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LEVERAGING TIES: THE CONTINGENT VALUE OF ENTREPRENEURIAL TEAMS' EXTERNAL ADVICE NETWORKS ON INDIAN SOFTWARE VENTURE PERFORMANCE

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This study investigates the impact of entrepreneurial teams' external networks on their ventures' performance. We first argue that ventures whose entrepreneurial teams span many structural holes in their external advice networks experience higher performance. We then propose that network ties are not uniform in their effect, but rather are contingent on two distinct features of entrepreneurial teams: (i) their strategic consensus—extent of agreement on key goals and strategies within the team—and (ii) internal cohesion—extent of interpersonal friendships within the team. Finally, we propose that team demographics and team networks complement (rather than substitute) each other. Data from Indian software ventures provide support for these arguments. We extend entrepreneurship research by highlighting how venture teams' internal processes and external networks jointly shape performance outcomes. We also add to the literature on team networks by drawing attention to the role of strategic consensus as a distinct pathway through which teams can leverage their external networks.

INTRODUCTION

The social context within which individuals and firms are embedded has received increased attention in the management literature (Granovetter, 1985; Burt, 1992). Within entrepreneurship research, the importance of social ties of entrepreneurs has also been well recognized (e.g., Aldrich and Zimmer, 1986; Hite and Hesterly, 2001), and scholars have shown that the structure of *interpersonal networks* of individual entrepreneurs matter for new venture outcomes such as capability acquisition (e.g., McEvily and Zaheer, 1999).

In this study, we propose expanding this research area by studying two relatively uncharted territories. First, in line with the upper echelons perspective (Hambrick and Mason, 1984) and drawing on Burt's (1992) structural holes theory, we study the performance impact of the networks of new ventures' top management teams (hereafter entrepreneurial teams) as a whole, rather than focus on the founding entrepreneurs' social network. We conceptualize entrepreneurial teams as being embedded in a network of social ties with external advisors (hereafter external network). We propose to examine the main effect of entrepreneurial teams' external network structure on venture performance.

Second, we build on past research suggesting that the value of interpersonal and interorganizational network ties may vary (e.g., Ahuja, 2000; Burt, 1997; Gargiulo and Benassi, 1999; Podolny and Baron, 1997). Organizational scholars have begun to examine the contingent value of

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ties for *interpersonal networks* (e.g., Burt, 1997; Podolny and Baron, 1997) and for *interorganizational networks* (e.g., Ahuja, 2000). In line with recent work by Reagans and colleagues (e.g. Reagans and Zuckerman, 2001; Reagans, Zuckerman and McEvily, 2004), we focus on *team level networks* where little is known about whether and which contingencies moderate the effect of entrepreneurial teams' networks on organizational performance. We propose that the structure of external networks is not uniform in its impact, but rather varies with the internal dynamics within the entrepreneurial team.

We draw on recent research that illustrates the importance of internal team dynamics in start-ups (e.g., Foo, Sin, and Yiong, 2006), as well as theory on team networks (Reagans *et al*., 2004) to build our framework. We focus on two features of team dynamics: i) *strategic consensus,* or the extent to which team members agree on what the goals and strategies of the venture should be; and ii) *team cohesion,* or the extent of interpersonal attraction within the team. We argue that strategic consensus and cohesion impact the effectiveness and efficiency of utilization of resources from the external network, and hence, moderate the benefits of external network structure. Finally, we propose that team demographics and team networks complement (rather than substitute) each other in settings such as entrepreneurial teams where team members' skills may not fully match the requirements of the task at hand.

We test and find support for our framework using data from a setting where the importance of networks is often claimed but rarely tested—Indian software ventures. In this study, we make two key contributions to the literature on entrepreneurship and team networks. First, we contribute to the entrepreneurship literature by synthesizing hitherto distinct streams of research on entrepreneurial teams and entrepreneurial networks to advance our understanding of how the external networks of teams and their internal conditions jointly drive venture heterogeneity. Second, we extend theory on team networks by highlighting the role of strategic consensus as a distinct pathway through which teams can leverage their external networks. Our findings also reveal a boundary condition to extant theorizing by delineating when team demographics and team networks complement (rather than substitute) each other.

ENTREPRENEURIAL TEAMS' SOCIAL CAPITAL AND VENTURE PERFORMANCE

Social capital theorists adopting the *bridging social capital perspective* (Adler and Kwon, 2002) focus on how the local structure of an actor's network ties is most conducive to the realisation of the actor's goals and objectives. In the context of new ventures, the external networks of entrepreneurial teams are very salient, since these ventures often have few other resources to rely upon as they struggle to overcome the liability of newness (Stinchcombe, 1965). Network ties act as conduits, providing valuable resources in a timely manner to the entrepreneurial team. Such access will likely increase the strategic alternatives considered and the knowledge and information needed to develop and evaluate such alternatives, hence improving strategic decision making.

Burt (1992) offers the most trenchant formulation of the 'bridging social capital' view. He argues that the benefits of social capital stem from non-redundant ties (i.e., structural holes). Non-redundant contacts are disconnected in some way—either directly, in the sense that they are unacquainted with each other, or indirectly, in the sense that they are connected to a nonoverlapping set of contacts. When an actor's contacts are non-redundant, they are more likely to provide access to novel information, advice, and other resources. Burt (1992) thus identifies the causal mechanism underlying Granovetter's (1973) seminal insight that weak ties are more likely than strong ties to act as bridges to novel information and knowledge. The value of weak ties, Burt argues, stems less from their strength per se, and more from their greater propensity to bridge otherwise disconnected groups, making it more likely that such ties will convey novel information and knowledge.

While past research has examined the networks of new ventures' CEOs (e.g., McEvily and Zaheer, 1999), arguably, focusing on the entrepreneurial team as opposed to the individual CEO provides a more complete picture of the knowledge and informational resources accessible to the new venture. When the entrepreneurial team as a whole spans many structural holes (i.e., bridging many non-redundant contacts), it is more likely to enjoy superior access to a broad array of resources,

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such as novel information and advice on technology trends, sources of funding, location of skilled human resources, and the like that is valuable for entrepreneurial activity. Superior access to resources critical for decision making is likely, on average, to lead to more comprehensive and faster strategic decision making. Greater speed (Baum and Wally, 2003; Eisenhardt, 1989) and comprehensiveness (Fredrickson and Mitchell, 1984) of the team's strategic decision making has been associated with superior organizational performance outcomes. More formally, our baseline prediction is:

Hypothesis 1a: More structural holes in the entrepreneurial team's external network is associated with superior venture performance.

More recent literature on team networks has provided empirical support for these ideas (e.g., Reagans and Zuckerman, 2001). The key theoretical finding in this literature is that when networks are included, the performance impact of functional diversity drops significantly—so, networks substitute for functional diversity within teams. The explanation advanced is that functional diversity is correlated with greater external network range and lower internal cohesion (Reagans *et al*., 2004). So, when network variables are included, the effect of functional diversity on team performance may not hold. But is this true for all teams?

Team networks research has examined mainly research and development (R&D) teams within established organizations. Our focus on entrepreneurial teams enables us to draw an additional prediction on when functional diversity and structural holes act as substitutes or complements in driving team performance. Teams within established organizations are generally formed on functional task considerations, such as when a manager *assigns* employees to a project R&D team. In this case, the matching of team members' skill sets to the requirements of the task is likely to be complete since the team is formed on that basis. So, an R&D team within established organizations is almost always likely to have the full array of skills required for the task at hand, and functional diversity in such teams does not reflect completeness of task skills.

In contrast, entrepreneurial teams are rarely formed on a functional basis. Instead, entrepreneurial teams are usually formed using nonfunctional considerations, such as similarity between members (e.g., friends join together to start a new venture) or prior network connections (Ruef, Aldrich, and Carter, 2003). In this case, the matching of team members' skill sets to the task requirements is a variable. So, in entrepreneurial teams, functional diversity reflects completeness of skills required, and more functional diversity in this context implies a better match between task requirement and member skills. A straightforward implication of this reasoning is that functionally diverse entrepreneurial teams are more likely to be associated with positive venture performance outcomes—a prediction supported by extant research (e.g. Beckman, Burton, and O'Reilly, 2007). However, a more interesting and novel implication is the benefits of functional diversity within entrepreneurial teams will hold even when network variables are introduced. In other words, functional diversity and external network structure have additive (i.e., complementary) effects on entrepreneurial team performance. More formally:

Hypothesis 1b: The positive effect of entrepreneurial team's external structural holes on venture performance complements (rather than substitutes for) the effect of functional diversity.

INTERNAL TEAM DYNAMICS AS A CONTINGENCY FACTOR

We propose in this study that the performance impact of external ties may depend on two features of internal dynamics that impact teams' ability to utilize resources available through the external network—strategic consensus and team cohesion. These two features map onto an important distinction made by group process scholars (Hackman, 1987; McGrath, 1984) between a task performance orientation, concerning activities geared toward accomplishing the group's task, and a group maintenance orientation, concerning activities geared toward maintaining relationships within the group. We argue that strategic consensus and cohesion within the entrepreneurial team influence the efficiency and effectiveness with which a team can tap into its external advice network and thus act as important moderators of external network structure.

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The moderating effect of strategic consensus

The impact of an external network on venture performance will depend on the strategic consensus within the entrepreneurial team—the extent to which team members agree on what the strategy and goals of the business ought to be (Miller, Burke, and Glick, 1998). At the extreme, entrepreneurial teams with many structural holes in their external network may get overwhelmed by the substantial quantity of resources flowing through. Strategic consensus can alleviate this problem in two ways.

First, strategic consensus can help the team clarify the venture's needs and what resources are required to be brought into the venture. Greater strategic consensus enables entrepreneurial teams to better coordinate the search through the team's external network and the eventual transfer of the relevant resources into the venture. As the members act in unison to acquire these resources, the likelihood that they will be found, brought in, and used increases. This is especially important since new teams whose members have not worked together in the past often face coordination problems (Stinchombe, 1965). Lack of strategic consensus would lead the team members to dissipate their energy in pursuing too many divergent strands of information and knowledge. Greater strategic consensus enables the team to focus attention on specific information and knowledge that is valuable in the light of the commonly agreed priorities facing the venture.

Second, strategic consensus shapes the salience that individual team members attach to specific information and advice flowing through their external networks. This view on decision making within the entrepreneurial team is consistent with the attention-based view of the firm. As Ocasio describes, attention encompasses 'the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers' (Ocasio, 1997: 189). Greater strategic consensus enables team members to apply similar screening logics to resources made available by the external advice network, giving salience to similar types of resources and perceiving the value of resources in similar ways. Strategic consensus may hence increase the similarity of the filters that entrepreneurial team members implicitly use while searching for knowledge and information through their networks.

Put another way, without a simultaneous consideration of its network position and strategic consensus, the entrepreneurial team would encounter a 'search-transfer' problem (Hansen, 1999) in which the team cannot utilize or absorb the relevant resource that it has identified through its network search. In summary, while spanning more structural holes may, in general, be beneficial for venture performance, we expect entrepreneurial team members to make more effective use of resources available through the external network when there is greater strategic consensus within the team. Hence we propose:

> *Hypothesis 2: The positive effect of structural holes on venture performance will be stronger for teams with greater strategic consensus.*

The moderating effect of team cohesion

Another key team process in the capture of external resources through the entrepreneurial team's network is cohesion, or the extent of interpersonal attraction within the group (McGrath, 1984). Greater cohesion improves communication and trust within the team, facilitating speedy collective action, and hence will allow entrepreneurial teams to make more efficient use of the resources potentially available through their external network.

Cohesion reduces communication costs within teams (Smith *et al*., 1994), leading to faster and more accurate sharing of the resources accessed from the external network. Faster sharing of critical informational resources reduces the occurrence of 'hidden profile' problems (Wittenbaum and Stasser, 1996) within the team—where team members have unique, unshared decision-relevant information. In contrast, in low cohesion teams, interpersonal frictions will likely make it more difficult to share task- relevant resources obtained from the external network. This is also the essence of Reagans and Zuckerman's (2001) argument that strong within-team communication ties enable R&D teams to take advantage of sparse and diverse ties external to the team.

Team cohesion also generates trust between team members, making it possible for the team to collectively act on the basis of resources provided by an individual team member's external network contact. The trust between team members ensures that collective team action is possible without engaging in potentially time-consuming and

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costly efforts to convince the rest of the team about the reliability and authenticity of the resources provided by a particular team member's network contact. In summary, these arguments suggest that team cohesion moderates a team's ability to tap into its external network.

Hypothesis 3: The positive effect of structural holes on venture performance will be stronger for teams with greater cohesion.

METHODS

We tested our predictions using cross-sectional data from Indian software ventures. Our sampling frame of 470 ventures was obtained by selecting companies less than six years old from the Indian software industry association's membership list. The entrepreneurial team was operationalized by asking the CEO of these ventures to identify up to two of the most important employees of the venture who were crucial for strategic decision making. This sampling approach trades off the difficulty in obtaining complete sociometric data on team members' social networks against the risk of omitting team members (Simons, Pelled, and Smith, 1999). The reliance on the CEO to identify the most important participants in strategic decision making helps ensure that the sampling plan captured the most relevant data effectively (e.g., Smith *et al*., 1994). Our mail survey followed Dillman's (2000) guidelines to maximize response rates, and the final sample consisted of data from 84 ventures (18% response rate), of which 74 ventures had three-member entrepreneurial teams and 10 ventures had two-member teams. We used ordinary least squares (OLS) regression methods to test the hypotheses developed, after mean-centering the independent variables to reduce multicolinearity in moderated regressions (Aiken and West, 1991).

Measures

Our independent and control measures were adapted from existing and validated scales from the literature wherever available, and our dependent measure, venture performance, was collected independently of the survey, as detailed below.

Venture performance

We operationalized venture performance as the percentage change in sales revenues in the previous year. The CEOs of all 84 ventures were independently contacted by a networking association representative to obtain revenue growth. Research on new ventures traditionally focused on failure as the outcome of interest. However, more recent research (e.g., Baum, Calabrese, and Silverman, 2000) seeking to understand the drivers of early performance differences among surviving start-ups provides evidence of considerable variation in the early growth of start-ups, with some ventures flourishing while others languish. Growth is an important performance outcome because it confers ventures with economies of scale, increased power, the ability to withstand environmental jolts, and eventually, likely greater profits.

Teams' external network structure

As elaborated below, we use Burt's (1992) constraint measure to measure teams' external network structure. In addition, we draw on the work of Hansen, Podolny, and Pfeffer (2001) on project team networks, which pioneered the method of team aggregation used in this study. To draw up individual entrepreneurial team member's external networks, we asked respondents to name a maximum of five of the most important people, not employed by their company, whom they rely on for valuable advice, guidance, or information relevant to the company. Since respondents could list up to five contacts (consistent with past studies; e.g., McEviley and Zaheer, 1999), and the entrepreneurial team was restricted to three members, the maximum possible number of contacts in an entrepreneurial team's external network is limited to 15.

The external networks of individual team members were then added up to obtain the team's external network as illustrated through an example. Figure 1 shows the external network of Bacchan and Dharam, the entrepreneurial team members of the focal venture. Bacchan reports five network contacts, of which there are two indirect ties (between Rekha and Kamal and between Hema and Rekha, shown as dotted lines). Dharam also reports five network contacts, with three indirect ties (between Dimple and Amir; Ash and Rekha and Hema and Rekha, all shown as dotted lines).

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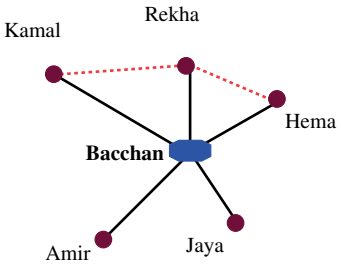
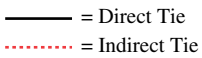
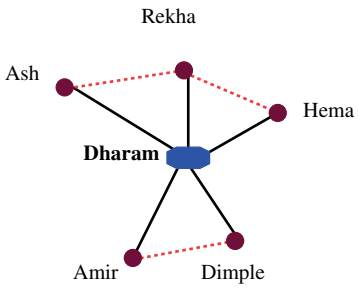


Bacchan's Network

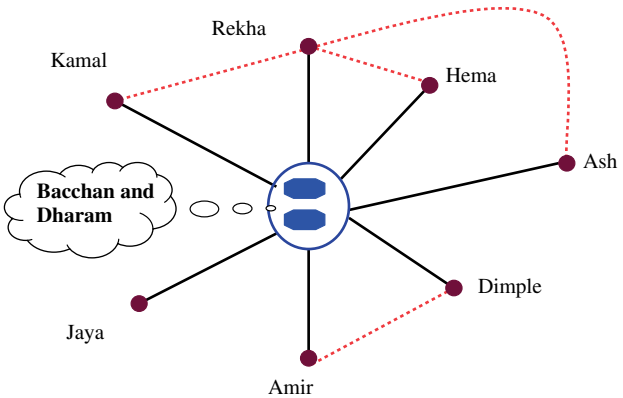
	Bacchan	Rekha	Hema	Amir	Jaya
Bacchan	-				
Rekha	1	-			
Hema	1	1	-		
Amir	1	0	0	-	
Jaya	1	0	0	0	-
Kamal	1	0	0	0	0

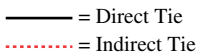


Dharam's Network



	Dharma	Rekha	Hema	Amir	Dimple
Dharam	-				
Rekha	1	-			
Hema	1	1	-		
Amir	1	0	0	-	
Dimple	1	0	0	1	-
Ash	1	1	0	0	0





	Bacchan and Dharam	Rekha	Hema	Jaya	Amir	Kamal	Dimple
Bacchan and Dharam	-						
Rekha	1	-					
Hema	1	1	-				
Jaya	1	0	0	-			
Amir	1	0	0	0	-		
Kamal	1	1	0	0	0	-	
Dimple	1	0	0	Not asked	1	Not asked	-
Ash	1	1	0	Not asked	0	Not asked	0

Figure 1. Deriving the team's network from member's networks. This figure is available in color online at www.interscience.wiley.com/journal/smj

We constructed the team's external network by adding the network ties of all team members, counting an external contact only once, even if that contact had been named by several team members. So, in the example above, the total number of ties in the team's network is seven = five (Bacchan's external ties) + five (Dharam's external ties)—three (to avoid double counting Rekha, Amir, and Hema who were cited by both Bacchan and Dharam). After aggregating the team's network in this manner, we measured the team's structural holes using Burt's (1992) constraint measure.[1]

Burt's (1992) constraint (c) score captures the extent to which an alter j constrains entrepreneurial team i, and is a multiplication of (i) team i's investment of time and energy in the relationship with j and (ii) the lack of structural holes around j and is given by the following formula (Burt, 1992): $c_{ij} = (p_{ij} + \sum_q p_{iq}p_{qj})^2$, for $q \neq i, j$ where p_{ij} is the proportion of team i's relations invested in contact j and $\sum_q p_{iq}p_{qj}$ is the portion of team i's relations invested in contact q, who are in turn invested in contact j. Summed up over all the alters, $\sum_j c_{ij}$ is the network constraint measure. Network constraint is lowest when an entrepreneurial team spans many structural holes and is highest when the team spans few structural holes. Hence, the coefficient of *network constraint* should be negative and significant if Hypothesis 1a is supported.

Strategic consensus

The literature suggests two ways to operationalize the construct of strategic consensus. The first approach asks respondents to rate the importance of specific measures of operative goals and the means to achieve those goals, and uses dispersion scores on these ratings as the measure of strategic consensus (e.g., Knight *et al*., 1999). While this approach has the advantage of generating a more 'objective' measure of strategic consensus, the drawback is the large number of survey items required (typically about 40). However, Miller *et al*. (1998) suggest a perceptual key informant methodology, which trades off the benefit of far fewer survey items against the potential cost of perceptual bias.

In this study, we follow Miller *et al*.'s (1998) approach by measuring strategic consensus using a three-item scale, and simultaneously minimize the risk of potential perceptual bias by obtaining responses from all team members. The scale items were developed by adapting items previously used in research and field interviews. We assessed strategic consensus by asking respondents to rate the extent of agreement within the team on the following three items ($\alpha = 0.91$) using a five-point Likert scale anchored from 'strong disagreement' to 'strong agreement': (i) The long term strategic goals of the company; (ii) the short-term business objectives that should be considered the most important; and (iii) the best ways to ensure the company's survival. The three survey items focused on the domain of venture viability, because field interviews revealed that management team members of new ventures were concerned with issues of short-term and longer-term viability while discussing strategic choices, and likely had strongly held preferences and beliefs on the topic. We averaged each team member's response to the three items to obtain a composite score for strategic consensus. We then averaged this score within the entrepreneurial team to compute strategic consensus within the team. The average James, Demaree, and Wolf's (1984) interrater reliability coefficient $R_{wg(3)}$ statistic for this scale was 0.9, indicating a high level of interrater agreement. The coefficient of *strategic consensus* × *network constraint* should be negative and significant if Hypothesis 2 is supported.

Team cohesion

We measured team cohesion by modifying Carless and De Paola's (2000) scale on work team cohesion to the context of a new venture. Specifically, we used a three-item scale [$\alpha = 0.91$] to measure team cohesion, asking team members to rate the following statements using a five-point Likert scale anchored from 'strongly disagree' to 'strongly agree': (i) Team members have a close relationship with each other; (ii) team members like to spend time together outside of work; and (iii) team members consider themselves personal friends. We averaged each team member's response to the three items to obtain a composite score for cohesion. We then averaged this score within the entrepreneurial team to compute team cohesion. The average James *et al*.'s (1984)

[1] We get consistent results with an alternate measure of non-redundancy suggested by Nicolaou and Birley (2003).

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interrater reliability coefficient $R_{wg(3)}$ statistic for this scale was 0.9, indicating a high level of interrater agreement. The coefficient of *team cohesion* × *network constraint* should be negative and significant if Hypothesis 3 is supported.

Functional diversity

We measured functional diversity within the team using the Blau (1977) index. This measure was computed using self-reported functional areas of expertise by individual team members in our survey.

Control variables

Our research design controls for industry effects by focusing on a single industry. Drawing on prior research (e.g., Baum, Locke, and Smith, 2001; Beckman *et al*., 2007; Roure and Keeley, 1990), we controlled for the following firm and team specific effects: (i) *Venture size*, using the logged number of full time employees; (ii) *Venture age*, using firm age in years; (iii) *Professional investor backed,* set to one for venture capital or angel investor-backed ventures, and zero otherwise; and (iv) *Prior start-up experience* within the team, by summing the count of new ventures started by the team members before the current one.

RESULTS AND DISCUSSION

Descriptive statistics and correlations of all the variables are presented in Table 1. As the table shows, correlations among the independent variables suggest that multicolinearity is unlikely to be a problem.

Table 2 presents the results of our model predicting venture growth performance. Model 1 is the base model and includes only the control variables, followed by Model 2 that includes the main effects of external networks and internal team dynamics—*network constraint, strategic consensus,* and *team cohesion*. Model 3 tests the full model with interaction effect between *network constraint* and the two team dynamics variables—*strategic consensus* and *team cohesion*.

As can be seen from the base model (Model 1), the coefficient of *venture age* is negative and significant, which is consistent with past research on new ventures (e.g., Ostgaard and Birley, 1996). Again, consistent with prior research (e.g. Beckman *et al*., 2007; Eisenhardt and Schoonhoven, 1990) *functional diversity* has a positive (+0.294) and significant coefficient. *Venture size* also has a significant negative influence on venture growth.

Model 2 of Table 2 presents the test of Hypotheses 1a and 1b. Hypothesis 1a predicts that venture performance is enhanced as the structural holes in the entrepreneurial team's external advice network increases. In other words, venture performance is enhanced as network constraint (the measure of structural holes) decreases. As can be seen, the coefficient of *network constraint* is negative and significant (p=0.01 one-tailed), showing strong support for Hypothesis 1a. This coefficient is also negative and significant in Model 3. We interpret this finding as strong support for Hypothesis 1a that lower *network constraint* (i.e., greater structural holes) is positively correlated with new venture performance.

Table 1. Descriptive statistics and correlation matrix[a]

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Revenue growth (log)	0.20	0.20	—							
2. Venture size (log)	3.5	1.2	−0.20^{+}	—						
3. Venture age	3.9	2.4	−0.21^{+}	0.07	—					
4. Professional investor backed	0.42	0.5	0.10	0.18^{+}	−0.18	—				
5. Prior start-up experience	1.57	1.4	−0.08	−0.10	0.01	0.03	—			
6. Functional diversity	0.47	0.21	0.32*	−0.08	0.01	0.02	−0.19^{+}	—		
7. Network constraint[b]	0.32	0.16	−0.36**	0.11	0.22*	0.05	0.15	−0.17	—	
8. Team cohesion[b]	2.9	1.1	0.05	0.03	0.03	−0.01	0.19^{+}	0.10	0.20^{+}	—
9. Strategic consensus[b]	3.3	1.0	−0.11	0.08	−0.03	0.20^{+}	0.11	−0.19^{+}	0.12	0.22*

[a] Reported correlations are Pearson coefficients with N = 84.
$^{+}$ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.
[b] Means and standard deviations reported before mean-centering the variables.

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Table 2. Regression results on the drivers of venture growth

	Model 1 (base model)	**Model 2** (main effect of network constraint)	**Model 3** (network constraint × team dynamics)
Venture size	−0.032^{+}	−0.028^{+}	−0.026
	(0.019)	(0.020)	(0.021)
Venture age	−0.016*	−0.010^{+}	−0.010^{+}
	(0.008)	(0.007)	(0.007)
Professional investor backed	0.0329	0.047	0.054
	(0.048)	(0.044)	(0.044)
Prior start-up experience	−0.006	−0.004	0.001
	(0.010)	(0.010)	(0.011)
Functional diversity	0.294**	0.227*	0.246*
	(0.098)	(0.111)	(0.119)
Network constraint		−0.366**	−0.299*
		(0.122)	(0.137)
Strategic consensus		−0.013	−0.033^{+}
		(0.021)	(0.022)
Team cohesion		0.020	0.009
		(0.021)	(0.022)
Network constraint × strategic consensus			−0.234*
			(0.127)
Network constraint × team cohesion			−0.219^{+}
			(0.141)
Model F	5.7***	6.3***	4.6***
Adjusted R^2	0.14	0.18	0.20
N	84	84	84

[a] The dependent variable is log of revenue growth. Unstandardized regression coefficients with standard errors in parentheses. All models estimated using OLS regression with robust standard errors. Main effect variables are mean centered.
$^{+}$ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ (one tailed).

The coefficient of *functional diversity* continues to remain positive and is statistically significant in Models 2 and 3 even after the inclusion of the network variable, *network constraint*. In addition, the magnitude of *functional diversity* in both Model 2 (+0.227) and in Model 3 (+0.246) is respectively statistically indistinguishable from Model 1 (+0.294) (F=0.36, p=0.55 and F=0.16, p=0.69 respectively). These results suggest that functional diversity and structural holes have independent additive effects on performance, strongly supporting Hypothesis 1b that structural holes and functional diversity are complements rather than substitutes for entrepreneurial teams.

As can be seen from Model 2, the direct effects of *strategic consensus* and *team cohesion*, although not the object of study in this research, are not significant. Hypothesis 2 predicts that structural holes in the entrepreneurial team's external advice network would be particularly beneficial when there is greater strategic consensus within the team. The results shown in Model 3 suggest that *network constraint* × *strategic consensus* and *network constraint* are jointly significant (F=5.3, p = 0.02), which shows that strategic consensus moderates the effect of network constraint on venture growth. The coefficient of the interaction term *network constraint* × *strategic consensus* is negative, suggesting that high strategic consensus amplifies the beneficial effects of greater structural holes in the external network, supporting Hypothesis 2. Similarly, the coefficients of *network constraint* × *team cohesion* and *network constraint* are jointly significant at the 10 percent level (F=2.8, p=0.06); and the coefficient of *network constraint* × *team cohesion* is negative, supporting Hypothesis 3. The adjusted R^2 increase from 18 percent in Model 2 to 20 percent in Model 3 indicates that the two interaction terms add to explanatory power (Aiken and West, 1991). Overall, we conclude that strategic consensus and cohesion within entrepreneurial teams is an important contingency to capture value

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from structural holes in the teams' external networks.

Although much has been written about individual entrepreneur's personal networks as well as about entrepreneurial teams' internal processes, our understanding of how entrepreneurial teams leverage their networks remains limited. This study first demonstrated that entrepreneurial teams spanning many structural holes in their external advice network are associated with high growth ventures. In addition, and more importantly, this study showed that the beneficial effects of structural holes are not uniform, but rather vary with the internal dynamics of entrepreneurial teams. Results for this sample show that greater strategic consensus and greater cohesion within entrepreneurial teams enables them to leverage the structural holes in their external advice networks. These findings confirm our general thesis that network effects are not uniform but rather are contingent on the attributes of the focal actor—here the entrepreneurial team.

We make a theoretical contribution to the literature on entrepreneurial teams by identifying how the external networks of teams influence performance outcomes and the internal conditions under which teams can maximize the benefits from their external networks. Drawing on the upper echelon tradition (Hambrick and Mason, 1984; Simons and Peterson, 2000), research on entrepreneurial teams has generally focused on their internal features—emphasizing the impact of demographic attributes (e.g., Watson, Stewart, and BarNir, 2003) and team processes (e.g., Ensley, Pearson, and Amason, 2002) on performance outcomes. Less attention has been paid to how entrepreneurial teams gain access to external decision-relevant information and knowledge, despite evidence of their importance from the vast literature on individual entrepreneur's personal networks (Aldrich, 1999). We argue and provide evidence that entrepreneurial teams' social ties are important conduits for accessing relevant external knowledge and require managerial actions that are quite different from managing internal processes in the team. Further, by focusing on the *pattern* of teams' external ties, we extend prior research on management teams of established organizations that focus on team members' networking activities (Luo, 2003) or ties to specific categories of contacts, such as ties to government officials (Peng and Luo, 2000).

We also make a theoretical contribution to the literature on team networks, which largely examines networks of work teams within established organizations. The first central finding in this literature is that the 'optimal' network structure for a team is high within-team density (a proxy for team cohesion) and high external range (a measure of network structure that is highly correlated with structural holes) (Reagans and Zuckerman, 2001). It appears that this broad principle is true in a start-up context as well, but with an important addition that our research helped to uncover. Theory on team networks does not distinguish between cohesion, which captures interpersonal friendships within the team, and strategic consensus, which indicates the extent of agreement on the key task goals and objectives. In this study, we show that in addition to team cohesion, an important factor in leveraging external networks is the extent of strategic consensus within the team. Given that cohesion and strategic consensus are conceptually distinct (and empirically as well, given the relatively low correlation between cohesion and strategic consensus in our sample), our research has uncovered an additional channel of leverage available to entrepreneurial teams to enhance the performance impact of their external networks.

The second theoretical finding in team networks is the greater predictive power of network factors over team demographics in predicting performance outcomes. Reagans *et al*. (2004), using a sample of R&D teams inside established organizations, show that team network variables (external network range and within-team network density) are a proximate driver of performance compared to functional diversity—an important team demographic attribute. Our finding that network structure and functional diversity have an *additive* effect on performance reveals a boundary condition based on team formation that theory has not considered. Specifically, our research suggests that in settings with variation in the completeness of teams' task-relevant skill sets, network structure likely complements rather than substitutes for team demographics.

Although not directly comparable, our finding on the main effect of structural holes also builds on and extends prior research on entrepreneurs' personal networks. Early entrepreneurship research established that entrepreneurs' personal networks have positive performance effects (e.g.,

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Birley, 1985), although precise network measures were not calculated. Subsequent research on entrepreneurs' networks reported mixed effects—while some research (e.g., Bruderl and Preisendorfer, 1998; Ostgaard and Birley, 1996) showed that entrepreneurs' network ties were significant drivers of early venture growth, others showed that networks did not matter (e.g., Johannisson, 1996). One reason for the mixed findings is past research may not have accurately captured the full range of network resources since it was focused only on the CEO's networks. By examining the role of the entrepreneurial team's networks rather than just the CEO, we overcome this limitation, making our results more compelling. A second reason advanced for the mixed findings in past research is imperfect operationalization of network constructs (Burt, 2000). By capturing details of specific individuals in the advice network as well as the relationships between network contacts, we more accurately capture the causal mechanism linking network structure to performance outcomes.

We should note that since this is a cross-sectional study, there is a possibility of reverse causality. It is possible that superior performance causes greater strategic consensus or cohesion within the team. Behavioral decision theory (Bazerman, 1994) suggests this may be less likely in settings with high uncertainty, such as new ventures, because systematic biases (e.g., confirmation bias) could lead to selective perception in individuals in ways that maintain the consistency of their prior thinking. However, theory also predicts that successful ventures are more likely to have entrepreneurial teams with greater consensus and cohesion.[2] Hence, longitudinal research designs are needed to further understand how teams use their external ties.

CONCLUSION

This research demonstrated that entrepreneurial teams, and not just individual entrepreneurs, differ systematically in the structure of their external networks, with greater structural holes in entrepreneurial teams' external networks being positively correlated with their ventures' performance, as well as the entrepreneurial teams' functional diversity. Moreover, although network structure is important, this research showed that more cohesive teams and teams with greater strategic consensus can reap greater benefits from appropriately structured external networks. We thus begin to unpack some of the mechanisms by which management teams of new ventures jointly use their human and social capital as drivers of firm heterogeneity (Castanias and Helfat, 1991).

Our findings have three practical implications for new venture management. First, as shown for other teams, entrepreneurial teams should build an external advice network that spans many structural holes. This is particularly important considering entrepreneurs' natural inclination to draw their team members from their close circles of friends and families (Ruef *et al*., 2003), who in turn tend to know the same set of people, leading to a dense external network. Second, entrepreneurs need to pay attention to maintaining consensus within the team on the key goals of the venture in order to leverage benefits from external ties. Reaching agreement on key goals is likely a difficult task in new ventures because high uncertainty could lead to continual debate. Finally, it is important to consider the functional diversity of the entrepreneurial team in addition to its network structure. While we await future research to shed light on the generalizability of these results to other settings, this study provides the first systematic evidence that entrepreneurial teams' internal dynamics and external network structures are important sources of heterogeneity, with performance implications for new ventures.

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