© *Academy of Management Journal*
2008, Vol. 51, No. 1, 97–111.

ENTREPRENEURIAL ORIENTATION AND NEW VENTURE PERFORMANCE: THE MODERATING ROLE OF INTRA- AND EXTRAINDUSTRY SOCIAL CAPITAL

WOUTER STAM
TOM ELFRING
VU University Amsterdam

This study advances research on entrepreneurial orientation and social capital by examining how the configuration of a founding team's intra- and extraindustry network ties shapes the relationship between entrepreneurial orientation and new venture performance. Using an original data set of 90 new ventures in the emerging open source software industry, we found that the combination of high network centrality and extensive bridging ties strengthened the focal link. Among firms with few bridging ties, centrality weakened the relationship between entrepreneurial orientation and performance. Overall, these findings contribute to a better understanding of when network centrality represents an asset or a liability for entrepreneurial firms.

Although a firm's entrepreneurial processes may facilitate the pursuit of new entry opportunities that enhance its performance, adopting a strong entrepreneurial orientation is increasingly considered necessary but insufficient for wealth creation by new ventures (Covin & Slevin, 1989; Ireland, Hitt, & Sirmon, 2003; Lumpkin & Dess, 1996). A better understanding of the conditions under which an entrepreneurial orientation enhances firm performance may thus require a contingency perspective that emphasizes the importance of fit among a firm's strategic posture and other constructs of interest (Lumpkin & Dess, 1996). Whereas much work has focused on the moderating role of environmental and organizational factors, surprisingly few studies have examined how a firm's embeddedness in interfirm networks influences the wealth creation potential of its entrepreneurial orientation (Simsek, Lubatkin, & Floyd, 2003). The limited empirical evidence that exists suggests that although networks may facilitate the performance of entrepreneurial firms, not all ties do so equally (Peng & Luo, 2000). Thus, identifying conditions under which particular relationships enhance or constrain entrepreneurial behavior and performance represents an important research agenda (Lee, Lee, & Pennings, 2001).

In this study, we aim to extend this line of work by examining how the social capital that is embedded in the intra- and extraindustry ties of a new venture's founding team influences the relationship between the firm's entrepreneurial orientation and its performance. Broadly referring to the resources that actors derive from embeddedness in networks of relationships (Adler & Kwon, 2002), "social capital" has been found to directly impact venture performance by providing entrepreneurs access to information (Birley, 1985), financial capital (Batjargal, 2003), emotional support (Brüderl & Preisendörfer, 1998), legitimacy (Stuart, Hoang, & Hybels, 1999), and competitive capabilities (McEvily & Zaheer, 1999). In addition, social capital offers important indirect benefits by leveraging the productivity of a venture's internal resources (Florin, Lubatkin, & Schultze, 2003). Yet disagreement persists on what network position is most conducive to firm performance (Ahuja, 2000). Scholars focusing on "internal" social capital have proposed that a central position within a network is most beneficial (e.g., Tsai, 2001), but those examining "external" social capital have emphasized the performance benefits of bridging ties beyond the network (e.g., Perry-Smith & Shalley, 2003). Contributing to recent efforts to integrate and reconcile these perspectives (e.g., Oh, Chung, & Labianca, 2004), we build on the premise that social capital has contingent value (Ahuja, 2000) and propose that optimal firm performance results from the fit between a venture's strategic posture and the configuration of

We thank Duane Ireland and the three anonymous *AMJ* reviewers for their many invaluable comments that greatly improved the quality of this article. Also, we want to thank Anoop Madhok and Mike Hitt for their generous feedback. This research was supported by a grant from the Netherlands Organization for Scientific Research (NWO project 014-43-745). The first author would like to thank Ian MacMillan and Rosalie Cohen of the Sol C. Snider Entrepreneurial Research Center of the Wharton School, where this work was completed.

its intra- and extraindustry ties. Both types of ties provide firms with access to distinct social resources (Geletkanycz & Hambrick, 1997), but the value of such access will be contingent on the resource needs associated with a firm's entrepreneurial orientation.

Using an original data set of informal interfirm ties in the emerging open source software industry in the Netherlands, this study specifically examined how a venture's intraindustry network centrality and range of extraindustry bridging ties shape the contribution of its entrepreneurial orientation to performance. Since simultaneously establishing and maintaining intra- and extraindustry ties may involve significant trade-offs, an important question concerns whether the performance effects of these relationships are complementary or redundant (Mehra, Dixon, Brass, & Robertson, 2006). Addressing recent calls for "more complex, multidimensional models that examine the interactions between different types of [social capital] conduits" (Oh et al., 2004: 870), we therefore sought to identify the configuration of network centrality and bridging ties that maximizes the contribution of an entrepreneurial orientation to firm performance.

THEORY AND HYPOTHESES

In line with prior research, we define an entrepreneurial orientation as the processes, structures, and behaviors of firms that are characterized by innovativeness, proactiveness, and risk taking (Covin & Slevin, 1989; Miller, 1983). Notwithstanding the possibility that these three dimensions may vary independently of one another (Lumpkin & Dess, 2001), we view entrepreneurial orientation as the simultaneous exhibition of innovativeness, proactiveness, and risk taking and thus focus on the performance implications of a firm's overall entrepreneurial posture. An entrepreneurial orientation may contribute to higher performance by facilitating a firm's capacity to identify innovative opportunities with potentially large returns, target premium market segments, and obtain first mover advantages (Lumpkin & Dess, 1996; Wiklund & Sheperd, 2005). Research has shown, however, that new ventures are often unsuccessful in translating an entrepreneurial orientation into higher performance because of a lack of strategic resources (Hitt, Ireland, Camp, & Sexton, 2001). Accordingly, an entrepreneurial orientation will only facilitate wealth creation when firms strategically acquire, develop, and leverage resources that foster both opportunity- and advantage-seeking behaviors (Ireland et al., 2003). The social capital that is embedded in executives' external ties can be considered such a resource, one that is unique to each firm, largely invisible to competitors, and difficult for them to imitate (Galaskiewicz & Zaheer, 1999).

Although the breadth of the social capital construct has facilitated its application to various research topics, including entrepreneurs' career histories (Burton, Sorensen, & Beckman, 2002) and social skills (Baron & Markman, 2003), we acknowledge the danger of viewing social capital as an "umbrella concept" (Adler & Kwon, 2002: 18) and define it more specifically as the actual and potential resources available to a firm through its network of relationships (Nahapiet & Ghoshal, 1998). Building on Nahapiet and Ghoshal's identification of three facets of social capital—structural, relational, and cognitive—this study focuses on its *structural* dimension, which involves the overall pattern of connections and the resources available to a firm as a function of its position within this network structure. Our focus on network structure is grounded in the premise that although prior work has examined the core discussion networks of entrepreneurs (e.g., McEvily & Zaheer, 1999), the field of entrepreneurship "remains virtually untouched by theory and empirical research on the network forms of social capital" (Burt, 2000: 372).

This study specifically examined two salient dimensions of a firm's structural social capital: (1) intraindustry network centrality and (2) range of extraindustry bridging ties. Echoing the distinction between "internal" and "external" social capital (Adler & Kwon, 2002), our approach builds on the notion that intra- and extraindustry ties provide a focal firm with access to distinct social capital resources (Geletkanycz & Hambrick, 1997). We define network centrality as the degree to which a firm has quick and independent access to other firms in a particular industry network through the fewest possible links (Powell, Koput, & Smith-Doerr, 1996). Range of bridging ties is defined as the extent to which a firm maintains ties beyond the focal industry network to organizations from other fields (Geletkanycz & Hambrick, 1997).

As an illustration consider Mr. Jansen, cofounder of a Dutch software company that sells Linux-based products, who is a member of several industry associations and a frequent participant in industry conferences. Through these activities, Mr. Jansen has formed ties with core firms in the industry that provide access to industry-specific knowledge of, for instance, open source technologies, business models, and licensing schemes. By contrast, consider Mr. de Boer, who quit his job as a consultant to start a venture that develops open source desktop solutions. Although Mr. de Boer sustains few links to other open source companies, he has accu-

mulated extensive personal ties to venture capital firms, research institutes, and law firms. Such ties afford him timely access to new knowledge of attractive real estate locations, sources of financial capital, emerging markets, and other opportunities that exist beyond industry boundaries.

These cases illustrate that entrepreneurs may manage the trade-off between building intra- and extraindustry social ties quite differently. An important question, then, concerns how both types of relationships affect the contribution of entrepreneurial orientation to performance and what balance of ties is optimal. In this article, we address this question and examine how different configurations of network centrality and bridging ties moderate the entrepreneurial orientation–performance link.

The Moderating Role of Intraindustry Network Centrality

Network centrality refers to a firm's position in the entire pattern of ties comprising a network and indicates the firm's structural proximity to all other firms in the network. Previous research suggests that firms with central network positions enjoy several advantages that contribute to higher performance (Brass, Galaskiewicz, Greve, & Tsai, 2004). Being positioned at the confluence of information and resource flows, a central firm will be the first to learn about new market conditions, strategies of competitors, and partnership opportunities (Powell et al., 1996). High network centrality indicates that entrepreneurs have access to many alternative providers of valuable resources (Tsai, 2001). Such privileged access is particularly beneficial to highly entrepreneurial firms since entrepreneurial orientation constitutes a resource-intensive strategic posture that involves much uncertainty (Wiklund & Sheperd, 2005). High network centrality, then, facilitates an entrepreneurial orientation by increasing a firm's capacity to quickly identify, access, and mobilize external resources. Indeed, recent research supports this view and shows that ventures with high centrality pursue more innovative strategies and have better odds of acquiring venture capital (Burton et al., 2002).

In addition, ventures that sustain a central network position are perceived as industry leaders, which makes them more visible and trustworthy to potential resource providers from outside their industry, such as suppliers, customers, and venture capitalists interested in the entrepreneurial activities introduced by the firms (Stuart et al., 1999). This view of network ties as "prisms of the market" (Podolny, 2001) suggests that high centrality signals the quality and status of a venture as an exchange partner. External constituents are more willing to grant a central firm access to their resources because they perceive it as more trustworthy and of better quality than more peripheral firms. In particular, firms with strong entrepreneurial orientations benefit from the industry leadership status associated with high centrality, because these ventures need to acquire resources and mobilize institutional support from a variety of domains to successfully commercialize their innovations (Aldrich & Fiol, 1994). Central firms are likely to be the first point of contact for interested outsiders, so that they have better abilities to attract valuable resources from diverse social circles. Following this logic, we posit:

Hypothesis 1. The relationship between entrepreneurial orientation and performance is stronger for firms with high network centrality than for firms with low network centrality.

The Moderating Role of Extraindustry Bridging Ties

Although informal industry networks constitute an important source of social capital for new ventures, entrepreneurs may also sustain bridging ties to organizations outside their industry. Such ties are particularly important for ventures with strong entrepreneurial orientations since they facilitate access to complementary resources that are not available within industry boundaries, but are necessary for the entrepreneurial firms to appropriate value from their innovations (Teece, 1986). Bridging ties are crucial for ventures with strong entrepreneurial orientations as these ties may stimulate exposure to a diversity of approaches, perspectives, and ideas that are not well established in their industry (Hargadon, 2002). Although ventures with weak entrepreneurial orientations can rely on common industry knowledge regarding tried-and-true products and services, highly entrepreneurial firms develop new routines, competencies, and technologies and therefore need networks rich in bridging ties that "bring together new combinations of productive factors" (Low & Abrahamson, 1997: 443). Thus, bridging ties function as a scanning device that allow entrepreneurial firms to detect new trends and asymmetries in a market faster than firms lacking such connections.

Besides providing access to novel resources, bridging ties also allow new ventures to associate themselves with successful, well-established firms and institutions that operate in their external environment (Stuart et al., 1999). Since firms with strong entrepreneurial orientations tend to be the

first to introduce new products and services that significantly depart from existing offerings, they are in greater need of building legitimacy for their innovations (Aldrich & Fiol, 1994). Establishing a diverse set of bridging ties permits entrepreneurial ventures to generate an understanding of their innovative activities among external resource providers and enhance their legitimacy by "piggybacking" on the credibility of organizations from other industries (Starr & MacMillan, 1990). Extraindustry links with, for example, venture capitalists, educational curricula, and the media allow entrepreneurial ventures to demonstrate their congruence with existing norms and practices, thereby facilitating access to valuable resources that support venture growth and survival (Zimmerman & Zeitz, 2002). On the basis of the preceding arguments, we propose:

Hypothesis 2. The relationship between entrepreneurial orientation and performance is stronger for firms with extensive bridging ties than for firms with fewer bridging ties.

A Configurational Perspective on Entrepreneurial Orientation and Social Capital

Recent entrepreneurship research indicates that studying multivariate configurations of an entrepreneurial orientation and other important constructs may provide a more complete understanding of the entrepreneurial orientation–performance relationship than bivariate contingency models do (Wiklund & Sheperd, 2005). According to configural research, firms that are configured consistently with normative theory on multiple dimensions will achieve higher performance than firms that are consistent on only two dimensions (Dess, Lumpkin, & Covin, 1997). Likewise, recent network research has suggested that a better understanding of social capital performance effects can be obtained by examining configurations of different social capital conduits and the contingencies that shape their effects (Mehra et al., 2006; Oh et al., 2004). Combining both literatures, then, suggests that only certain configurations of entrepreneurial orientation, network centrality, and bridging ties maximize firm performance.

An entrepreneurial orientation may be more strongly associated with performance when it is combined with both high network centrality and extensive bridging ties. Bridging ties broaden the knowledge base of a highly central firm and increase its capacity to appreciate, recombine, and apply the knowledge that is accessible through its intraindustry ties (Cohen & Levinthal, 1990). Highly central firms with diverse ties to other fields should also be more attractive exchange partners, which enhances their ability to access resources controlled by other industry firms. Bridging ties thus enhance the value of a central network position. In turn, high centrality facilitates exposure to industry-specific information that deepens the knowledge bases of the firms and reinforces their capability to absorb and apply new knowledge acquired through bridging ties. Furthermore, central firms are perceived as important industry leaders and are therefore in a more powerful position to negotiate favorable terms of exchange with organizations from other fields (Brass & Burkhardt, 1993). Thus, high network centrality enhances the value of a firm's bridging ties.

Essentially, firms with high network centrality and extensive bridging ties occupy a unique brokering position that facilitates their capability to recognize information asymmetries in the market and connect seemingly unrelated facts into novel combinations (Burt, 2000; Hargadon, 2002). Exposure to new ideas and perspectives via bridging ties may outweigh any conformist pressures coming from intraindustry ties (Perry-Smith & Shalley, 2003). In addition, being directly tied to other fields makes highly central firms less dependent on industry peers for access to new knowledge. These firms are able to verify and triangulate information received from competitors with information received through bridging ties, thereby enhancing their access to high-quality information that facilitates the pursuit of innovative, high-risk opportunities. Ventures with strong entrepreneurial orientations particularly benefit from occupying network positions rich in brokerage opportunities because these firms apply the strategy-making processes and decision styles that favor the pursuit of innovative opportunities (Lumpkin & Dess, 1996). Indeed, an entrepreneurial orientation represents a critical internal capability that allows firms to generate more value from their social capital (Lee et al., 2001). These arguments suggest the following hypothesis:

Hypothesis 3. At high levels of bridging ties, the relationship between entrepreneurial orientation and performance is stronger for firms with high network centrality than for firms with low network centrality.

Although prior research has often equated network centrality with positive performance outcomes (Brass et al., 2004), entrepreneurial firms may in fact suffer from high centrality when they have few bridging ties. Pursuing innovative opportunities with unexpected returns requires ties to

disparate social circles that may offer new perspectives and nonredundant information (Perry-Smith & Shalley, 2003). Highly central firms with few extraindustry links may thus be sealed off from novel knowledge from beyond their networks. In addition, firms that rely exclusively on intraindustry ties may face significant pressures to conform to the norms and practices that prevail in their industries (DiMaggio & Powell, 1983). Social information processing theory predicts that such pressures play a particularly important role under conditions of uncertainty, as actors rely on social ties to deal with ambiguous decisions (Ibarra & Andrews, 1993). This argument suggests that very highly entrepreneurial firms, which venture into uncharted territories without much precedent, are subject to conformist pressures coming from overly extensive intraindustry interaction. Thus, high network centrality in combination with low bridging ties may constrain both a firm's ability and willingness to pursue innovative, high-risk opportunities. Indeed, research shows that entrepreneurs with relatively great experience in the core of an industry tend to be less innovative (Cliff, Jennings, & Greenwood, 2006).

In addition to innovativeness and risk taking, proactiveness is also constrained when new ventures with high centrality sustain few bridging ties. Network centrality may facilitate a firm's responsiveness through enhanced access to information on competitors' strategies (Ingram & Roberts, 2000), yet the lack of access to novel information on external developments may limit the firm's capacity to recognize new opportunities that emerge outside its industry. Given a limited range of bridging ties, the highly central firm greatly depends on other industry firms for access to novel information. The information that does indirectly reach the highly central firm may be misleading and distorted by competitors in such a way that it hampers the speed and effectiveness of the firm's decision making (Ingram & Roberts, 2000). Thus, highly central firms that lack sufficient bridging ties are less likely to pioneer new methods, processes, and technologies because they are less able to accurately monitor new developments in their external environment. Given this logic, we propose:

Hypothesis 4. At low levels of bridging ties, the relationship between entrepreneurial orientation and performance is weaker for firms with high network centrality than for firms with low network centrality.

METHODS

Research Setting

The empirical context of this study was the emerging open source software industry in the Netherlands. In contrast to the traditional software market, in which firms produce proprietary products and generate revenues from license fees, open source software is freely accessible to everybody who wishes to modify its "source code" and is mainly developed within online developer communities, an example being the Linux operating system. In recent years, new firms have emerged that aim to carve out a new market niche for open source products and services. We define an industry as "firms that use similar inputs and technologies, produce similar products, and serve similar customers" (Low & Abrahamson, 1997: 440). Accordingly, we examined a distinct population of firms that shared similar resource needs and institutional pressures. This population's boundaries were salient and defined in terms of geographical propinquity, common technological orientation, and shared belief systems.

Several characteristics of this emerging industry made it a valuable research setting in which to test our hypotheses. First, firms in this market faced much uncertainty regarding the kinds of open source business models that would be successful. Second, the firms experienced legitimacy problems, as reflected by the scanty public knowledge regarding open source software and the lack of support from organizations with vested interests in the proprietary software market. Although entrepreneurial orientation and social capital may play important roles in overcoming such knowledge and legitimacy challenges, most research has examined established industries (Aldrich & Fiol, 1994). We therefore chose to study how entrepreneurial orientation and social capital shaped the performance of ventures in an emerging industry.

Research Design and Data Collection

We collected data from multiple sources to establish the validity of our measures and reduce common method variance. The primary data for our study were collected in 2005 by surveying sampled firms' founding teams. We departed from previous research on the ego networks of entrepreneurs by studying a bounded community of firms and the interfirm network ties between their founders. In ego network research, a focal respondent ("ego") cites a number of network contacts ("alters") and reports on the ties between these alters (Wasserman & Faust, 1994). Although easier to obtain than other

forms of network data, ego-centered data have significant shortcomings, in that respondents are less likely to mention their weak ties and may have perceptual biases about ties among their alters (Marsden, 2005).

We addressed the importance of adequate network boundaries by following a two-step approach (Laumann, Marsden, & Prensky, 1983). First, in the absence of a complete overview of all firms in the open source software industry, we used multiple secondary data sources to construct an initial list. Relevant sources included (1) the membership list of the industry association, Vereniging Open Source Nederland, (2) the Web site of a government program, Open Standards and Open Source Software, and (3) Internet searches by means of keywords such as "open source solutions" and "Linux." In total this search yielded 127 firms. Next, we conducted interviews with industry experts to validate our initial list. This step was important as consensus on the identities of relevant members may be lower in emerging industries than in stable institutionalized fields, so that combining objective and cognitive approaches to identifying a study population is preferred (Kenis & Knoke, 2002). Nine ventures were mentioned by more than one expert and were added to the initial list. Since 11 ventures had gone out of business or had ceased their open source activities, the final population amounted to 125 firms.

The founding teams from which we collected survey data were defined as those individuals who had founded a firm and who worked full time in executive-level positions. After using the informant interviews as input for questionnaire construction, we pretested the survey in six representative ventures. Next, we followed several suggestions by Dillman (2000) to maximize response rates. Firms received a letter stating the purpose and importance of the research project and then a phone call in which they were requested to participate. Whenever possible, we made appointments to personally deliver questionnaires to the entrepreneurs. This allowed us to guarantee confidentiality as well as to conduct short interviews. In total we received 121 individual responses from 90 firms, representing an overall participation rate of 72 percent. Missing data reduced the usable sample to 87 firms, of which 26 firms had multiple respondents. An average of 1.36 founders (a 62 percent internal response rate) responded from each firm.

We tested for nonresponse bias by comparing key attributes of respondents and nonrespondents. *T*-tests indicated no significant differences on either firm size or firm age. Because respondents reported on their ties to all firms, we compared them with nonrespondents on number of incoming ties, finding a significant, positive difference (2.29 vs. 3.81 ties, $t = -2.27$, $p < .05$); this result suggested that exclusion of highly central firms from the data did not severely affect the accuracy of our analysis.

Measures and Validation

Performance. Previous research suggests that capturing the multidimensionality of new venture performance requires the use of multiple measures (Wiklund & Sheperd, 2005). Subjective measures are particularly useful for assessing the broader, nonfinancial dimensions of performance, are generally more accessible than objective indicators, and have been shown to exhibit strong reliability and validity (Dess & Robinson, 1984). Objective performance measures, on the other hand, are less prone to common method bias and are especially helpful in assessing a venture's financial performance. A potential drawback is that objective indicators are often hard to obtain and difficult to interpret in the context of new ventures (Chandler & Hanks, 1993).

Given the unique strengths and weaknesses of the two types of measures, this study employed both. First, we used self-reported measures of ten dimensions of *new venture performance* relative to competitors: sales growth, employment growth, market share, gross profits, net profit margin, innovation in products and services, speed in developing new products and services, quality of products and services, cost control, and customer satisfaction. Respondents used a scale ranging from 1, "much worse," to 7, "much better," to rate these items ($\alpha = .80$). Second, we used a firm's *sales growth* as an objective performance measure. We were successful in obtaining sales growth data for a subsample of 72 firms. Sales growth was measured as the percent change in total sales over the previous year. Significant correlation of the two measures ($r = .32$, $p < .01$) supported the validity of the subjective measure.

Entrepreneurial orientation. We used Covin and Slevin's (1989) nine-item scale. All items employed a seven-point semantic differential scale with a neutral midpoint. Following Lumpkin and Dess (2001), who noted that the original Covin and Slevin question, asking whether a firm prefers to "undo competitors" or to "live and let live" measures competitive aggressiveness instead of proactiveness, we replaced this question with an item from Lumpkin and Dess asking whether a firm "has a strong tendency to follow the leader" or to "be ahead of other competitors" in introducing new products and services. Acknowledging the entre-

preneurial orientation dimensionality debate (Lumpkin & Dess, 2001), we factor-analyzed the items and found that all of them loaded above 0.60 on a single factor with an eigenvalue of 4.04. Hence, we combined the nine items into a single scale (α = .84). To assess the validity of this measure, we examined its correlation with objective indicators of an entrepreneurial strategy. Our entrepreneurial orientation measure was significantly correlated with the average percentage of sales spent on R&D (r = .37, p < .01) and with the number of products and services introduced to the market during the past year ahead of competitors (r = .40, p < 01).

Network centrality. We mapped the informal networks among the firms, using a roster method (Wasserman & Faust, 1994) in which respondents were presented with a list of all firms in their industry. This approach enhances reliability of measurement and better captures weak ties that may be forgotten in studies using free-recall designs (Marsden, 2005). Respondents were asked to "check off those firms where you regularly exchanged information with the CEO or someone else from the board over the past year." We recorded the responses in a 90 by 90 data matrix in which cell *ij* was coded 1 when any of the founders of firm *i* reported an information tie with firm *j*. To reflect our assumption that information flows in both directions, we symmetrized this matrix using the union rule: if either member of a pair nominated the other, the pair of firms was considered to have a tie. The findings remained unchanged when alternative methods to symmetrize the data were used. From the symmetrized data matrix, we finally calculated each firm's closeness centrality in UCINET VI (Borgatti, Everett, & Freeman, 2002). Capturing a firm's proximity to all other firms in a network, closeness centrality is a global measure of centrality in which both direct and indirect ties are taken into account (Freeman, 1979). We computed network centrality for each firm as the reciprocal of the sum of the shortest path distance to each other firm in the network (i.e., the number of links that it takes for the firm to reach every other firm).

Bridging ties. We adapted the managerial ties scale developed by Peng and Luo (2000), which was found to be a reliable and valid indicator of the extent to which a firm's managers sustain personal ties to other organizations. We presented the entrepreneurs with a list of 13 different kinds of organizations; the organization types were distilled from the expert interviews and were expected to be important sources of resources and legitimacy for open source companies. Examples are research institutes, financial institutions, law firms, open source development communities, and foreign companies. Respondents were asked to assess the extent to which the founders of their firm maintained personal contact with each type of organization (0, "no contact," to 7, "very extensive contact"). Responses were averaged into a composite measure of bridging ties (α = .88).

Control variables. Younger and smaller firms may face more severe challenges in exploiting opportunities because of their small resource bases. We therefore controlled for *firm age* by calculating the logarithm of the number of years since a firm was founded. In addition, we controlled for *firm size*, which was calculated by taking the logarithm of each firm's total number of employees, including founders (full-time equivalents). Next, the extent to which ventures pursued a pure open source business model may affect their dependence on industry network ties and could reflect differences in selection environments. Hence, we controlled for *open source specialization* by including the percentage of a firm's total revenues over the past year that was generated from open source products and services. Finally, founders' prior work experiences may indicate differences in skills and credentials. We thus controlled for *human capital* by calculating an equally weighted composite measure of three commonly used measures (cf. Florin et al., 2003): industry experience, start-up experience, and managerial experience obtained prior to founding the current venture. *Industry experience* was measured as the number of years of IT (information technology) industry experience on a firm's founding team. *Start-up experience* was measured as the number of start-ups that a founding team had founded. *Managerial experience* was measured as the number of years that team members had worked in senior management functions.

Assessing Common Method Bias

We undertook several procedures recommended by Podsakoff, MacKenzie, and Lee (2003) to reduce and evaluate the magnitude of common method bias. First, we assessed interrater reliabilities for the 26 firms in which we obtained data from multiple respondents. Intraclass correlation coefficients (ICC [1,1]) for our scales exhibited high interrater reliability (Shrout & Fleiss, 1979), all at the .001 level: performance (ICC = .81), entrepreneurial orientation (ICC = .73), and bridging ties (ICC = .72). Second, as explained earlier, we were successful in obtaining sales growth data from a subsample of 72 of the 90 firms in the study. Our subjective and objective performance measures were significantly correlated (r = .32, p < .01) and yielded

similar findings. Third, we conducted Harman's one-factor test on all of the items, extracting three distinct factors that accounted for 61 percent of the total variance, with the first factor explaining 26 percent. Thus, no single factor emerged, nor did one factor account for most of the variance. Fourth, using LISREL confirmatory factor analysis we tested a model loading all of the items onto a common method factor, a model loading the items onto their theoretically assigned latent variables, and a model loading the items onto their latent variables as well as onto an additional method factor. Given sample size restrictions, we performed pairwise tests and used five items per latent variable (i.e., those with the highest factor loadings). In all cases, a two-factor model showed a superior fit to the data (all at the .001 level). For example, comparing a two-factor model involving bridging ties and performance to a one-factor model yielded a significant change in chi-square ($\Delta\chi^2$ [$\Delta df = 1$, $n = 118$] = 869.03, $p < .001$; CFI = .98, RMSEA = .05). Adding an additional method factor did not significantly improve model fit ($\Delta\chi^2$ ($\Delta df = 10$, $n = 118$) = 12.64, $p < 0.24$; complete results are available on request). Overall, these results suggested little threat of common method bias and provided support for the validity of our measures.

Analytical Approach

We used hierarchical moderated regression analysis to test our hypotheses. Hierarchical regression analysis allows for a comparison between alternative models with and without interaction terms, where an interaction effect only exists if the interaction term contributes significantly to the variance explained in the dependent variable over the main effects of the independent variables (Jaccard & Turrisi, 2003). The independent variables were mean-centered prior to the formation of interaction terms as recommended by Aiken and West (1991). For all models, we used several regression diagnostics to assess whether modeling assumptions were satisfied. We checked for normality by conducting a Kolmogorov-Smirnov test, which supported the univariate normality assumption. In addition, we assessed the variance inflation factor (VIF) values and found no significant multicollinearity problems (VIF < 2.59).

RESULTS

Table 1 provides descriptive statistics and zero-order correlations among the variables used in the regression analyses. The average venture had been in business for five years and had four employees. Company founders from a typical venture maintained on average four ties to other firms in the Dutch open source software industry (maximum degree was 19). Significant positive correlations existed between firms' network centrality and bridging ties ($r = .51$, $p < .01$). It thus appears that, on average, firms with central network positions also sustained extensive bridging ties.

Table 2 reports the results of the hierarchical regression analyses. At the first step we entered the control variables and main effects of the entrepreneurial orientation and social capital variables, which together explained a significant share of the variance in performance (model 1: $R^2 = .47$, $p < .001$; model 4: $R^2 = .37$, $p < .001$). Interestingly, entrepreneurial orientation showed no significant direct relationship with performance (model 1: $\beta = .10$, n.s.; model 4: $\beta = .19$, n.s.). In addition,

TABLE 1
Means, Standard Deviations, and Correlations[a]

Variable	Mean	s.d.	1	2	3	4	5	6	7	8
1. New venture performance	4.63	0.76								
2. Sales growth	27.13	32.38	.32**							
3. Entrepreneurial orientation	4.43	0.95	.38**	.42**						
4. Network centrality	31.41	7.87	.20	.09	.26*					
5. Bridging ties	2.34	1.23	.37**	.40**	.48**	.51**				
6. Firm age[b]	0.58	0.39	−.17	−.19	−.14	.14	.18			
7. Firm size[b]	0.61	0.33	.33**	.25*	.13	.29**	.44**	.37**		
8. Open source specialization	71.62	33.49	.01	−.09	.23*	.17	.10	−.10	−.18	
9. Human capital	18.03	16.97	.19	.21	.27*	.12	.26*	−.21*	.12	.00

[a] $n = 87$.
[b] Log-transformed.
* $p < .05$
** $p < .01$
Two-tailed tests.

TABLE 2
Results of Hierarchical Regression Analyses[a]

Variables	New Venture Performance			Sales Growth		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Controls						
Firm age	−.32**	−.35***	−.36***	−.25*	−.30*	−.30*
Firm size	.27**	.27**	.29**	.21†	.21†	.24*
Open source specialization	.10	.02	.06	−.16	−.20†	−.16
Human capital	−.05	−.13	−.10	.09	.07	.14
Main effects						
Entrepreneurial orientation	.10	.17†	.02	.19	.26*	.14
Network centrality	−.21*	−.20*	−.31**	−.13	−.10	−.21
Bridging ties	.56***	.57***	.54***	.39**	.41**	.41**
Two-way interactions						
Entrepreneurial orientation × network centrality		−.05	.00		−.17	−.17
Entrepreneurial orientation × bridging ties		.23*	.20*		.23†	.28*
Network centrality × bridging ties		.24*	.16†		.24†	.23†
Three-way interaction						
Entrepreneurial orientation × network centrality × bridging ties			.30*			.25†
ΔR^2		.11**	.04*		.07†	.03†
R^2	.47	.58	.62	.37	.44	.47
Adjusted R^2	.42	.53	.57	.30	.34	.36
F	10.00***	10.73***	11.29***	5.11***	4.53***	4.51***
n	87	87	87	72	72	72

[a] Standardized coefficients are reported.
† $p < .10$
* $p < .05$
** $p < .01$
*** $p < .001$

whereas bridging ties had a statistically significant, positive relationship with both performance measures, network centrality showed a significant, negative association with new venture performance (model 1: $\beta = -.21$, $p < .05$) and a negative but insignificant relationship with sales growth (model 1: $\beta = -.13$, n.s.).

In the second step, we entered the two-way interaction terms to test our contingency hypotheses. This addition increased both the explained variance in new venture performance (model 2: $\Delta R^2 = .11$, $p < .01$) and sales growth (model 5: $\Delta R^2 = .07$, $p < .10$). Hypothesis 1 stipulates a positive effect on performance of the interaction between network centrality and entrepreneurial orientation. As shown in models 2 and 5 of Table 2, the interactive effect of centrality and entrepreneurial orientation on both performance measures is negative but not statistically significant. Thus, Hypothesis 1 received no support. Next, Hypothesis 2 predicts a positive effect of the interaction of bridging ties and entrepreneurial orientation on performance. Supporting Hypothesis 2, the results in models 2 and 5 of Table 2 show that the interaction between bridging ties and entrepreneurial orientation indeed has a statistically significant, positive effect on new venture performance (model 2: $\beta = .23$, $p < .05$) and a marginally significant, positive effect on sales growth (model 5: $\beta = .23$, $p < .10$). Thus, Hypothesis 2 was supported.

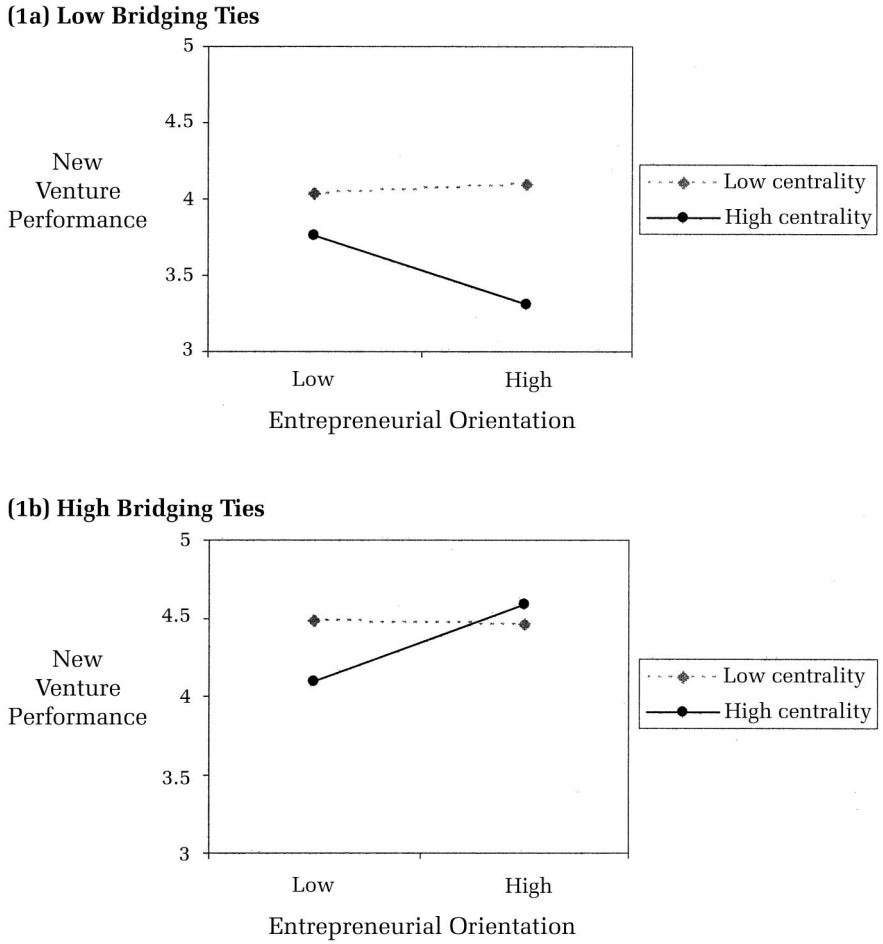
At step 3, we entered the three-way interaction term to test our configuration hypotheses. The addition of this product term significantly increased the variance explained in new venture performance (model 3: $\Delta R^2 = .04$, $p < .05$) and moderately improved the variance explained in sales growth (model 6: $\Delta R^2 = .03$, $p < .10$), suggesting that configurations of entrepreneurial orientation, network centrality, and bridging ties significantly account for performance differences among firms.

To advance further interpretations, we plotted these interaction effects for two levels of bridging ties, defining the low level as minus one standard deviation from the mean and the high level as plus

one standard deviation from the mean. For each level of bridging ties, we plotted the relationship between entrepreneurial orientation and new venture performance for low and high levels of network centrality. Figure 1 shows the results. We performed a simple slope analysis (Aiken & West, 1991) for each regression line to test whether its slope was significantly different from zero. In line with Hypothesis 3, Figure 1b shows that the relationship between entrepreneurial orientation and performance was significantly positive when network centrality and bridging ties were both high ($b = .26$, $t = 3.01$, $p < .01$) but neutral when centrality was low and bridging ties were high ($b = .03$, n.s.). Conversely, Figure 1a reveals that entrepreneurial orientation had a marginally significant, negative relationship with performance among firms with high network centrality and few bridging ties ($b = -.24$, $t = -1.67$, $p < .10$). Among firms with low centrality and few bridging ties, entrepreneurial orientation was unrelated to performance ($b = -.01$, n.s.). To further probe the three-way interaction effect, we also employed a slope difference test (Dawson & Richter, 2006) that examines whether differences between pairs of slopes are significantly different from zero. This analysis supported the prediction that the relationship between entrepreneurial orientation and performance was significantly stronger when bridging ties and network centrality were both high and significantly weaker when bridging ties was low and centrality high (in both cases, $\Delta b = .27$, $p < .05$). Thus, Hypotheses 3 and 4 received support.

We performed several tests for the full models to check the robustness of the findings. First, we redid the analyses using a subsample of 65 dedicated open source companies, defined as firms that had (1) generated more than 50 percent of their previous year's sales from open source products/services and (2) adopted open source in their first year of

FIGURE 1
Moderating Effects of Intra- and Extraindustry Social Capital on the Relationship between Entrepreneurial Orientation and Performance



operation (cf. Bonacorsi, Giannangeli, & Rossi, 2006). Results of these analyses showed no substantial differences regarding the main findings that were obtained using the full sample. Second, we checked the impact of possible heterogeneity in firms' product offerings. Using our survey data, we added three controls: (1) a dummy variable indicating the presence of foreign sales, (2) the share of last year's turnover resulting from sales to government and nonprofit organizations, and (3) the percentage of last year's sales generated from the sale of services. For these analyses, the results and interpretations were entirely consistent with those presented above (results are available upon request).

DISCUSSION

This study reveals that the configuration of a founding team's intra- and extraindustry social capital can explain both positive and negative performance effects of a firm's entrepreneurial orientation, lending empirical support for recent configurational perspectives presented in the entrepreneurship (e.g., Wiklund & Sheperd, 2005) and network (e.g., Oh et al., 2004) literatures. As expected, we found that the combination of high network centrality and extensive bridging ties strengthened the relationship between entrepreneurial orientation and performance. Among ventures with fewer bridging ties, network centrality weakened the entrepreneurial orientation–performance link. These findings underline the importance of fit between entrepreneurs' social capital resources and the unique resource needs associated with an entrepreneurial orientation.

An unexpected result concerned the lack of support for an independent moderating effect of network centrality. One possible explanation is the nature of our sample and measures. Since entrepreneurial orientation and centrality were positively correlated, the finding may reflect limited variance in centrality scores among entrepreneurial firms. Although alternative measures such as degree and betweenness centrality yielded the same results, it could be that centrality in other types of industry networks (e.g., common affiliations, mobility ties) exerts stronger moderating effects. Another possibility for the lack of moderation is that the use of an aggregated measure of entrepreneurial orientation, although supported by our factor analysis, may mask unique interactions between network centrality and individual entrepreneurial orientation dimensions (cf. Lumpkin & Dess, 2001). For example, high centrality may constrain innovativeness by limiting access to novel knowledge from outside a network yet facilitate risk taking by reducing perceived uncertainty. Thus, future studies should explicitly address the precise mechanisms through which network position influences firm performance.

Although the moderating role of network centrality appeared insignificant from a bivariate contingency perspective, a closer inspection of higher-order interactions revealed the presence of two opposite moderating effects that remained hidden when network centrality was studied in isolation. Given a continuous increase in bridging ties, centrality initially weakens the relationship between entrepreneurial orientation and performance, but at a certain inflection point, this negative moderating effect turns positive. It appears that it is not privileged access to industry-specific resources per se that facilitates an entrepreneurial orientation, but rather a firm's ability to complement such access with the novel recombination of resources from other social domains. This finding is interesting, because prior work has examined the moderating effects of centrality without investigating how these effects are conditional on a firm's bridging ties (e.g., Tsai, 2001).

Contributions

This research makes a contribution by demonstrating how different social capital conduits interactively shape the relationship between entrepreneurial behavior and firm performance. The finding that network centrality and bridging ties have complementary effects on performance provides initial empirical support for recent contentions that internal and external social capital may have interactive effects (Mehra et al., 2006; Oh et al., 2004). Supporting the notion that social capital has contingent value (Ahuja, 2000), this study also shows that the performance implications of particular network configurations depend on a firm's entrepreneurial orientation. The result underscores the need to examine not only the interactions among different social capital conduits, but also the contingencies that determine the optimal balance of ties, in future network research.

This study also advances knowledge of the "dark side" of social capital (Gargiulo & Benassi, 2000). The results highlight that by simultaneously examining internal and external social capital, we gained a better understanding of the conditions under which network centrality was detrimental to performance. Previous research has shown that firms can become overembedded in cohesive networks of strong ties (Uzzi, 1997). Accordingly, firms may maximize their performance by achieving a mix of arm's-length and embedded ties. We complement this line of work by suggesting that

overembeddedness can also be viewed as an imbalance between internal and external social capital. This idea suggests that considering a firm's embeddedness only in a single network may generate misleading results and implies that future research may fruitfully examine the configuration of a firm's weak and strong ties across multiple networks.

Empirically, this study enhances understanding of how entrepreneurial orientation and social capital shape the performance of new ventures in emerging industries (cf. Aldrich & Fiol, 1994). Failing to support some previous arguments that adopting a strong entrepreneurial orientation early in an industry's life cycle generates valuable first mover advantages (Lumpkin & Dess, 2001), weak main effects of entrepreneurial orientation on performance emerged here. Perhaps the innovative nature of the industry implies that all firms in our study displayed a relatively strong entrepreneurial orientation, thereby making any differences among firms less consequential for performance. Alternatively, our measures may have failed to capture some unique aspects of entrepreneurial behavior in nascent industries. Further research is clearly needed to identify the elements of an entrepreneurial orientation that enhance the performance of industry pioneers.

Regarding the role of social capital in the emerging industry context, this study adds to knowledge of how informal ties affect firm performance (cf. Peng & Luo, 2000). Unlike some previous work, this study collected complete network data that enabled us to capture how network position in an industry's informal social structure influences firm performance. Although not hypothesized, a significant negative main effect of network centrality on new venture performance was found. Central firms may contribute to integration and learning at the industry level, yet this result suggests that networking entails significant investments of resources that may hurt the performance of individual entrepreneurs. Especially in nascent industries, where resources and networks are still emergent, the social capital stemming from high centrality may not offset the costs of occupying such a network position. Thus, future studies should identify conditions under which social capital enhances both individual and collective performance (Ibarra, Kilduff, & Tsai, 2005).

Limitations and Future Directions

This study is not without limitations. First, data collection on independent and dependent variables through the same survey may have introduced common method bias. To reduce and evaluate this potential problem, we used multiple performance measures, secondary respondents, Harman's one-factor test, and confirmatory factor analyses. Although these procedures suggested little threat of common method bias, we advise readers to interpret our results with caution.

Second, this study's performance measures could be improved by considering more specific performance dimensions. Although our performance indicators yielded similar findings, the results for the subjective measure were stronger than those for sales growth. This may reflect differences in sample size and reliability between the two measures or the nature of our sample. Indeed, our sample included many early stage ventures for which financial performance indicators may not always be appropriate (Zahra, 1996). The pattern of results may also highlight a need to unbundle aggregated performance measures that can mask important indirect effects of a firm's resources on lower-level business processes (Ray, Barney, & Muhanna, 2004). Thus, future research should employ finer-grained performance measures that capture the effectiveness of a venture's key business processes.

Third, we only examined a single, emerging high-tech industry. The global and innovative nature of the open source software industry, the importance of developer communities therein, and the presence of many young firms are factors that may limit the generalizability of the results. We think exciting opportunities exist for future comparative research—covering multiple industries that differ in life cycle, technological intensity, or institutional context—that may discover how particular industry conditions influence entrepreneurial orientation and social capital performance effects.

Fourth, our cross-sectional data fail to capture the dynamic interplay between entrepreneurial orientation and social capital. Knowledge of the most advantageous network positions draws attention to the question of how firms acquire such positions in the first place. Future studies can make a valuable contribution by identifying the individual-, firm-, and industry-level determinants of executives' external ties. Observing strong correlations among entrepreneurial orientation and social capital also raises an important question that requires further inquiry: Do executives of entrepreneurial firms build distinctively different external ties, or does differential access to social capital result in different levels of entrepreneurial orientation?

Finally, the logic for our configurational hypotheses was grounded in the structuralist network tradition, which has emphasized the impact of social structure on the behavior of actors at the expense of considering the role of individual agency and at-

tributes. We agree, however, with Kilduff and Krackhardt that "any approach to human action must include individuals as perceiving and opportunity-seeking actors" (1994: 88). A natural extension of the current study would be to examine the psychological and social processes that govern how executives' ties affect organizational outcomes. Such research might fruitfully build on the "upper echelons perspective" (Hambrick & Mason, 1984) by investigating how the social networks and personal backgrounds of entrepreneurs jointly shape their cognitive biases and strategic choices.

Practical Implications

Possible limitations notwithstanding, the present study offers several practical implications. The findings reveal that entrepreneurs can enhance the performance of their ventures by simultaneously stimulating their entrepreneurial orientations and building social ties to other firms in their industry. Entrepreneurs should recognize, however, that a strong entrepreneurial orientation may constrain performance when a central network position is not accommodated by sufficient extraindustry bridging ties. Thus, in addition to considering the human capital of entrepreneurial team members, it is also important to evaluate members' social capital during the process of team formation and development. As an example, consider an entrepreneur with extensive experience and relationships in the computer industry and who has started a firm that develops an innovative storage device. For such an industry insider, the findings suggest that teaming up with individuals who have social ties to a variety of other fields may prevent overembeddedness and will enhance venture performance.

Given potential trade-offs between building different social capital conduits, an important challenge for entrepreneurs concerns balancing their efforts at strengthening their intra- and extraindustry social capital. Entrepreneurs are encouraged to support initiatives that may foster the development of intraindustry ties, such as attending social events (e.g., conferences, business meetings), acquiring memberships in industry associations, and initiating a database of important industry contacts. At the same time, however, the findings suggest that such networking activities may cause overembeddedness and show that these initiatives must be complemented by programs that support the creation of extraindustry ties. Novel arrangements, like the use of sophisticated "social software" technologies, have the potential to build ties to a wider range of social circles that may offer the resources that facilitate a firm's entrepreneurial activities and performance.

REFERENCES

Adler, P. S., & Kwon, S. W. 2002. Social capital: Prospects for a new concept. ***Academy of Management Review,*** 27: 17–40.

Ahuja, G. 2000. Collaboration networks, structural holes, and innovation: A longitudinal study. ***Administrative Science Quarterly,*** 45: 425–455.

Aiken, L. S., & West, S. G. 1991. ***Multiple regression: Testing and interpreting interactions.*** Thousand Oaks, CA: Sage.

Aldrich, H. E., & Fiol, C. M. 1994. Fools rush in? The Institutional context of industry creation. ***Academy of Management Review,*** 19: 645–670.

Baron, R. A., & Markman, G. D. 2003. Beyond social capital: The role of entrepreneurs' social competence in their financial success. ***Journal of Business Venturing,*** 18: 41–60.

Batjargal, B. 2003. Social capital and entrepreneurial performance in Russia: A longitudinal study. ***Organization Studies,*** 24: 535–556.

Birley, S. 1985. The role of networks in the entrepreneurial process. ***Journal of Business Venturing,*** 1: 107–117.

Bonaccorsi, A., Giannangeli, S., & Rossi, C. 2006. Entry strategies under competing standards: Hybrid business models in the open source software industry. ***Management Science,*** 52: 1085–1098.

Borgatti, S. P., Everett, M. G., & Freeman, L. C. 2002. ***Ucinet for Windows: Software for social network analysis.*** Harvard, MA: Analytic Technologies.

Brass, D. J., & Burkhardt, M. E. 1993. Potential power and power use: An investigation of structure and behavior. ***Academy of Management Journal,*** 36: 441–470.

Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. 2004. Taking stock of networks and organizations: A multilevel perspective. ***Academy of Management Journal,*** 47: 795–817.

Brüderl, J., & Preisendörfer, P. 1998. Network support and the success of newly founded businesses. ***Small Business Economics,*** 10: 213–225.

Burt, R. S. 2000. The network structure of social capital. In B. Staw & R. I. Sutton (Eds.), ***Research in organizational behavior,*** vol. 22: 345–423. Greenwich, CT: JAI Press.

Burton, M. D., Sorensen, J. B., & Beckman, C. M. 2002. Coming from good stock: Career histories and new venture formation. In M. Lounsbury & M. Ventresca (Eds.), ***Research in the sociology of organizations,*** vol. 19: 229–262. Greenwich, CT: JAI Press.

Chandler, G. N., & Hanks, S. H. 1993. Measuring the

performance of emerging businesses: A validation study. ***Journal of Business Venturing,*** 8: 391–408.

Cliff, J. E., Jennings, P. D., & Greenwood, R. 2006. New to the game and questioning the rules: The experiences and beliefs of founders who start imitative versus innovative firms. ***Journal of Business Venturing,*** 21: 633–663.

Cohen, W. M., & Levinthal, D. A. 1990. Absorptive capacity: A new perspective on learning and innovation. ***Administrative Science Quarterly,*** 35: 128–152.

Covin, J. G., & Slevin, D. P. 1989. Strategic management of small firms in hostile and benign environments. ***Strategic Management Journal,*** 10: 75–87.

Dawson, J. F., & Richter, A. W. 2006. Probing three-way interactions in moderated multiple regression: Development and application of a slope difference test. ***Journal of Applied Psychology,*** 91: 917–926.

Dess, G. G., Lumpkin, G. T., & Covin, J. G. 1997. Entrepreneurial strategy making and firm performance: Tests of contingency and configurational models. ***Strategic Management Journal,*** 18: 677–695.

Dess, G. G., & Robinson, R. B. 1984. Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. ***Strategic Management Journal,*** 5: 265–273.

Dillman, D. A. 2000. ***Mail and internet surveys: The tailored design method.*** New York: Wiley.

DiMaggio, P., & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. ***American Sociological Review,*** 48: 147–160.

Florin, J., Lubatkin, M. H., & Schulze, W. 2003. A social capital model of high-growth ventures. ***Academy of Management Journal,*** 46: 374–384.

Freeman, L. C. 1979. Centrality in social networks: Conceptual clarification. ***Social Networks,*** 1: 215–239.

Galaskiewicz, J., & Zaheer, A. 1999. Networks of competitive advantage. In S. B. Bacharach (Ed.), ***Research in the sociology of organizations,*** vol. 16: 237–261. Amsterdam: JAI Press.

Gargiulo, M., & Benassi, M. 2000. Trapped in your own net? Network cohesion, structural holes, and the adaptation of social capital. ***Organization Science,*** 11: 183–196.

Geletkanycz, M. A., & Hambrick, D. C. 1997. The external ties of top excecutives: Implications for strategic choice and performance. ***Administrative Science Quarterly,*** 42: 654–681.

Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top managers. ***Academy of Management Review,*** 9: 193–206.

Hargadon, A. B. 2002. Brokering knowledge: Linking learning and innovation. In R. I. Sutton & B. M. Staw (Eds.), ***Research in organizational behavior,*** vol. 24: 41–85. Greenwich, CT: JAI Press.

Hitt, M. A., Ireland, R. D., Camp, S. M., & Sexton, D. L. 2001. Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. ***Strategic Management Journal,*** 22: 479–491.

Ibarra, H., & Andrews, S. B. 1993. Power, social influence, and sense-making: Effects of network centrality and proximity on employee perceptions. ***Administrative Science Quarterly,*** 38: 277–303.

Ibarra, H., Kilduff, M., & Tsai, W. 2005. Zooming in and out: Connecting individuals and collectivities at the frontiers of organizational network research. ***Organization Science,*** 16: 359–371.

Ingram, P., & Roberts, P. W. 2000. Friendships among competitors in the Sydney hotel industry. ***American Journal of Sociology,*** 106: 387–423.

Ireland, R. D., Hitt, M. A., & Sirmon, D. G. 2003. A model of strategic entrepreneurship: The construct and its dimensions. ***Journal of Management,*** 29: 963–989.

Jaccard, J., & Turrisi, R. 2003. ***Interaction effects in multiple regression*** (2nd ed.). Thousand Oakes, CA: Sage.

Kenis, P., & Knoke, D. 2002. How organizational field networks shape interorganizational tie-formation rates. ***Academy of Management Review,*** 27: 275–293.

Kilduff, M., & Krackhardt, D. 1994. Bringing the individual back in: A structural analysis of the internal market for reputation in organizations. ***Academy of Management Journal,*** 37: 87–108.

Laumann, E. O., Marsden, P. V., & Prensky, D. 1983. The boundary specification problem in network analysis. In R. S. Burt & M. J. Minor (Eds.), ***Applied network analysis:*** 18–34. Beverly Hills, CA: Sage.

Lee, C., Lee, K., & Pennings, J. M. 2001. Internal capabilities, external networks, and firm performance: A study on technology-based ventures. ***Strategic Management Journal,*** 22: 615–640.

Low, M. B., & Abrahamson, E. 1997. Movements, bandwagons, and clones: Industry evolution and the entrepreneurial process. ***Journal of Business Venturing,*** 12: 435–457.

Lumpkin, G. T., & Dess, G. G. 1996. Clarifying the entrepreneurial orientation construct and linking it to performance. ***Academy of Management Review,*** 21: 135–172.

Lumpkin, G. T., & Dess, G. G. 2001. Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. ***Journal of Business Venturing,*** 16: 429–451.

Marsden, P. V. 2005. Recent developments in network measurement. In P. J. Carrington, J. Scott, & S. Wasserman (Eds.), ***Models and methods in social net-***

work analysis: 8–30. Cambridge, U.K.: Cambridge University Press.

McEvily, B., & Zaheer, A. 1999. Bridging ties: A source of firm heterogeneity in competitive capabilitites. ***Strategic Management Journal,*** 20: 1133–1156.

Mehra, A., Dixon, A. L., Brass, D. J., & Robertson, B. 2006. The social network ties of group leaders: Implications for group performance and leadership reputation. ***Organization Science,*** 17: 64–79.

Miller, D. 1983. The correlates of entrepreneurship in three types of firms. ***Management Science,*** 29: 770–791.

Nahapiet, J., & Ghoshal, S. 1998. Social capital, intellectual capital, and the organizational advantage. ***Academy of Management Review,*** 23: 242–266.

Oh, H., Chung, M.-H., & Labianca, G. 2004. Group social capital and group effectiveness. ***Academy of Management Journal,*** 47: 860–875.

Peng, M. W., & Luo, Y. 2000. Managerial ties and firm performance in a transition economy: The nature of a micro-macro link. ***Academy of Management Journal,*** 43: 486–501.

Perry-Smith, J. E., & Shalley, C. E. 2003. The social side of creativity: A static and dynamic social network perspective. ***Academy of Management Review,*** 28: 89–106.

Podolny, J. M. 2001. Networks as the pipes and prisms of the market. ***American Journal of Sociology,*** 107: 33–60.

Podsakoff, P. M., MacKenzie, S. B., & Lee, J. Y. 2003. Common method biases in behavioral research: A critical review of the literature and recommended remedies. ***Journal of Applied Psychology,*** 88: 879–903.

Powell, W. W., Koput, K. W., & Smith-Doerr, L. 1996. Interorganizational collaboration and the locus of innovation: Networks of learning in Biotechnology. ***Administrative Science Quarterly,*** 41: 116–145.

Ray, G., Barney, J. B., & Muhanna, W. A. 2004. Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resource-based view. ***Strategic Management Journal,*** 25: 23–37.

Shrout, P. E., & Fleiss, J. L. 1979. Intraclass correlations: Uses in interrater reliability. ***Psychological Bulletin,*** 86: 420–428.

Simsek, Z., Lubatkin, M. H., & Floyd, S. W. 2003. Interfirm networks and entrepreneurial behavior: A structural embeddedness perspective. ***Journal of Management,*** 29: 427–442.

Starr, J. A., & MacMillan, I. C. 1990. Resource cooptation via social contracting: Resource acquisition strategies for new ventures. ***Strategic Management Journal,*** 11: 79–92.

Stuart, T. E., Hoang, H., & Hybels, R. C. 1999. Interorganizational endorsements and the performance of entrepreneurial ventures. ***Administrative Science Quarterly,*** 44: 315–349.

Teece, D. J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. ***Research Policy,*** 15: 285–305.

Tsai, W. 2001. Knowledge transfer in intraorganizational networks: Effects of network position and absorptive capacity on business unit innovation and performance. ***Academy of Management Journal,*** 44: 996–1004.

Uzzi, B. 1997. Social structure and competition in interfirm networks: The paradox of embeddedness. ***Administrative Science Quarterly,*** 42: 35–67.

Wasserman, S., & Faust, K. 1994. ***Social network analysis: Methods and applications.*** Cambridge, U.K.: Cambridge University Press.

Wiklund, J., & Sheperd, D. 2005. Entrepreneurial orientation and small business performance. ***Journal of Business Venturing,*** 20: 71–91.

Zahra, S. A. 1996. Technology strategy and new venture performance: A study of corporate-sponsored and independent biotechnology ventures. ***Journal of Business Venturing,*** 11: 289–321.

Zimmerman, M. A., & Zeitz, G. J. 2002. Beyond survival: Achieving new venture growth by building legitimacy. ***Academy of Management Review,*** 27: 414–431.

Wouter Stam (wstam@feweb.vu.nl) is an assistant professor of management at VU University Amsterdam. He expects to receive his Ph.D. from the same university in early 2008. He has been a visiting scholar at the Wharton School, University of Pennsylvania. His current research interests include intra- and interorganizational networks, organizational learning, and strategic entrepreneurship.

Tom Elfring (telfring@feweb.vu.nl) is professor of strategic management at VU University Amsterdam. He holds a joint appointment at the Faculty of Economics and Business Administration and at the Faculty of Social Sciences. His Ph.D. was received from the University of Groningen. His current research interests include corporate entrepreneurship and venturing, networking in emerging organizations, and strategic entrepreneurship.