since some aspects of the cooperation between syndicate partners are apparently based on informal agreements rather than contractual terms (Wright and Lockett, 2003). Accordingly, Ma et al. (2013) provide empirical evidence for familiarity, which is based on repeated syndications between VC firms, having a positive impact on the effectiveness of VC syndication. While information coming from strong ties might be more trustworthy and even more specific, it is likely to be less novel than information sourced from more distant contacts. In other words, VC firms tending to build strong links with the same VC firms without involving others, might have somewhat reduced access to new information and opportunities, so strong connections might not always be advantageous (Granovetter, 1973).
Most studies focus on the relational characteristics established in the past by observing the position of a VC firm within the syndication network prior to an investment (e.g. Podolny, 2001; Hochberg et al., 2007; Alexy et al., 2012; Ma et al., 2013). However, the status and strength of ties formed following the initial investment can also strongly influence the value-add effect, for example, by providing access to new, valuable information that benefits the start-up. As the screening effect is more influenced by relational characteristics before the deal, and the value-add effect by relational aspects of social capital stemming from both before and after the deal, the status and strength of ties might be relevant in different ways in the two periods. New information and insights from the post-deal syndications are very likely to be of value to the start-up. The theoretical rationale for the post-deal network position’s effect on performance is scant. In a way, scholars allude to this by stating that the structure of a syndication network at one point in time influences the formation of future ties (Sorenson and Stuart, 2008; Hopp, 2010). Furthermore, Jackson, Bates and Bradford (2012) find that VC firms’ activism results in better performance, and that such activism or value-adding behaviour is influenced by the information available to the VC firm. Hypothetically, there might also be a negative effect if a VC firm has high status in the syndication network after the deal. That is because establishing and maintaining that status could be costly, and those resources could be otherwise used to support the start-up (Ozmel et al., 2012). Hence, we are in the dark concerning the question of whether the involvement of a high status VC firm or one with strong ties (prior to or post deal) will always be associated with better performance. Of even greater interest is how the two different observations, before and after a deal, interact with respect to the VC firm’s performance.

Summarizing previous studies, we find that there are structural and relational aspects of the investment deal that affect performance. As stated, all attributes seem to be interlinked and cannot be examined in isolation. However, not all characteristics can be clearly identified as contributing to the greater success of some deals than others, as a characteristic might be hindering or boosting performance, probably depending on the context. In turn, the context could be partly formed by other deal characteristics or those of the VC firm. We therefore pose the question of what structural and relational aspects of the social capital associated with a deal explain high performance, and under which circumstances. There is obviously a need to trace the pattern of well-performing investment deals with respect to attributes deriving from the pre-investment phase, the deal characteristics themselves, and the post-investment phase.

**Study Design**

**Data**

We base our analysis on a longitudinal dataset comprising 1,072 VC deals in the German market between 2003 and 2009. This figure includes target firms in different industries, with a majority operating in the life science and computer fields. The bulk of the firms were located in Germany, but some foreign start-ups with at least one German VC firm are involved. For the 333 investment deals in 2006 and 2007, we observed their performance in mid-2013. The point of observation for the outcome was six and seven years respectively after the investment, allowing for the development of the target firm and the value-add effect of the VC firm(s) to kick in. In order to establish the network position of the VC firms involved in the deals in 2006 and 2007 prior to and subsequent to a deal, we considered all 1,072 investments between 2003 and 2009. To ensure the comparability of the studied VC deals, we focused on similar investments in terms of seed and early stages. We exclude Business Angels and unnamed investors as suggested by Rosenbusch et al. (2013). Data was
originally compiled by the German Private Equity and Venture Capital Association (BVK), which has been found to encompass the most comprehensive data set for Germany and is comparable to other data sets such as VentureSource (Lutz et al., 2013). The dataset was complemented with details on deal characteristics (e.g. the diversity of types of VC firm involved), the venture capitalists (type of VC firms, years in business at point of investment) and the target firms (performance in 2013) involved by accessing several national and international web-based sources.

**Method**

This study employs a configurational approach that uniquely promotes an understanding that there are combinations of attributes that explain a certain phenomenon. Fuzzy-set Qualitative Comparative Analysis (fsQCA) (Ragin 1987, 2008) is increasingly employed by the management research community (Wiklund and Shepherd, 2005; Fiss, 2011). Although developed as a case-based method, it is more and more applied to larger samples (Rihoux et al., 2013). Those recent publications have shown that there might be a trade-off as the deep-case know-ledge can hardly be justified for over 300 cases, for example. Nevertheless, QCA offers a unique option for tracing patterns explaining outcomes of causal relationships (Vis, 2012). This approach analyses different causal conditions explaining a defined outcome. Cases with high performance are characterized by different conditions. However, how conditions affect the performance may depend on the context, that is, on other conditions such as characteristics of the deal or syndication behaviour prior to or after investment. Rather than looking for the single route to success, this method accounts for the realistic possibility that there are different combinations of VC firm and deal characteristics that might lead to the outcome, referred to as equifinality (Ragin, 2006). Another strength of this method is that configurations explaining the outcome are asymmetric in relation to configurations explaining the non-outcome. In other words, the combination of conditions leading to high performance cannot be reversed to describe non-performance, as to do so would neglect the causal relationship (Mackie, 1965). Accordingly, the complexity of the effect of social capital associated with a deal on performance is accounted for. The comparison of cases, applying Boolean algebra and algorithms, allows the logical reduction of the set of configurations.

**Analytical Strategy**

In order to conduct the analysis, we construct a so-called truth table, a matrix in which each row represents a specific configuration of attributes that may or may not explain high performance. The strength of applying fuzzy-set QCA opposed to crisp-set QCA, lies in the calibration of measures, which enables the transformation of measures into concepts based on theory. Conditions and outcome ought to be calibrated to express (partial) membership in defined sets in the interval of 0 and 1. The set is structured by defining three qualitative anchors indicating the value for full- and non-membership as well as the point of maximum ambiguity. Those anchors derive from the understanding of the cases and ought to be external to the data. The rescaled membership scores are then gauged by means of the direct method. For the outcome, we have assigned the values directly; an action often also referred to as qualitative calibration. In that case, different levels of membership scores are defined preliminarily using an interval-scale (e.g. 0, 0.33, 0.67, 1) (Ragin, 2008). In a second step, the causal conditions are reduced according to two principles. Following Ragin (2008) we exclude unique cases by setting the minimum number of cases to be considered for a solution to be two for large samples. Secondly, all cases failing to meet a specified consistency level of 0.8 are excluded. The term consistency is used in QCA to assess the degree to which a condition or
configuration are a subset of the outcome. Hence, a consistency of 1.0 describes perfect consistency (Ragin, 2006). Thirdly, the remaining cases are logically reduced to simplified combinations, a process implemented using the fsQCA software (Ragin and Davey, 2009). This further simplification is possible by engaging in counterfactual analysis. Consequently, the inclusion of logical remainders is permitted, that is, configurations of conditions that are hypothetically possible are included in the truth table irrespective of a lack of empirical evidence. Solution sets without counterfactuals are therefore referred to as complex solutions. Whereas the solution that incorporates all theoretically possible counterfactuals, which help to further reduce the solution, represents the parsimonious solution. Incorporating only those counterfactuals for which strong theoretical expectations exist, gives the intermediate solution (Ragin, 2008).

Outcome Description

The outcome is defined as the performance of the investment deal, implying that we look at the success of a deal from the VC firm perspective. As we are dealing with a fuzzy set, there are different categories of the outcome ranging from full membership or high performance to non-membership or low performance. The highest returns can be generated when start-ups are either sold (a trade sale) or go public (an IPO). According to Hochberg et al. (2007), an acquisition or an IPO can be considered an investment's success. We have therefore coded these exits as a success, that is, they are fully integrated into the set of strongly performing deals. Furthermore, Hochberg et al. (2007: 262) conclude that “unsuccessful investments are typically shut down,” implying that insolvent firms can be justifiably considered unsuccessful; a notion that provides the anchor for the bottom of the range of performance. There is considerable variety in the group in between ranging from firms that are legally still alive, but do not increase the value of the firm, to those with a constantly increasing net value (Phalippou and Gottschalg, 2009). However, the mere fact of survival can still qualify them as part of the set representing well performing deals. Using qualitative calibration, those deals are then assigned the value of 0.67. Because there is a degree of uncertainty concerning firms in which no activity could be investigated, they seem not to be definitively part of the set of non-performers. For this reason, this group of deals are assigned the membership degree of 0.33.

Conditions

Structural conditions. The literature is not clear on whether syndication in isolation generates high performance, or whether it is an indication of especially risky investments. We include syndication as a binary condition indicating whether the current investment is made in unison with at least one other VC firm (1) or not (0) regardless of the type of VC firm.

Differences in motives and experience among dissimilar types of VC firms lead to different compositions of social capital within syndicated deals with unalike VC firm types. We refer to this characteristic as diversity. Diversity can affect high performance positively because the VC firms have a wider range of experience to call upon when selecting target firms and can also contribute more value in the post-investment phase. Alternatively, diversity might have a negative effect resulting from the potential for agency conflict between the VC firms (Wright and Lockett 2003). Accordingly, the diversity condition is dichotomous, indicating whether dissimilar VC firms are involved in the relevant deal coded with 1 (e.g. CVC and independent VC firm), or if the participating VC firms are of the same type, coded with 0.
Performance is also known to be positively influenced by the participation of established VC firms (Sorenson and Stuart, 2001). Whether a VC firm is included in the subset representing well-established firms is determined by how many years that firm has been in business at the point of investing in a start-up. This might be linked to the network resources of a VC firm, since being in business longer enables the firm to establish more contacts. However, VC firms that have been in the market for some time, but not acquired high status by collaborating with other VC firms should have a different success quota than non-established VC firms lacking status. Therefore, the participation of an established VC firm is assigned a separate condition. If a VC firm has successfully completed the lifecycle of a VC fund, it is considered a full member. Scholars (e.g. Hochberg et al., 2007) have found an average fund lifecycle to extend to 10 years, thus a firm with 10 years in business is coded as a full member. A firm that has been in business for two years or less is coded as definitely not established.

Relational Conditions. The relational aspects of status and strength of ties linked to the participating VC firms can be identified from the syndication network of those VC firms. To establish the conditions describing the VC firms’ position within the syndication network, we draw on SNA. First of all, we constructed a matrix displaying the relationships between the VC firms. Each actor (i.e. a VC firm) is a node and a common financing round creates an edge, that is, a tie between them (Wasserman and Faust, 1994). The resulting graph is weighted as the strength of ties represents the frequency of joint deals. We calculate actor network measures, meaning that every VC firm can be assigned a separate value. Since the research question targets different effects from networks before and after the deal, the network position for each VC firm in the three-year window preceding the deal is determined, (that time period being referred to as t1) and in the three years after the deal, starting in the very year of the deal (labelled t3). To identify the status of VC firms, we follow previous studies (Podolny, 2001; Hochberg et al., 2007; Ma et al., 2013) and employ the degree centrality of a VC firm as proxy. Degree centrality looks at how many different VC firms an actor is directly connected to. The links represent the accessible social capital, which signifies access to information, or even power, and therefore status. As degree centrality is measured twice for each VC firm in t1 and t3, the measure needs to be made comparable by normalizing it (Wasserman and Faust, 1994). The second network measure analyses the tendency of a VC firm to establish strong ties as opposed to frequent single links. As the network matrix captures the frequency of joint financing rounds, the measure average weight per edge is employed as a proxy for the existing strength of ties between VC firms. This approach follows Hochberg et al. (2007), who assume an interaction between the involved VC firms when jointly financing a start-up, which intensifies the link between them. As we expect a difference between VC firms engaging in frequent single ties and those forming strong ties, two separate measures are necessary, rather than examining weighted degree measures as e.g. Alexy et al. (2012) do.

In order to convert the four network variables - degree centrality and average weight of ties in t1 and t3 - into status and strength of ties conditions, two further steps are required. First, as the network position was determined for every VC firm, syndicated deals can be attributed more than one value. Syndicated deals can be understood as cooperation, therefore the most valuable resources are relevant of Ozmel et al. (2012). Accordingly, we used the maximum of the degree centralities and average strength of ties associated with an investment deal to determine the network conditions in t1 and t3. Secondly, the network measures need to be calibrated. As there is scant research on what might be considered high or low degrees of centrality or average strength per tie, these measures can only be interpreted following a comparison of the value of the VC firms. Therefore, we base our set calibration on case knowledge (Ragin, 2008). For degree centrality, having established ten
per cent or more of the theoretically possible connections to other VC firms has been identified as full membership of high status. In the period 2007–2009, for instance, this would mean having connections to at least 28 different VC firms. Non-membership is assigned to VC firms without any links, hence those who have only undertaken financing rounds alone. Concerning the strength of ties, an average strength of two qualifies as the full membership threshold. VC firms attaching little importance to establishing strong links by repeatedly co-financing deals with different VC firms will display an average weight per edge of around 1, which marks the threshold for non-membership.

Results

Descriptive Statistics

The descriptive statistics and the set calibration for the conditions and the outcome are shown in Table 1. For the 333 investments conducted in 2006 and 2007, we observe the outcome in mid-2013. There are 146 observations for the diversity condition, as it can only be evident when there is more than one VC firm involved. Correspondingly, 146 out of the 333 deals are syndicated.

As Ragin (2008) noted, the fsQCA solution is presented using filled and empty circles, indicating presence and absence of conditions explaining the outcome in Figure 1. Blank spaces are therefore irrelevant to explaining the outcome, that is, the condition is a neutral permutation. Following Fiss (2011), we distinguish between core and peripheral conditions, which permits a relevance ranking of the conditions according to the strength of evidence in relation to the outcome. Core conditions (large circles) are at the heart of the solution set, occurring in the parsimonious and intermediate solution, whereas peripheral conditions (small circles) are evident only in the intermediate solutions.

The solution table presents the configurations that explain the outcome at a credible consistency level (≥0.8) and with unique cases dropped (frequency cut-off: 2). Overall the solution set displays a consistency level of 0.85 and a coverage level of 0.54. It contains four configurations explaining high performance equifinally. Consistency evaluates the extent to which the subset relates to the outcome, whereas coverage gauges the share of the outcome explained by a configuration, or by all configurations taken together (Ragin, 2006). The coverage and consistency values are listed for each configuration. Accordingly, each configuration is sufficient to explain strongly performing deals but is not necessary to do so, as there are alternative paths to explain the outcome (Mackie, 1965).

Configurations

As presented in Figure 1, all configurations have the presence of syndication in common, indicating that this might be a necessary condition. This is further supported by the analysis of the necessary conditions, which clearly shows syndication to be a necessary condition as the consistency is 1.0. According to the conjunctural causation, syndication is indeed necessary to explain high performing VC deals, but insufficient alone, as every configuration requires the presence or absence of at least four further conditions. Having an established VC firm involved in a deal is a common trait for three configurations, however, configuration number four explains the high performance under the absence of this condition. The remaining conditions cannot clearly be defined as present, absent or irrelevant in explaining the outcome, as they appear in all traits within the solution set and are thus clearly context dependent. Which configurations are core to and which peripheral to the solution also differ.
Configuration 1: High status VC firms. The coverage level of 0.39 shows that configuration one describes the most relevant path explaining the outcome. It describes a syndicated deal, which requires at least one VC firm that is well established within the VC firm industry and most importantly the participation of a high status VC firm in the years before the deal (status t1) and also one of the VC firms developing or maintaining a high status in the period after the deal. However, a VC firm tending to conduct investments repeatedly with the same VC firm after the deal has taken place, must not co-invest.

Configuration 2 and 3: Opportunities to compensate for missing status and strength of ties. Configuration two and three differ from the previous solution especially in terms of the relational conditions before the deal. Both solutions imply the absence of either high status or strong ties in the period preceding the investment, which are both relevant for the selection effect. When comparing the configurations, two approaches to dealing with this could be identified. Configuration two typifies the path of low-status VC firms subsequently developing to become high status VC firms in t3 and thereby affecting the value-add effect. At the same time, this solution is marked by VC firm that are alike co-investing. Configuration three on the other hand, approaches missing relational characteristics by involving different types of VC firms in the syndicate, while neither of the investors builds up strong ties in the post-deal period.

Configuration 4: Alternatives to including established VC firms. Configuration four differs from the preceding configurations considerably, especially, because no established VC firm takes part in the deal. At the same time, the VC firms involved are required to be of the same type. Furthermore, the configuration states the deals have involved VC firms with high status both before and after the deal and have strong ties to other VC firms in the period after the deal.

DISCUSSION & IMPLICATIONS

Discussion

Our results suggest that understanding high performing investments in start-ups requires the analysis of complex patterns. The fsQCA approach enables us to analyse context dependencies between conditions and as a result to show the different paths to the outcome of high performance rather than evaluating the single effect of variables. The four identified configurations all equifinally lead to high performance, yet differ in coverage.

Whether the constellation of different types of VC firms investing in one start-up leads to high performance is strongly context dependent. For instance, when there is no VC firm involved that has repeatedly invested jointly with the same VC firm before or after the observed deal, diversity appears to foster high performance (configuration three). This is consistent with the findings of Alexy et al. (2012) who looked at the diversity of VC firms in terms of their social network. While they could show that both diversity and similarity between VC firms have a positive effect, they were unable to offer an explanation as to why that should be the case. Our results provide a logic that both incorporates the social network structures and the similarities derived from bringing together like or different types of VC firms. We have found the presence of more established VC firms to partly explain high performance in three out of four configurations. Yet, configuration number four clearly shows that successful deals can be conducted even without the involvement of VC firms boasting many years in business. The other conditions reveal that immaturity might be compensated for by the
involvement of high status VC firms and by strong links before and after the deal. This result justifies the differentiation between the age of VC firms and their status as separate conditions, instead of employing one reputation or experience condition. The cases that did not involve established VC firms might correspond to the ambitions and risk-taking behaviour of VC firms suffering from the liability of newness. Gompers (1996) found such risk taking to lead new firms to outperform more established incumbents. The data from the current study only occasionally reveal this phenomenon, as that configuration has a low coverage. Nevertheless, the cases represented by configurations 1–3 might well involve less-established VC firms.

Turning to the characteristics deriving from activities prior to the deal, the presence or absence of a high status VC firm in the syndicate appears more relevant than having an actor with strong connections. Accordingly, the benefits of high status, such as access to new information, seem to outweigh the benefits of reduced transaction costs from strength of ties. Nevertheless, syndication without high-status players can also be successful. That might be because the actors involved are not individually connected to many others, but together have a considerable number of connections. Configuration three, for instance, offers justification for the claim that a lack of high status before or after the deal can be balanced by the social capital inherent in a deal, if that deal incorporates different types of VC firms. Furthermore, social capital might be better exploited in those cases described by configurations without high status VC firms involved pre-deal or post-deal. The absence of a high status VC firm might avoid status shaping the social order within a syndicate, and therefore facilitate all partners being equally involved in the decision making (Ma et al. 2013).

The network characteristics concerning the degree of centrality after investment paint an even clearer picture. The status achieved in the years after the deal is very relevant to the outcome. The status of the VC firms involved therefore contributes to the value-add effect and ultimately influences performance. Nevertheless, our results also underline that status is rather long-term (Washington and Zajac, 2005), as all configurations displaying high status in the pre-deal phase also have a high-status player involved in the after-deal phase. The decision to analyse the network positions three years before and after the deal made it possible to identify those VC firms attaining a higher status position. In contrast, establishing strong connections after the deal leads to ambiguous results. Both the presence and the absence of strong connections will serve to explain high performance. However, the coverage level of the configurations points to the absence being more common (configuration one and three), as the condition of VC firms with strong ties, is only required when no established VC firm is involved (configuration four).

**Theoretical Contribution**

Our findings provide important insights to assist research on the performance of VC firm investments in start-ups in the seed and start-up phase. First, the findings show that there is no single blueprint detailing the structural and relational aspects of social capital in an investment deal that will deliver high performance: instead, there are four different paths to success. Secondly, the results are in line with previous studies, which have shown the positive influence on performance that can result from syndication and from having well-established VC firms involved in the deal (Hochberg et al., 2007; Ma et al., 2013). Thirdly, as we found the status of the VC firm in the years after an investment to be highly relevant, future research should not neglect this relationship and be sure to include analysis of it. Both the selection and value-add effect have an impact on the performance of the investments (Rosenbusch et al., 2013) and the value-add effect is also constituted by the information the VC firms.
acquire after joining the start-up, therefore the VC firm’s behaviour after the deals needs to be taken into account when assessing its performance. Going back to the understanding of status affecting the social structure within a syndicate by influencing the VC firm’s behaviour (Ma et al., 2013), the issue arises of the post-deal position within the VC industry, which results from the post-deal investment behaviour, possibly changing the social order within the industry. Fourthly, the strength of ties VC firms establish is not decisive in the success of the syndicates. Accordingly, the reduced transaction costs owing to investing repeatedly with the same syndication partners do not seem to matter greatly, because if the strength of ties was not a neutral permutation, its absence was predominantly required. This could also point towards the benefits of the “strength of weak ties” (Granovetter, 1973) within the VC industry. Fifthly, diversity in the type of VC firms involved in a deal, seems to be highly dependent on contextual embedding. Further research is required to investigate what constellations of VC firm types are most promising. While most studies have focused on network positions attributed to VC firms in the pre-investment phase (Hochberg et al., 2007; Ma et al., 2013), we contribute towards a more dynamic notion of syndicates and thus of networks over time. Our findings strongly support the approach advocating accounting for changes in networks and have implications with respect to the relevance of establishing or maintaining a high status within the syndication network with strong ties, as this will not only affect the recognition of future opportunities, but also foster the value-add effect on existing deals.

With regard to the application of the new method of fsQCA in the field of management, we have further contributed by applying fsQCA in a setting that has addressed recent fsQCA issues. First, mixing QCA with other methods seems likely to become standard practice in the future, but is currently rare in QCA studies (Rihoux et al., 2013). This study goes some way to addressing this by using SNA to define four of the conditions. As the study looks at both the network position before and after the investment deal, the challenge of combining QCA with time is also addressed. Finally, this study contributes by further establishing this methodology in the management research.

Implications for Practice

Regarding practical implications, we recommend start-ups engaging with VC firms acknowledge that non-prestigious VC firms, in terms of status and age, can forge successful deals. Instead of being guided by status and experience, start-ups might look at the future engagements a candidate VC firm targets. The right future engagements can not only boost the VC firm’s performance, but also offer the start-up access to new information that can bolster the value-add effect. Furthermore, start-ups should embrace the idea of having more than one VC firm engaged in their project, that scenario holds promise for the screening and the post-investment activism. Another point concerns the syndication network of VC firms within the industry. Start-ups need to be aware of the connectedness between VC firms, as information such as that revealing a start-up has sought capital but been turned down by a VC firm is likely to be shared in the industry and to increase the likelihood of being denied again (Bygrave, 1987). As a result, start-ups should be well prepared and have carefully assessed which VC firm they wish to approach.

Moreover, our findings might also be helpful for VC firms considering a new investment opportunity and whom they should invite to partake in it. Above all, our research has emphasized the importance of social capital as an ingredient for success, shown by the necessary conditions of jointly investing in start-ups and also by the importance of allocating information and experience in business. This might be particularly helpful for non-established VC firms, who could find a roadmap for furthering their development within the study.
Limitations & Future Research

FsQCA requires the calibration of sets. This process is based on the researcher's expertise, and owing to the lack of set calibration in comparable studies, there might be arguments for setting the threshold values differently. More studies in management applying fsQCA will enrich the basis for creating membership criteria by offering comparisons across studies. We limited our sample to seed and early stage investments in start-ups, but maybe the participation of VCs in later stages has a greater effect on performance. Hopp (2010), for instance, argues that the involvement of new VC firms can help to bridge a competency gap, which might have stalled the progress stemming from an initial investment. Accordingly, the participation of new VC firms can have a significant impact on the target firm's performance. Therefore, analysing the deals considering subsequent investment phases could provide insight into at which phase of a start-up a VC firm has the greatest impact on performance. The generalizability of our findings might be limited with respect to varying screening and value-adding abilities across VC firms in different nations. VC firms from the USA have been found to have better screening abilities than European VC firms (e.g. Croce et al., 2013). Accordingly, in the USA, characteristics relevant to the screening effect, such as the network position before the deal and the composition of the syndicate might be relatively more important than those related to the value-add effect, that is, the social capital acquired after the deal.

Conclusion

To sum up, our findings clearly show that VC firms play an essential role in shaping the development of start-ups. More specifically, by applying a fuzzy-set qualitative comparative analysis, we were able to explain a large part of the phenomenon of high performing VC firms with the conditions of the structural and relational aspects of social capital associated with an investment deal. In other words, we have provided empirical evidence that who you are and who you know can explain better deal performance. These findings are relevant for future research in the area of VC firm syndications as well as for the operations of start-ups and VC firms.

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REFERENCES


**Figure 1. Solution Set High Performance**

**Table 1. Descriptive statistics and set calibration criteria**

<table>
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<th>Configuration</th>
<th>N. Obs</th>
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<th>St. Dev.</th>
<th>Full membership</th>
<th>Crossover point</th>
<th>Full non-membership</th>
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<td>18.42</td>
<td>10</td>
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a) non-calibrated values b) qualitative, calibrated values