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LOOKING BEYOND THE LOCAL TIES: EXAMINATION OF THE INDUSTRY NETWORK STRUCTURE'S ROLE IN THE IMPRINTING OF NEWCOMERS' STATUS

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LOOKING BEYOND THE LOCAL TIES: EXAMINATION OF THE INDUSTRY NETWORK STRUCTURE’S ROLE IN THE IMPRINTING OF NEWCOMERS’ STATUS

Hana Milanov, Instituto de Empresa, Spain

ABSTRACT

Given the importance of network status, this study aims to develop a richer understanding of how industry network characteristics, specifically network density and structural differentiation, influence status of the organizations entering the industry network. I develop a model including the direct and moderating effects of the industry’s network on newcomer’s status and test proposed relationships on a panel data of 410 U.S. venture capital firms (3,616 observations). The findings suggest that newcomers’ status is positively imprinted when the organization enters the industry network at a time when the network is not as dense or structurally differentiated. For newcomers who enter a structurally differentiated network, finding prominent partners in the year of entry may offset the negative effects of “social newness” imposed by structurally differentiated industry networks.

INTRODUCTION

Due to their liability of newness, young organizations heavily rely on interorganizational relationships (Stinchcombe, 1965) and strive for moving up the industry’s status hierarchy (Larson, 1992). Ambition for network status -- or centrality relative to other organizations in the industry network -- is driven by the wish to access many privileges that status brings (Benjamin & Podolny, 1999), which ultimately lead to higher performance (Shipilov, 2005). In this light, recent research started to build a bridge between the network entrants’ initial relationships and later status. We know that for newcomers entering industry networks, founders’ social capital acts as an important origin of their initial network position (Hallen, 2008), while the structure of initial formal partnerships makes for an important imprinting factor that influences a newcomer’s status in the long term (Milanov & Fernhaber, 2007; Milanov & Shepherd, 2008).

Notwithstanding the contribution of the initial efforts to understand origins of status, prior research disregarded that in addition to partnering history of individual firms, partnership formation is also affected by the changes in the overall industry network (Hagedoorn, 2006). Industry network structure is an important factor in the model of status imprinting because firms do not form partnerships in a vacuum. Indeed, their perceptions of partner availability and attractiveness are also a result of the overall context in which they are embedded (Gulati & Gargiulo, 1999). This in turn means that the evolution, formation and diffusion of status beliefs depend on how the information is mobilized within the overall social system (Tortoriello, McEvily, & Perrone, 2004).

Accordingly, this study aims to develop a richer understanding of how newcomers attain status by accounting for the industry network characteristics whose properties differ over time with respect to network density and structural differentiation (Ahuja, 2000). Specifically, I seek to understand how network status is imprinted by: 1) the industry network density - as it may influence the availability of potential partners and 2) industry network structural differentiation --
as it determines the extent to which the structural and relational characteristics of firms are imbued with meaning, and consequently, the extent to which firms’ social positions become guiding points for evolution of status structures (Gulati et al., 1999).

This study has three primary intended contributions. First, by accounting for industry level network effects, this study goes beyond the formation of first direct ties and examines in more detail than has been done before the importance of the initial social context at the time of network entry for newcomer’s status. Second, examining an interdependency that arises from the joint influence of multiple aspects of newcomers’ embeddedness (Dacin, Ventresca, & Beal, 1999; Hagedoorn, 2006) I provide a more fine-grained picture of the initial social context. This represents a response to the call in the recent literature (Hagedoorn, 2006) to account for both direct and interaction effects of industry structure and quality of newcomer’s first partners in building a more comprehensive model of organizations’ social status. Third, while prior research examined the effects of industry level network properties for general partnership formation (Gulati & Gargiulo, 1999), this study shows that the same factor that was found to promote partnership formation among network incumbents does not necessarily represent same partnering opportunities to newcomers. Compared to network incumbents, newcomers to the network suffer from the liabilities of newness, resource constraints, and lack of a history of partnerships in the network (Bae & Gargiulo, 2003), meaning that the rules of network evolution discovered by looking at incumbent firms are not necessarily applicable to newcomers. Hence, scholars are advised to distinguish between newcomers and incumbents in order to better understand the multiple roles that broader network structures play in shaping the opportunities and barriers for the firms in the network (Dacin et al., 1999; Granovetter, 1985; Powell & Smith-Doerr, 1994).

Global social context

The impact of social relationships can be studied with respect to organizations’ direct ties or their “local” embeddedness in dyads, triads and group memberships (Granovetter, 1985; Scott, 1991; Wasserman & Faust, 1994). Likewise, to account for the structure of the indirect ties surrounding organizations (Ahuja, 2000), one can take a more “global” perspective, and study organizations’ embeddedness in the broader social structures that surround them (Gilsing, Nooteboom, Vanhaverbeke, Duysters, & van den Oord, 2006; Gulati et al., 1999; Hagedoorn, 2006; Kenis & Knoke, 2002). Prior research substantially added to our understanding of the important consequences of the social relationships in which the organizations are embedded, yet it rarely considered the multiple aspects of organizations’ embeddedness that result from participating in the industry’s social structure.

This study builds on prior findings regarding the mechanisms through which the initial relationships generate the social signals that shape the path of the newcomer’s status. While the majority of studies focus on the effects of organizations’ positions stemming from their early direct and indirect ties (Baum, Calabrese, & Silverman, 2000; Milanov et al., 2008; Stuart, Hoang, & Hybels, 1999), there have been fewer empirical studies that complemented the above by additionally theorizing about the structure of relationships in the overall industry. Accordingly, we relax the assumption that the audiences’ perceptions are independent of the overall context in which they are embedded (Granovetter, 1985), and acknowledge that the evolution, formation, and diffusion of status beliefs depends on how the information is mobilized within the social system (Tortoriello et al., 2004).

Social structures direct attention, shape meanings and dictate the information on which actors focus (Benjamin & Podolny, 1999) on different levels. More specifically, the meaning and
mechanisms of the transfer of initial signals stemming from the local network context are likely to inherently depend on the structure of the overall industry network, and the extent to which such social structures are distinct to allow market stratification and differentiation (Gould, 2002). Therefore by taking a “nested view” of an organization’s embeddedness (Hagedoorn & Duysters, 2002) and exploring the global industry network context in conjunction with initial partnerships, we can gain a richer view of how newcomers achieve central positions.

**Industry Network Structural Differentiation**

Social attributes are likely to be of higher or lower importance depending on the extent to which the roles and expectations from certain social positions are defined, understood and adopted by organizations in the field. Small group research shows that the structure of social positions emerges gradually, as group members construct collective understandings through interaction (Ridgeway, 1991). In the industry network context, the emergence of social positions and a consensus on their meanings depend primarily on the structural differentiation of the field.

Structural differentiation is defined as “an emergent systemic property that captures the extent to which organizations come to occupy an identifiable set of network positions, each of them characterized by a distinct relational profile” (Gulati & Gargiulo, 1999:1450). At the very birth of an organizational field, when relationships between organizations are sparse, the roles and meanings of taking certain positions in the social context are typically vaguely defined. As industry networks evolve, the extent and nature of social information available about organizations changes (Baum, Shipilov, & Rowley, 2003), and the criteria of social ordering become better defined. As a consequence, the structural and relational characteristics of organizations become imbued with meaning, and organizations’ social attributes become guiding points for the evolution of status structures (Gulati & Gargiulo, 1999).

Increasing structural differentiation enables network incumbents to discriminate among partners based on their social profiles in the network (Baum et al., 2003; Gulati & Gargiulo, 1999). As a direct consequence, this means that the organizations can rely less on the exogenous factors (such as mutual resource interdependence) in forming new relationships (Gulati, 1998) and instead base their partnering behavior guided by signals in the industry network in which they are embedded. When structural differentiation is high, the social positions that organizations occupy become of primary importance, making the incumbents more alert to preserving (or enhancing) their positions by paying more attention to the quality of organizations with whom they form relationships (Podolny, 1994; Washington & Zajac, 2005) -- where the signals of quality will increasingly be of a social, relational nature.

Observed as a system level property, additional social information provided by the progressive structural differentiation of the network decreases the *systemic* level of uncertainty faced by organizations (Gulati & Gargiulo, 1999). At the same time, this means that organizations are more sensitive to signals stemming from social positions, which may in fact increase the relative uncertainty surrounding the newcomer. Consequently a lack of rich social history of relationships in the network may constrain the newcomer in attaining high social status.

Prior research has found that the probability of relationship formation between any two companies in the industry increases as structural differentiation increases in the network (Gulati & Gargiulo, 1999). However, this need not be the case when one of the two organizations is a newcomer to the network, because the increase in vertical differentiation in the network increases the incumbents’ sensitivity to similarity in structural position (Chung, Singh, & Lee, 2000). While
social information in the network may aid network incumbents in selecting their partners (Gulati & Gargiulo, 1999), lack of newcomer’s social history may point to its “liability of social newness”, and impede the organization in gaining status. In other words, because the strong structural differentiation sharpens the awareness of distinct positions and advantages of status, the rules of status homophily which emerge to guide the network dynamics may present a strong social barrier to entry (Washington & Zajac, 2005) to newcomers trying to build their status. In the interorganizational network context, structural differentiation highlights the fact that partnering with a network unknown dilutes the status of the high status organization (Podolny, 1994; Stuart et al., 1999). Thus, at a time when a status homophily is established as an endogenous rule of selecting ones’ affiliates, incumbents may develop the awareness of the newcomer’s social liability that likely represents a disadvantage for a newcomer’s status.

On the contrary, when the structural differentiation is low, the differences of structural and relational profiles are not as clear (Baum et al, 2003; Gulati & Gargiulo, 1999), and the social equality among participants in the industry is likely greater due to the lack of institutionalized rules on social positions. Consequently, when structural differentiation is not high, the social discrimination is not pronounced (Washington & Zajac, 2005) and the newcomer’s lack of a “partnering portfolio history” need not present a liability to building its status.

H1: Controlling for the social attributes of a newcomer’s initial social context, the extent of industry network’s structural differentiation at the year of the newcomer’s network entry will be negatively associated with its status.

Mitigating the negative effect of social newness

I proposed that the increase in the industry network’s structural differentiation may be negatively associated with the newcomers’ status. However, this negative direct effect does not take into account the variance in the quality of the first partners that newcomers acquire at the time of entry. Because of the inherent interdependence of social signals on the general systemic properties of networks, it is necessary to consider the development of the global network in conjunction with the initial local context (Gulati & Gargiulo, 1999) of the organization’s entry to the network.

Prior research points to the importance of finding prominent partners for young organizations. Prominent actors are visible and outstanding organizations that are well regarded for their performance and success in the industry, and accordingly, their behavior is widely visible and observed among industry participants (Rindova, Williamson, Petkova, & Sever, 2005). In that sense, prior research finds that having prominent partners can be an important endorsement of quality (Stuart et al. 1999) and a strong stamp of visibility (Gulati 1998), which enhances newcomers’ chances to find better positioned future partners (Milanov & Shepherd, 2008). While research reports various positive effects that stem from having prominent partners (Baum et al., 2000; Stuart, 1999), including the positive effect on status (Milanov & Shepherd, 2008), partners’ prominence may be differentially important in achieving status, contingent on the overall structural differentiation of the industry network.

For the newcomer with prominent initial partners, a structurally differentiated network may work to its advantage. Having its initial “prominent” label from the identity of its partners is likely to convey a stronger meaning in the context of a structurally differentiated network and enforce newcomer’s initial position. The value of the initial partners’ prominence for the newcomer’s
signal of quality may in effect be enhanced because in structurally differentiated networks the
incumbents increasingly rely on the relational and structural signals (Gulati, 1998). Thus, when
the industry network is more structurally differentiated, and the incumbents’ social positions more
distinct and stable, the strength of the newcomer’s signals from prominent partners is likely to be
more pronounced in the network.

On the contrary, a structurally differentiated network may pose higher challenges to the
newcomer without a prominent backing. With rules and positions in the network firmly defined, a
newcomer without prominent partners may face a stronger social discrimination (Washington et
al., 2005), which is likely to leave the organization at the “margins” of the social circle. Due to the
emphasized awareness of the newcomer’s liability of social newness in structurally differentiated
networks and the explicit homophily behavior of the network incumbents, the newcomer may find
it even harder to prove itself deserving of high status. Thus, I expect:

**H2: Newcomers that develop partnerships with prominent organization in the year of a
their network entry will mitigate the negative effect of structural differentiation of the
industry network on newcomer’s status such that the negative relationship between the
industry structural differentiation and status is less negative the greater the prominence of
the newcomer’s partners n in the year of network entry.**

**Industry network density**

Industry density is a macro-level property of social networks, which is represented by the
proportion of realized observed ties to all potential ties between a set of organizations (Wasserman
& Faust, 1994). Prior literature offers different mechanisms through which industry network
density, capturing the intensity and the extent of interaction observed in the socio-structural
system, may influence incumbents’ behavior.

One perspective argues that density means that organizations are better informed on the
pervasiveness of new forms of cooperation (Gulati & Gargiulo, 1999) and see industry network
density as a corollary to the legitimacy of partnering as an organizational practice. According to
this view when the cooperative relationships are sparse, the form is still considered illegitimate. In
contrast, as network density increases, a firm’s propensity to collaborate would increase because
of the industry environment it is embedded in (Hagedoorn, 2006). More broadly, another
perspective argues that industry network density influences the availability of information in the
system (Blau, 1977), as well as the speed and the reliability with which the information is spread
through the network (Kenis & Knoke, 2002; Wasserman & Faust, 1994). Both of these
perspectives could lead us to expect that industry network density potentially influences the
overall rate of collaboration in the industry because the organizations learn about new partnering
opportunities (Kenis et al., 2002), which may increase newcomer’s chances to find partners and
become more central as legitimacy of partnering pervades the industry.

However, in addition to influencing the availability of information in the system, the
pervasiveness of ties in the industry network also influences the extent of resources available for
forming new relationships. In other words, less dense networks are expect to have a larger number
of firms which are available as potential partners as organizational resources are not completely
exhausted in current relationships. Accounting for the carrying capacity of the network actors to
form new relationships, the dense industry network may lower the newcomer’s ability to form new
relationships because the incumbents’ resources are engaged in multiple extant relationships. This
argument is in line with the embeddedness perspective which additionally highlights that members
of more embedded networks are more risk averse to reach outside of the extant relationships in the fear that an unknown partner could prove unreliable (Sorenson & Stuart, 2005; Uzzi, 1996). Hence, the existing relationships between firms in the network may lower incumbents’ propensity to dis-embed themselves from their existing relationships and shift their resources in order to establish novel relationships with the newcomer. As the newcomer may be facing a crowded relational space in its first year in the network when such a network is dense, the lack of available social capital to draw upon in forming new relationships may have a negative and enduring influence on its ability to advance its position in the industry status hierarchy.1

**H3:** Controlling for the social attributes of a newcomer’s initial social context, the extent of industry network density at the year of the newcomer’s network entry will be negatively associated with its status.

### METHODS

#### Sample

Venture Capital (VC) industry represents a good context for this study because relationship formation that occurs through co-investments of VC firms in portfolio companies (so called syndicates) is a frequent and important practice in the industry (Lerner, 1994). Moreover, network status carries important benefits for both the VC firm (Podolny, 2001), and the companies in its portfolio (Hochberg, Ljungqvist, & Lu, 2007).

We use VentureXpert as a main source of data and derive a sample of 411 U.S.-based limited partnership firms, involved in venture-related investments and founded in the 1980 – 1995 period, which entered the industry network through syndicated relationships within the first three years of their founding. We start identification of VCFs for the sample in 1980 due to the institutionalization of the private equity industry in this period. As 2004 presents the last available year of complete data, the selection window closes in 1995, to ensure at least 10 years of operation for the firms which were founded in that year. A 10 year period should allow for a more stringent test of the imprinting hypotheses, as compared to prior studies that examined a 6-year period to test the endurance of initial conditions (Bamford, Dean, & McDougall, 2000; Baron, Hannan, & Burton, 1999)

#### Measures

Prior to calculating network measures, we first constructed network adjacency matrices. We define a network relationship between two VCFs when these firms jointly invest (syndicate) in a portfolio company in the same year (Podolny, 2001). While the sample is composed only of private limited partnerships, other types of firms also participate in VC investing (such as investment banks or corporate subsidiaries) and a large percentage of them enjoy important positions in the industry’s social structure (Florida & Smith, 1993). Therefore, they were included as members of the industry network. Following prior network literature (e.g. Ahuja, 2000; Gulati & Gargiulo, 1999, Hochberg, et al., 2007), we constructed the network adjacency matrices as 5-year moving windows, where the measure of status for 1987 would include all relationships that a firm formed in years 1983-1987. In calculating all network measures, we used UCINET 6.81 (Borgatti, Everett, & Freeman, 2002).

**VCF status (t+1).** A commonly accepted measure of a firm’s network status uses Bonacich’s (1987) centrality measure (Podolny, 2001; Sorenson & Stuart, 2001). Based on this measure, a
VCF’s status is dependent on the number of other VCFs with which it has participated in financing particular portfolio companies, as well as the status of those firms. The scores are calculated for each VC firm in the network and normalized by the maximum status score in the industry for the respective year (Podolny, 2001).

**Industry Network Density at Entry.** This variable is operationalized as the cumulative number of syndicated relationships in the industry in a certain year, divided by the total number of possible relationships in the system (Wasserman & Faust, 1994; Gulati & Gargiulo, 1999). Like all other imprinting variables, the measure is time invariant and recorded for the year of the firm’s entry to the network (1980-1995).

**Industry Network Structural Differentiation at Entry.** Following Gulati and Gargiulo (1999), this construct is operationalized by computing the centralization index of the network, which is measured as the standard deviation of eigenvector centrality scores of the organizations in the industry in that year (Wasserman & Faust, 1994). Prior to calculating the standard deviation of the scores, each firm’s score is normalized by dividing its eigenvector centrality score by the highest eigenvector centrality score among the network firms in the industry for each year. This is necessary in order to make the measure comparable across time, as well as to capture the relative internal differentiation of the industry’s network for each year.

**Initial Partners’ Prominence.** To identify prominent initial partners, we require a measure that reflects how visible, outstanding and well regarded an organization is relative to other industry participants. Accordingly, we operationalize each partner’s prominence as the cumulative number of the IPOs that the newcomer’s partner achieved up to the year of study. This measure captures a firm’s prominence because in the VC context, IPO brings out the VC firm’s operations to the public and significantly increases its visibility (Gompers, 1996). IPO events generate pronounced interest and the coverage of such events in both public and industry-specific press is extensive (Echols & Tsai, 2005). Second, IPOs are considered to be “golden exits” in the VC industry, so taking a cumulative record in the IPO market captures the extent to which initial partners have become well regarded in the industry. Finally, IPO data are publicly available and thus achieving an IPO makes a firm stand out from others independently of any “insider” insight into its operations. We calculate overall initial partner prominence as the mean prominence of newcomers’ initial partners across all initial partners (dividing the total prominence with a number of newcomer’s partners in the year of entry to the network). We used the average rather than the sum, because it purifies any effects on status that may have resulted from the size of the newcomer’s ego-network at the time of network entry. The variable enters the analyses as a time-invariant covariate.

**Initial Structural Embeddedness** is operationalized as the focal firm’s ego-network density (Rowley, Behrens, & Krackhardt, 2000). The measure is calculated as the number of present connections between a firm’s syndicate partners divided by all possible connections between them (Wasserman & Faust, 1994). The measure is time invariant and recorded for the year of firm’s entry to the network.

We included a series of control variables in all our models. Our first consideration was to isolate the imprinting effect of hypothesized variables in the year of network entry from the endogenous change in status. Hence, we include status at time \( t \), in all of our models as a predictor of status in year \( t+1 \). This is important because prior literature highlights the self-reproducing nature of status orderings (Podolny & Phillips, 1996). Inclusion of this variable should help account for the structural path dependency of network positions (Chung et al., 2000; Lavie &
Rosenkopf, 2006) and help account for specification bias which may arise from unobserved heterogeneity. Specifically, this control resolves an acknowledged identification problem: do initial embedded networks and prominent initial partners imprint status, or are these imprinting variables spuriously correlated with status because newcomers are more likely to have prominent partners and related higher status due to the same unobserved characteristics that make the newcomers superior in some other way? Controlling for status in network entry year and all subsequent years is likely to account for differences in such characteristics as well as control for endogeneity in status development. This procedure is consistent with literature studying the dynamics of networks (Baum et al., 2000; Powell, Koput, & Smith-Doerr, 1996), and more specifically, status evolution (Podolny et al., 1996).

Next, we include time-period effects and enter a collection of decade indicator variables, excluding the 2000s for comparison. These dummies help account for any temporal heterogeneity (Baum et al. 2003; Shipilov 2005) that could influence the dynamics of status. To control for the number of available partners and the extent of competition in the industry, we introduce industry network size as a control, measured as the number of VC firms participating in the industry network in each year.

In addition, we introduce a number of controls for the characteristics of the VC firm. Because the relationships formed in the industry may reflect the firm’s capabilities or others’ perception of such capabilities (Baum et al., 2000) we control for newcomer’s ego-network size, measured as the number of partners that the newcomer had in each consecutive year. We control for newcomer’s size because larger VCFs could be more attractive as partners. Following with prior literature (Echols & Tsai 2005; Podolny 2001), we measure size as the number of funds from which a VC firm invests in each year. We control for newcomer’s age at entry because some firms may have some pre-established legitimacy prior to entering the network by engaging in non-syndicated investments (Gompers, 1996). The next control is for newcomer’s location because firms operating from regions with higher industry clustering may be more attractive as partners than other firms. Location is controlled by introducing two dummy variables for repeatedly cited hubs of VC activity: Massachusetts and California (Florida & Kenney, 1988). I also introduce two controls capturing VC firms’ investment strategy. First, I control for VCF lead specialization in forming relationships in each year by including a proportion of rounds where the focal VCF acts as a lead investor. Prior research has established that leading syndicates may reflect a firm’s “investment in reciprocity” (Hochberg, Ljungqvist, & Lu, 2006), and such behavior may ultimately influence status. Firm was identified as a lead investor if in the first round of investment into the company it was the only firm to have invested, or when the firm invested in the first and all subsequent rounds (Sorenson & Stuart, 2008). Second, I include the average round in which a newcomer invested in each year as a control in all models. Early rounds reflect the higher uncertainty of the portfolio company (Dimov, Shepherd, & Sutcliffe, 2007) where strategic input by the VC firm is critical for the company’s success. Hence, a tendency to invest in earlier rounds may signal the newcomer’s capability to add value to the company and position the newcomer as an attractive partner. Next, because status is in part a reflection of observable quality, I control for the number of IPOs that the newcomer achieved in each consecutive year.

**Analytical Methods**

This research employs a longitudinal research design and tests the hypotheses set forth on a panel data set spanning years from 1980 to 2005, with time-variant variables updated yearly. Before conducting the analyses, the data were analyzed to ensure they did not depart substantially from normality. Measures of skewness and kurtosis were assessed for each variable in the
database. Based on these results, several transformations were made. First, as somewhat expected, the distribution of the status variable is skewed, with many more low-status firms than high-status firms. The found distribution is consistent with the status distributions observed in other industries, such as investment banking (Podolny, 1993), and in the wine industry (Benjamin & Podolny, 1999). To correct for such non-normality, the variable was transformed using the log linear transformation which improved the variable properties.

Scholars analyzing panel data are typically presented with a choice between fixed and random effects models. While generally, the preference is given to the fixed-effects estimators, which analyze only within-organization over-time variation (Halaby, 2004) because the major theoretical variables of interest (as well as important location control variables) are time-invariant, this study uses random effects estimation to predict status (Wooldridge, 2002).

RESULTS

In Table 1, we present the results testing the influence of industry network factors on VCF status (hypotheses 1 and 3). Model 1 introduces all the control variables. Model 2 adds the main effects for industry network density and structural differentiation in the year of newcomer’s network entry. In Model 3, I add the interaction term between industry structural differentiation and partners’ prominence (testing hypothesis 2). In Table 1, each column reports the results for a dependent variable measured at time t+1. Each row contains the effects of an explanatory variable measured at time t, or in the case of the independent variables, at the time of a VCF’s network entry. As evidenced in Table 1, all models are significant and each subsequent model improves the fit of its preceding model, as suggested by the significant increase of the Chi-square statistic.

Hypothesis 1 proposed that the industry network’s structural differentiation at the time of newcomer’s network entry will be negatively associated with the firm’s status. Referring to Model 2 I find a negative and somewhat marginally significant coefficient (coefficient=-1.32, p<0.055), which remains negative and achieves higher significance level in Model 3 (coefficient = -2.77, p<0.001), thus providing support for hypothesis 1. In Model 1, hypothesis 3 is also tested, which proposed a negative effect of industry network density at the time of newcomer’s network entry on the newcomer’s status. Reading of Model 1 shows support for hypothesis 3, as the coefficient is negative and significant (coefficient = -1.74, p<0.05).

Hypothesis 2 posited that the prominence of newcomers’ initial partners may mitigate the negative effect of industry structural differentiation on status proposed in the prior hypothesis. Model 3 within Table 1 shows that the estimated coefficient is positive and significant (coefficient = 0.393, p<0.001). To better understand the interaction effect, the results from the full model were plotted following established methods (Aiken & West, 1991). In Figure 1, the two lines on the graph respectively represent situations when the newcomer enters an industry network that is less or more structurally differentiated. As Figure 1 illustrates, the steeper slope of the line representing newcomers who initially affiliated with prominent partners in the industry suggests that VCFs entering the network with highly prominent initial partners can mitigate the negative effects of initial structural differentiation of the industry network, which supports hypothesis 2.

DISCUSSION

In studying the industry network as an important status imprinting factor, this study directly responds to Hagedoorn’s (2006) call for a richer understanding of the firm’s social context by
showing that status-hungry newcomers’ should tailor their initial networking strategies contingent on the structure of the industry network.

Overall, the results show that accounting for the direct and moderating effects of the industry network structure at the time of a firm’s entry to the network adds to our understanding of a newcomer’s status. Specifically, the results suggest that industry network density and structural differentiation at time of entry differentially influence newcomers’ status. Finding a negative influence of industry network density on status contributes to social network and management literatures by showing that industry network density -- beyond its communication role in transferring information among network incumbents -- has key implications for the competitive dynamics in the industry. Additionally, finding a negative effect for the industry network’s structural differentiation on newcomer’s status contributes to entrepreneurship literature as it teases out a heretofore ignored liability of organizations’ social newness. Finally, the interaction between the structural differentiation of the network and quality of newcomer’s first partners reveals that mechanisms exist to overcome the liabilities associated with social newness, if the newcomer is strategic in its selection of first partners.

Like all research, this study suffers from certain limitations which must be acknowledged. First, although prior literature acknowledged that especially for young companies, achieving social status is one of their ultimate aspirations (Larson, 1992) and that network status can be seen as “network performance” (Shipilov & Xiao Li, 2008), in this research its relationship to firm’s performance was only assumed. Second, although choosing the VC context lent itself well to understanding the mechanisms of social imprinting and antecedents to the firm’s status, care should be taken in generalizing these results beyond the US VC industry. Likewise, I acknowledge that some VCFs may be omitted in our sample due to the chosen time frame (1980-2004), as they may have operated and died before 1980. Additionally, our results should be interpreted with caution due to a form of survivor bias which may have been introduced by excluding 81 firms with single observations from the analyses.

In conclusion, this study highlights industry network structures’ multiple roles in shaping the opportunities and barriers for the firms in the network, and enables us to make more refined recommendations in advising newcomers on how to approach network entry.

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**NOTES**

1. A different argument to the embeddedness perspective highlights that VC network incumbents establish dense networks in order to keep the other firms from entering their market (Hochberg, et al., 2005). While this explanation focuses more on the competitive nature of the industry, the implications for the newcomer are the same because the “competition oriented” perspective suggests that the VC firms *proactively* use networking as a part of their strategy to deter entry for the newcomers.
REFERENCES


Table 1: Results

<table>
<thead>
<tr>
<th>Variable:</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
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<tbody>
<tr>
<td><strong>Independent Variables:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Industry Network Structural Differentiation (t entry)†</td>
<td>-1.318 † (0.686)</td>
<td>-2.771 † (0.808)</td>
<td></td>
</tr>
<tr>
<td>Industry Network Density (t entry)</td>
<td>-1.742 * (0.865)</td>
<td>-1.555 * (0.866)</td>
<td></td>
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<tr>
<td>Interaction IPP x Industry Structural Differentiation (t entry)</td>
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<tr>
<td><strong>Control Variables</strong></td>
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<tr>
<td>VCF Status (t)*</td>
<td>0.662 *** (0.011)</td>
<td>0.663 *** (0.011)</td>
<td>0.664 *** (0.011)</td>
</tr>
<tr>
<td>1980s</td>
<td>0.091 (0.062)</td>
<td>0.087 (0.062)</td>
<td>0.093 (0.062)</td>
</tr>
<tr>
<td>1990s</td>
<td>-0.015 (0.058)</td>
<td>-0.023 (0.058)</td>
<td>-0.024 (0.058)</td>
</tr>
<tr>
<td>Industry Network Size (t)</td>
<td>-0.0001 * (0.000)</td>
<td>0.000 ** (0.000)</td>
<td>0.000 * (0.000)</td>
</tr>
<tr>
<td>VCF Ego Network Size (t)</td>
<td>0.002 *** (0.000)</td>
<td>0.002 *** (0.000)</td>
<td>0.002 *** (0.000)</td>
</tr>
<tr>
<td>VCF Size: Number of Funds (t)*</td>
<td>0.206 *** (0.024)</td>
<td>0.208 *** (0.024)</td>
<td>0.207 *** (0.024)</td>
</tr>
<tr>
<td>VCF Age at Network Entry</td>
<td>0.010 (0.030)</td>
<td>0.016 (0.030)</td>
<td>0.018 (0.030)</td>
</tr>
<tr>
<td>VCF Location: CA</td>
<td>0.256 *** (0.046)</td>
<td>0.257 *** (0.046)</td>
<td>0.264 *** (0.046)</td>
</tr>
<tr>
<td>VCF Location: MA</td>
<td>0.166 * (0.070)</td>
<td>0.171 ** (0.070)</td>
<td>0.159 * (0.070)</td>
</tr>
<tr>
<td>VCF proportion of industry’s IPOs (t)</td>
<td>0.373 (0.885)</td>
<td>0.410 (0.885)</td>
<td>0.449 (0.883)</td>
</tr>
<tr>
<td>VCF proportion of deals lead (t)</td>
<td>-0.020 (0.035)</td>
<td>-0.019 (0.035)</td>
<td>-0.018 (0.034)</td>
</tr>
<tr>
<td>VCF average round entered (t)</td>
<td>-0.041 *** (0.005)</td>
<td>-0.041 *** (0.005)</td>
<td>-0.041 *** (0.005)</td>
</tr>
<tr>
<td>IPP - Initial Partners’ Prominence (t entry)</td>
<td>0.004 ** (0.001)</td>
<td>0.003 † (0.001)</td>
<td>-0.122 *** (0.036)</td>
</tr>
<tr>
<td>ISE - Initial Structural Embeddedness (t entry)</td>
<td>0.144 * (0.071)</td>
<td>0.155 * (0.071)</td>
<td>0.162 * (0.071)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.297 *** (0.115)</td>
<td>-0.521 *** (0.366)</td>
<td>-0.089 (0.387)</td>
</tr>
<tr>
<td><strong>Rho</strong></td>
<td>0.336</td>
<td>0.337</td>
<td>0.337</td>
</tr>
<tr>
<td>Wald Chi Sq. (d.f.)</td>
<td>9536.71</td>
<td>9545.8</td>
<td>9584.41</td>
</tr>
<tr>
<td>d.f.</td>
<td>14</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>ΔWald Chi Square</td>
<td>9.11 **</td>
<td>38.59 ***</td>
<td></td>
</tr>
<tr>
<td>Δd.f. from model (#)</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1: Interaction of Industry Network Structural Differentiation and Initial Partners’ Prominence