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Leveraging Ties: The Contingent Value of Entrepreneurial Teams' External Advice Networks on Indian Software Venture Performance

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Leveraging Ties: The Contingent Value of Entrepreneurial Teams' External Advice Networks on Indian Software Venture Performance

ABSTRACT

This paper investigates the impact of entrepreneurial teams' external networks on their ventures' performance. We propose that ventures whose entrepreneurial teams are embedded in less dense external advice networks experience higher performance because of superior access to valuable resources that improves strategic decision making. We then propose that network ties are not uniform in their effect, but rather are contingent on the characteristics of the network contacts and the internal dynamics within the entrepreneurial team. Data from Indian software ventures shows support for the both the direct effect of external networks and the contingent effect of internal team dynamics. However, we only find weak support for the contingent effect of network contact characteristics on venture performance.

There has been considerable interest in understanding how the social context in which individuals and firms are embedded (Granovetter, 1985) affect their economic behavior and performance. While embeddedness is viewed as having performance benefits (e.g. Burt, 1992; Gulati, 1998) more recent research suggests that embeddedness may not necessarily lead to beneficial outcomes (e.g. Gargiulo & Benassi, 1999) and that the value of ties might vary. Organizational scholars have begun to examine the contingent value of ties for *inter-personal networks* (e.g. Moran, 2005; Podolny & Baron, 1997) and for *inter-organizational networks* (e.g. Ahuja, 2000; Gulati & Higgins, 2003). There is however far less understanding of this possibility for *team level networks*. In fact, despite the recent surge of interest in networks of organizational teams (e.g. Athanassiou & Nigh, 1999; Balkundi & Harrison, 2005; Reagans & Zuckerman, 2001), little is known about whether and which contingencies moderate the effect of team embeddedness on organizational performance.

Understanding the full impact of embeddedness is crucial for new ventures since the social capital of its top management team (hereafter entrepreneurial team) is one of the critical resources that new ventures possess. We conceptualize entrepreneurial teams as being embedded in a network of social ties with external advisors (hereafter external network) and we examine both the direct and contingent effect of embeddedness by addressing the following research questions: How does the structure of entrepreneurial teams' external network influence their venture's performance? Is the value that entrepreneurial teams derive from the structure of their external network contingent on the internal dynamics within the entrepreneurial team? Finally, is the value that entrepreneurial teams derive from the structure of their external network contingent on characteristics of their network contacts?

The importance of social ties of entrepreneurs is well recognized in the literature (e.g. Aldrich & Zimmer, 1986; Hite & Hesterley, 2001) and scholars have shown that the structure of *inter-personal networks* of individual entrepreneurs matter for new venture outcomes (e.g., Birley, 1985; McEvily & Zaheer, 1999). This attention to the ties of individual entrepreneurs is in

contrast with the paucity of research on the networks of the entrepreneurial team as a whole. Arguably, the performance of the new venture is likely to depend on the external networks of all of its entrepreneurial team members rather than on just that of its founder. Determining the impact of the entrepreneurial teams' external network on new venture performance will give a more accurate picture of these ventures' fate. In this study, we propose that the structure of the external network in which entrepreneurial teams are embedded, and more specifically network density, affects venture performance since social ties provide access to valuable information, knowledge and advice (hereafter resources) that facilitates strategic decision making.

Moreover, prior research has not examined how the performance impact of entrepreneurial actors' external network varies with the attributes of the actor and with attributes of network contacts, and as such assuming that such attributes are either non important or homogeneous across networks. Both of these assumptions are unlikely to be true however at both the individual entrepreneur and the entrepreneurial team's level of analysis which is the focus of this study. First, internal team dynamics are proven to be important for entrepreneurial teams (e.g. Foo, Sin & Yiong, 2005) and are likely to affect their ability to tap into and benefit from their external networks. Second, even if two networks have the same structure not all networks contacts are of equal value. In this study, we thus propose that the structure of external networks are not uniform in their effect, but rather vary with the internal dynamics within the entrepreneurial team and the characteristics of network contacts.

We focus on two features of team dynamics, *strategic consensus* or the extent to which team members agree on what the goals and strategies of the venture should be and *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.

We then focus on two key contacts characteristics in the entrepreneurial teams' external network – their trustworthiness and criticality. *Contact trustworthiness* is defined as an

entrepreneurial team member's expectation that her focal network contact can (i) be relied on to fulfill obligations, (ii) will behave in a predictable manner (McAllister, 1995) and (iii) will act fairly even when the possibility for opportunism is present (Bromiley & Cummings, 1995). By *contact criticality* we refer to the extent to which an entrepreneurial team member's focal network contact gives her access to important resources (Barney, 1991). We propose that contact trustworthiness and criticality impact the reliability, value of and control over resources obtained through the external contact network and moderates the benefits of external network structure.

We test our theory in the context of Indian software ventures, an industry where entrepreneurship is booming and that is slowly becoming a force to be reckoned with in global markets. We find strong support for the direct effect of network density and the contingent effect of internal team dynamics on venture performance. We also find weak support for the contingent effect of contact trustworthiness but no support for the contingent effect of contact criticality.

We contribute to research on strategy and entrepreneurship by building on prior research that identified how *entrepreneurs* acquire valuable resources from their personal contact network (Birley, 1985; Nohria, 1992). This work enhances our understanding of how new ventures secure critical resources by focusing our attention on how *entrepreneurial teams*, as a whole, rather than individual entrepreneurs can leverage resources from their external network. Also, by shedding light on how entrepreneurial teams are a source of heterogeneity for new venture performance this study addresses questions that are central to research on strategy and entrepreneurship.

Finally, we are challenging the underlying assumptions in much of prior research on social networks that the value of networks is in their structure and not dependent on the focal actor(s) or team(s) characteristics and external network contacts characteristics.

STRUCTURE OF EXTERNAL ADVICE NETWORK AND VENTURE PERFORMANCE

Research under the rubric of "social networks" and "social capital" has largely sought to understand how attributes of an actor's social ties are most conducive to the realisation of the

actor's goals and objectives (see Adler & Kwon, 2002 for a review). In the context of new ventures, the external networks of entrepreneurial teams is very salient since these ventures often have little 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 that can help improve strategic decision making by increasing the strategic alternatives considered and the knowledge and information needed to develop and evaluate such alternatives. External network contacts can provide strategic knowledge and insights that extend beyond the team's own limited resource base increasing the alternatives available during strategic decision making. More generally, entrepreneurial teams well embedded in external networks can gain advantages such as knowledge spillovers on best practices, market intelligence on customer needs, or competitor moves, and failed technological or marketing approaches.

Burt's (1992) structural hole theory predicts that resources flowing through the entrepreneurial team's external network is less likely to be redundant, more likely to be novel and more likely to be made available faster if network contacts are themselves not connected to each other. This is also the essence of Granovetter's (1973) argument that weak ties bridging otherwise disconnected social groups are more valuable as sources of new information than strong ties, which are typically densely interconnected and hence offer redundant information. Social network research in this tradition underscores network density, which is the obverse of redundancy, as a key attribute of networks that captures the essence of the focal actor's network structure (Scott, 2000). Network density is the extent to which the focal actor's network contacts are themselves connected to each other – network density increases as the number of interconnections between contacts increases. Thus, entrepreneurial teams embedded in low density networks are likely to enjoy faster and superior access to a broad array of resources such as information and advice on technology trends, sources of funding, location of skilled human resources etc. that is valuable for entrepreneurial activity.

Faster and superior access to resources critical for decision making is more likely, on average, to lead to more comprehensive and faster strategic decision making. Greater speed (Baum & Wally, 2003; Eisenhardt, 1989) and comprehensiveness (Fredrickson & Mitchell, 1984) of the team's strategic decision making has been associated with superior organizational performance outcomes. More formally:

H1: Lower network density of entrepreneurial teams' external network is associated with greater venture performance

INTERNAL TEAM DYNAMICS AS A CONTINGENCY FACTOR

While low density external networks provide access to resources, the performance impact of external ties will depend on whether team dynamics enables its members to take advantage of these resources effectively and efficiently. We examine two aspects of team dynamics that may impact their ability to utilize resources available through the external network. The first aspect – which we term strategic consensus, is defined as the extent to which team members agree on what the strategy and goals of the business ought to be (Miller et.al. 1998). The second feature – which we term cohesion, is defined as the extent of interpersonal attraction within the group (McGrath, 1984) and essentially captures the extent to which entrepreneurial team members are friends.

These two aspects of team dynamics respectively map on to an important distinction made by group process scholars (e.g. Hackman, 1987; McGrath, 1984) between a task performance orientation -activities geared towards accomplishing the group's task, and a group maintenance orientation -activities geared towards maintaining relationships within the group, in theorizing about effective team performance. We argue below that strategic consensus and cohesion within the entrepreneurial team influence the efficiency and effectiveness in which a team can tap into its external advice network and thus act as important moderators of network density.

The moderating effect of strategic consensus

Although a low density external network provides access to valuable resources, its impact on venture performance may depend on the extent to which the entrepreneurial team can effectively bring in and utilize those resources for strategic decision making. Greater strategic consensus enables teams to take better advantage of the resources potentially available through their external network by clarifying which of these exactly needs to be brought into the venture, and increasing the likelihood that such resources will be accessed and transferred into the venture. As the density of the entrepreneurial team's external network decreases, the team will have access to and have to sift through a broader array of resources. As explained below, strategic consensus is an important factor in helping sort through such resources as they shape the salience that individual team members attach to specific information and advice flowing through their external networks.

For an entrepreneurial team, selecting the relevant information and knowledge from the flow of resources in their external network requires a clear agreement on what the venture's key strategic priorities and objectives are. Lack of such agreement would lead the team to dissipate its energy in pursuing too many divergent strands of information and knowledge. As such, greater strategic consensus within the team, i.e. the shared agreement within the team on the goals and objectives of the venture, 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. This view on decision making within the entrepreneurial team is consistent with the attention-based view of the firm. As Occasio (1997: Pg 189) describes, attention encompasses 'the noticing, encoding, interpreting and focusing of time and effort by organizational decision-makers'. In this context, greater strategic consensus within the team leads team members to apply similar screening 'logics' to resources made available by the external advice network -

giving salience to similar types of resources, perceiving the value of resources in similar ways etc.

Accessing resources through the team's network may also require pro-active and coordinated search, at a time when new ventures often face coordination problems since organizational members often have not worked together in the past (Stinchombe, 1965). Greater strategic consensus enables entrepreneurial teams to coordinate their actions better and as such facilitate the search through the team's external network and the eventual transfer of the relevant resources into the venture. 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 (Tsai, 2001) the relevant resource that it has identified through its network search. Hence, the lower the density of the external network of the entrepreneurial team, the broader the resources available to the team and the higher the strategic consensus required to transfer and absorb the relevant resource to the team.

In summary, while lower network density 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:

H2: External network density is more likely to be negatively associated with superior venture performance for ventures with greater strategic consensus within the entrepreneurial team

The moderating effect of team cohesion

While a low density external network provides access to valuable resources, its impact on venture performance is likely to depend on the extent to which the entrepreneurial team can efficiently bring in and utilize those resources for strategic decision making. Greater cohesion improves communication and trust within the team facilitating speedy collective action and hence will allow the entrepreneurial team to make more efficient use of the resources potentially available through their external network.

Cohesion is known to reduce communication costs within teams (Ouchi, 1980; 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 & Stasser, 1998) 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 (2001) argument that strong within-team communication ties enables 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 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, while lower network density may, in general, be beneficial for venture performance, we expect entrepreneurial team members to make more efficient use of resources available through the external network when there is greater strategic consensus within the team.

These arguments suggest that team cohesion moderates a team's ability to tap into its external network or more formally:

H3: External network density is more likely to be negatively associated with superior venture performance for ventures with greater cohesion within the entrepreneurial team

EXTERNAL CONTACT CHARACTERISTICS AS A CONTINGENCY FACTOR

While low density external networks increases access to resources, the performance impact of external ties will depend on whether external contact characteristics enables team members to access reliable and critical resources. We examine two aspects of external contact characteristics that may affect the quality of resources available from the entrepreneurial teams' external network. The first aspect – which we term contact trustworthiness, refers to the perception of entrepreneurial team members' that their focal contact is predictable and fair. The second aspect – which we term contact criticality, refers to the extent to which network contacts provides access to important resources that the entrepreneurial team would otherwise find very difficult to access. We argue below that contact trustworthiness and criticality increase the reliability, importance of and control over resources available through the external network and thus act as important moderators of external network density.

The moderating effect of contact trustworthiness

Contact trustworthiness is defined as an entrepreneurial team member's expectation that his or her focal network contact can (i) be relied on to fulfill obligations, (ii) will behave in a predictable manner (McAllister, 1995) and (iii) will act fairly even when the possibility for opportunism is present (Bromiley & Cummings, 1995; Butler, 1991). Our conceptualization is consistent with mainstream conceptualizations of trust that view it as encompassing two components - predictability of behaviour and the expectation of fairness (Lewicki & Bunker, 1996). As outlined below, greater contact trustworthiness is particularly valuable to teams with low density external networks.

Establishing the authenticity of resources flowing in from external networks could be problematic in the highly uncertain context of a new venture. In highly uncertain environments, trustworthiness is a key element necessary for establishing authenticity. Within firms, division of labor, hierarchy of authority and behavioral rules strongly constrain member's actions, generally attenuating the threat of opportunism (Aldrich, 1999). In contrast, exchanges across firm boundaries are not so constrained and present a higher threat of opportunism (Williamson, 1996). Under such conditions, trust in the exchange partner can mitigate the threat of opportunism. Hence trust will have a strong impact on the authenticity of the resources accessed through the external network.

The problem of determining the authenticity of resources flowing through the external network is likely to be especially problematic for entrepreneurial teams with low density networks because of the greater accessible volume of novel resources as well as the greater likelihood of encountering unreliable resources and misleading information. In contrast, in high density networks, resources are likely to be mostly redundant making it easier to check its veracity. Contact trustworthiness greatly reduces the need to establish the authenticity of resources since the greater integrity and competence of highly trustworthy contacts makes it unnecessary to do so. Put differently, we suggest that contact trustworthiness can ameliorate the downsides of having lower density external networks. Hence, all else being equal, contact trustworthiness is likely to be far more important for low density networks than for high density networks. More formally:

H4: External network density is more likely to be negatively associated with superior venture performance for ventures with greater contact trustworthiness

The moderating effect of contact criticality

There are two reasons why we believe the benefits of lower external network density are enhanced when contact criticality is also greater. First, building on the resource based view of the firm (Barney, 1991; Dierickx & Cool, 1989) we reason that while lower external network density provides access to novel resources it is not necessarily the case that these resources are also *valuable* for the venture. In a worse case scenario, the venture may be drowned with novel but non-valuable resources that slow down strategic decision making and leave the venture unable to access critical information or knowledge that could determine its early success. However, when contact criticality is greater, entrepreneurial teams are more likely to access novel resources that are also valuable in the light of the specific situation facing the venture. Put another way, greater contact criticality is particularly valuable for low density networks because it provides the team with novel and valuable resources.

Contact criticality is also more beneficial for low density external networks because of the control benefits that accrue to entrepreneurial teams embedded in low density external networks. Simply put, critical contacts wield power over the entrepreneurial team because of the team's dependence (Emerson, 1976; Pfeffer & Salancik, 1978) and are thus in a position to constrain the team's actions. However, entrepreneurial teams embedded in low density external networks – where network contacts are themselves not connected to each other - can overcome these constraints by playing off network contacts against each other (Burt, 1992). In contrast, in high density external networks – where network contacts are themselves densely interconnected – network contacts are more likely to come to a common set of expectations (Coleman, 1990; Podolny & Baron, 1997) on how the entrepreneurial team should act, thus reducing the team's ability to play off one contact against another. Put differently, contact criticality will be particularly harmful for high density networks but much less so for low density networks.

Both these arguments suggest that contact criticality moderates a team's ability to tap into its external network or more formally:

H5: Network density is more likely to be negatively associated with superior venture performance for ventures with greater contact criticality

METHODS

We tested the hypotheses developed in a single industry, Indian software, to control for a variety of industry specific effects that could potentially confound the performance impact of entrepreneurial teams. The software industry is also adequate since past research has shown that top management teams in this sector have high managerial discretion suggesting managerial intervention has significant performance consequences (Hambrick & Abrahamson, 1995). Finally, the Indian software industry is an interesting setting since it is slowly becoming a global force and research on emerging economies suggests that social networks may be even more important in this setting as they may substitute for missing or imperfect markets for information intermediaries (Khanna & Palepu, 1997).

Prior to the data collection we complemented our theory development with in-depth fieldwork with the top management teams of two ventures followed by interviews with the CEOs of 5 other ventures to get the richness of contextual detail required to ground our survey items. These interviews reaffirmed the relevance of examining the link between external networks and their attributes and internal team processes and venture performance. A pilot survey was used to refine the wording of items, layout of the instrument and the length of the survey.

Sampling Frame and Data Collection

We identified 470 software ventures that were less than six years old and members of either National Association of Software and Service Companies (NASSCOM) or IndUS Entrepreneurs (TiE). NASSCOM is the only industry association of software firms in India and

has a membership of about 900 firms accounting for about 98% of industry revenues. TiE is a prominent networking organization for high technology entrepreneurship and is headquartered in Silicon Valley with local chapters in many Indian cities. The 6-year upper limit is consistent with past research on identifying new firms (e.g. Zahra, Ireland & Hitt, 2000).

The mail survey packet was sent to the CEO of these 470 ventures in early 2002. It contained 3 mail surveys, one marked 'CEO Questionnaire' and the other two marked as 'Team Member Questionnaire'. The entrepreneurial team was operationalized by asking the CEO to identify the two most important employees of the venture that 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).

The mail survey protocol followed Dillman's (2000) guidelines to maximize response rates. Endorsement of the research project by NASSCOM and two local chapters of TiE were of significant help in achieving a satisfactory response rate. Of the 470 survey packets sent out, 462 were eligible for completion (8 ventures had either closed down or changed addresses) and 110 (24%) ventures responded with at least one survey while 97 (21%) ventures had returned all the surveys (i.e. CEO questionnaire + Team member questionnaire(s)). The final sample consisted of data from 84 (18%) ventures that were complete in all respects. The final response rate (18%) was considered sufficient and in line with typical response rates for mail survey methods (Rossi, Wright & Anderson, 1983). Out of the 84 ventures in the final usable sample, 74 ventures had 3-member entrepreneurial teams while 10 ventures had 2-member teams. Since venture size data was not available for non-respondent, we used one way ANOVA to compare the venture age of respondent and non-respondent ventures and found no significant differences.

Measures

Our dependent 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 from December 2000 to December 2001. The CEOs of all 84 ventures were independently contacted by a networking association representative to obtain revenue growth during the year 2001. Four ventures in the sample were started during the year 2000 and for these ventures respondents reported revenue growth after annualizing their sales revenue for 2000. There were no ventures started during 2001 in the final sample.

Research on new ventures traditionally focused on failure as the outcome of interest. However, more recent research (e.g. Baum et.al., 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, shifting focus to venture growth as an important measure of early venture performance. Growth is an important performance outcome because it confers ventures with economies of scale, increased power, the ability to withstand environmental changes, and eventually likely greater profits.

Network Structure

To draw up individual entrepreneurial team members external network, we asked respondents to name a maximum of the five most important people, not employed by their company that they rely on for valuable advice, guidance or information relevant to the company. Since respondents could list up to 5 contacts (consistent with past studies e.g. McEviley & Zaheer, 1999) and the entrepreneurial team was restricted to 3, 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 5 network contacts, of which there are 2 indirect ties (between Rekha and Kamal and between Hema and Rekha, shown as dotted lines). Dharam also reports 5 network contacts, with 3 indirect ties (between Dimple and Amir; Ash and Rekha and Hema and Rekha, all shown as dotted lines).

**********Figure 1 about here**********

We constructed the team's external network by adding the network ties of all team members then subtracting duplicate ties to the same external contact. In the example above since Rekha is tied to both Bacchan and Dharam, and both Bacchan and Dharam are tied to Hema and Amir, the total number of ties is 7 = 5 (Bacchan's external ties) + 5 (Dharam's external ties) – 3 (duplicate ties). It is possible that we might have overestimated the size of the team's contact network if team members identify the same contact using different names – for example, if one team member used the contact's first name while another team member used a nickname to identify the same contact.

Network Density. To determine network density, we asked each team member whether he or she thought there was a tie between each pair of contacts (i.e. the dotted lines in Figure 1, referred to as indirect ties) they had identified in the prior step. This methodology assumes that there are no systematic biases in the way team members perceive relations between their network contacts. Then we calculated the maximum adjusted number of ties which corrects for unknown data on the indirect ties, or links between the contacts across the different TMT teams' individual networks. In the example given above, we do not know for example if Jaya is tied to Dimple or Ash. Rather than simply ignore these potential ties, we assumed that the proportion of indirect

ties among the contacts that were not assessed equals the proportion of estimated indirect ties among the possible number of indirect ties that respondents were asked to assess (See Hansen et. al. 2000)[1]. We then calculated the *adjusted* maximum number of indirect ties as:

Adjusted maximum number of indirect ties = N*(N-1)/2 – X
= 7*6/2 – 4 (in the example)
= 17

Where N is the size of the entrepreneurial team's network (7 in the example), and X is the number of ties between contacts that could not be assessed (the 4 'not asked' cells in figure 1). Network density is then calculated as follows:

Network density = Number of reported indirect ties / adjusted max no of indirect ties
= 4 / 17 (in the example)
= 0.24

The coefficient of *Network density* should be negative and significant if hypothesis H1 is supported.

Strategic Consensus. Building on Miller et.al. (1998) we defined strategic consensus as the extent of agreement within the team on the long term goals and short term business objectives. 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 items). However, Miller et. al. (1998) suggests a perceptual key informant methodology, which trades off the benefit of far fewer survey items against the potential cost of perceptual bias.

[1] The results section outlines how we tested the robustness of this assumption.

In this study, we follow Miller et. al.(1998)'s approach by measuring strategic consensus using a 3-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[2]. We assessed strategic consensus by asking respondents to rate the extent of agreement within the team on the following three items (= 0.91) using a 5 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 whilst 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.

We tested the validity of aggregating individual responses to the team level in two ways. First, the one way analysis of variance suggested that the level of between-team variation was significantly greater ($p<0.001$) than the level of within-team variation, indicating relatively high level of agreement within teams. The average James et. al.'s (1984) inter-rater reliability coefficient $R_{wg(3)}$ statistic for this scale was 0.9 indicating a high level of inter-rater agreement. The coefficient of *Strategic consensus X Network density* should be negative and significant if hypothesis H2 is supported

Team Cohesion. We measured team cohesion by modifying Carless and Paola's (2000) scale on work team cohesion to the context of a new venture. Specifically, we used a 3-item scale [α =

[2] We administered the field-interview participants a survey adapted from Knight et.al. (1999) that measured strategic consensus using a 41 item scale. For the 7 ventures that participated in the field interviews, strategic consensus measured using the 41 item scale were consistent with the 3 item scale based on Miller et.al.'s (1998) approach.

0.91] to measure team cohesion, asking team members to rate the following statements using a 5 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 (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. Again, we tested the validity of aggregating individual responses to the team level in two ways. First, the one way analysis of variance suggested that the level of between-team variation was significantly greater ($p<0.001$) than the level of within-team variation, indicating relatively high level of agreement within teams. The average James et. al.'s (1984) inter-rater reliability coefficient $R_{wg(3)}$ statistic for this scale was 0.9 indicating a high level of inter-rater agreement. The coefficient of *Team cohesion X Network density* should be negative and significant if hypothesis H3 is supported

Contact Trustworthiness. We adapted items used in Johnson-George and Swap's (1982) scale for measuring trust in a specific other as well as McAllister's (1995) scale for affect and cognition based trust to measure contact trustworthiness. Specifically, we asked entrepreneurial team members their extent of agreement on a 5 point Likert type scale anchored from 'strongly disagree' to 'strongly agree' the following statements about each of their external network contacts: (i) This contact is generally honest and truthful in our interactions (ii) This contact is very competent in the areas in which we interact (iii) This contact tends to deliver on his or her promises and commitments made to me (iv) This contact would not take advantage of me even if he or she had an opportunity to do so. Factor analysis revealed that the four items loaded on to a single factor. We averaged each team member's ratings on the four items to obtain a composite score for contact trustworthiness. We then averaged this score within the entrepreneurial team to compute contact trustworthiness of the entrepreneurial team's external network. The coefficient

of *Contact trustworthiness X Network density* should be negative and significant if hypothesis H4 is supported.

Contact criticality. We measured contact criticality by asking team members to rate the following statement using a 5 point Likert scale anchored from 'strongly disagree' to 'strongly agree': "This contact gives me access to important networks that I would otherwise find very difficult to penetrate". We then calculated contact criticality of the entrepreneurial team's external network as the average of individual team members' rating of their contacts' criticality. The coefficient of *Contact criticality X Network density* should be negative and significant if hypothesis H5 is supported.

Control Variables. We controlled for *Venture size* and *Venture age* since past research had used these factors as proxies for availability of critical resources needed for firm growth (Baum, Locke & Smith, 2001). We also controlled for *Functional diversity* as a measure of the teams access to relevant functional skills and capabilities that are important for firm performance (e.g. Hambrick, 1994; Roure & Keeley, 1990) and could be correlated with entrepreneurial teams' network characteristics. Finally, we controlled for external *Network size* since larger networks could also provide access to greater volume of resources. *Venture size* is measured as the number of full time equivalent employees in December 2000 as reported by the CEO, *Venture age* is measured as the number of months from the date of legal incorporation of the venture as reported by the CEO. Data on venture age provided by NASSCOM and TiE matched self-reported age for all but 7 ventures, which were found to be more than 6 years old. After determining that the results did not vary if these ventures were included or not, we decided to retain them in our sample (with their self-reported age) to improve degrees of freedom. *Functional diversity* is measured using the Blau index (1977) based on self-reported functional areas of expertise. *Network size* is

defined as the total number of ties in the team's external network and could range from minimum of 0 to a maximum of 15.

Model and Analysis

We use OLS regressions methods to test the hypotheses developed. In order to correct for the multicollinearity that arises when testing moderated relationships among continuous variables, the independent variables were centered before the interaction terms were generated (Aiken & West, 1991). Centering involved subtracting the sample mean from each independent variable, leaving the sample distribution unchanged, but with a mean of zero. The interaction terms were generated by multiplication of the mean centered variables. Such a centering procedure is favored because it yields readily interpretable coefficients and significantly reduces multicollinearity between the main terms and the interaction terms.

RESULTS

Descriptive statistics and correlations of all the variables are presented in Table 1. The average venture experienced revenue growth of 81%, was about 3.8 years old with 71 employees. Of CEOs responding, 83% also identify themselves as founders[3], while 49% of the other team members are also founders. As the table shows, correlations among the independent variables suggest that multi-collinearity is unlikely to be a problem. As an additional check, we examined the variance inflation factors (VIFs) of each independent variable. The largest VIF at 1.5 was significantly less than the cutoff value of 3, confirming that multi-collinearity was not an issue (Hair et.al. 1998).

********Tables 1 and 2 about here **********

[3] Founders were defined as individuals who were significantly involved in start-up activities and who own a large equity stake in the venture.

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 effect for *Network Density*. Model 3 presents the effect of the interaction terms between network density and the two team dynamics variables – *Strategic consensus* and *Team cohesion*. Model 4 presents the effect of the interaction terms between network density and the two network contact characteristics variables – *Contact trustworthiness* and *Contact criticality* while Model 5 presents the full model.

Hypothesis 1 predicts that venture performance is enhanced as network density of the entrepreneurial team's external advice network decreases. As can be seen from Model 2 of Table 2, the coefficient of *Network density* is negative and significant (p=0.025, one tailed), showing strong support for H1. This coefficient is also negative and significant in the other models. We interpret this finding as strong support for H1 that lower network density has a beneficial effect on venture performance.

Hypothesis 2 predicts that lower network density in the entrepreneurial team's external advice network would be particularly beneficial when there is greater strategic consensus within the team. The coefficient of *Network density X Strategic consensus* is negative and significant in model 3 (p= 0.025 one tailed) and model 5 (p = 0.023 one tailed) showing strong support H2. Hypothesis 3 predicts that lower network density in the entrepreneurial team's external advice network would be particularly beneficial when there is greater team cohesion within the team. The coefficient of *Network density X Team cohesion* is negative and significant in model 3 (p=0.08 one tailed) and model 5 (p= 0.05 one tailed) showing strong support for H3. Taken together, these results suggest strong support for the notion that internal team dynamics is an important contingency that helps entrepreneurial teams in capturing value from their external networks.

Hypothesis 4 predicts that lower network density in the entrepreneurial team's external advice network would be particularly beneficial when the contact trustworthiness is greater.

Model 4 of Table 2 shows that the coefficient of *Network density X Contact trustworthiness* is negative and significant (p=0.03, one tailed)), supporting H4. However, this same coefficient is negative but with a lower significance level (p = 0.0.06 one tailed) in the full model - model 5. We interpret this result as moderate support for H4. Hypothesis 5 predicts that lower network density in the entrepreneurial team's external advice network would be particularly harmful when contact criticality is greater. However, models 4 and of Table 2 show that the coefficient of *Network density X Contact criticality* is not significant at conventional levels, suggesting no support for H5. Taken together, we interpret these results as weak support for our claim that characteristics of network contacts are an important contingency for network density.

The direct effects of *Strategic consensus*, *Team cohesion*, *Contact trustworthiness*, and *Contact criticality*, although not of interest in this study, are not significant when the interaction effects are introduced in the models. With respect to our control variables, the coefficient of *Venture age* is negative and significant which is consistent with past research on new ventures (e.g. Ostgaard & Birley, 1996). Again, consistent with prior research (e.g. Eisenhardt & Schoonhoven, 1990) the base model suggests that *Functional diversity* within the entrepreneurial team has a positive and significant effect on growth performance but this effect loses significance in the full model. *Venture size* also has a significant negative influence on venture growth in the base model but loses significance in the full model.

Robustness Tests

We completed a number of sensitivity tests (results not reported here) to estimate the robustness of the findings. We first tested if the reported results were driven by the particular method of aggregation used to consolidate individual networks into the team's networks. We re-ran the models by calculating network measures for each individual team member and then averaging across the team members, in order to obtain the 'average' network density. This alternative specification yielded similar findings. We tested if the performance effect of network

density was different for more innovative ventures and found no significant difference. We also tested for bias in the estimation of the beta coefficient for *network density*. The measure of *network density* assumes that the extent of indirect ties between contacts reported by different team members (the 'not asked' cells in Figure 1) does not differ systematically from the extent of indirect ties between contacts reported by the same team member. If this assumption were violated, then we would expect that three-member teams would have lower network density when compared to two-member teams, since three-member teams will likely have fewer common contacts (i.e. more 'not asked' cells). We used one way ANOVA to test for differences in network density between the ten two-member teams and a random sample of ten three-member teams. Our results suggest that while three-member teams on average had a larger network size ($F=11.75$, $p=0.003$) and had fewer common contacts ($F=4.6$, $p=0.5$) compared to two-member teams, there was no significant difference in network density between them ($F=0.11$, $p=0.74$). This suggests that measurement error in our measure of *Network density* is unlikely to be driving the result. Finally, we tested for an alternative specification that strategic consensus and team cohesion mediate the impact of external networks on venture performance outcomes but did not find any evidence of full or partial mediation.

DISCUSSION

The present study first demonstrated that the structure of the external advice network – proxied by network density – in which entrepreneurial teams are embedded, has a significant impact on venture performance outcomes. Results from this sample of Indian software start-ups show that ventures whose entrepreneurial teams are embedded in low density networks enjoy higher performance, measured by revenue growth. In addition, and more importantly, this study showed that network ties are not uniform in their effect, 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 better leverage the structure of

their external advice network. 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. However, we only find weak evidence that attributes of network contacts, namely contact trustworthiness and contact criticality, moderate the impact of network structure.

Our finding on the main effect of network density of entrepreneurial teams builds on research in the upper echelons (Hambrick & Mason, 1984) tradition that management teams' compositional attributes are reflected in organizational outcomes. One stream of prior research in this tradition has emphasized the informational value of top managers' social ties to specific types of contacts such as ties with investment banking professionals (Haunschild, 1994), professional association ties (Geletkanycz & Hambrick, 1997) and ties to government officials (Peng & Luo, 2000). Another stream of research has examined the importance of networking activities of managers and entrepreneurs, especially in emerging market settings (e.g. Luo, 2003). We extend both streams of research in two ways. First, by using a network structure perspective, we turn the spotlight away from the identities of teams' external contacts or specific types of networking activities to focus on the *pattern* of teams' external ties. Second, we extend research on team boundary spanning to a new domain – specifically new ventures in an emerging market setting, typified by significant uncertainty and paucity of resources.

Although not directly comparable, our finding on the main effect of network density also builds on and extends prior research on entrepreneurs' personal networks (see Hoang & Antoncic, 2003 for a recent review). Early entrepreneurship research established that entrepreneurs' personal networks have positive performance effects (e.g. Birley, 1985; Nohria, 1992), although precise network measures were not calculated. Subsequent research (e.g. Ostgaard & Birley, 1996; Hansen, 1995) showed that entrepreneur's social ties to categories of contacts – such as family; advisors, acquaintances etc. – were significant drivers of early venture growth. We extend this research in two ways. First, by examining the entrepreneurial team's networks, rather than just the founder's, this study more accurately captures the range of personal

network resources available to new ventures. Second, by capturing details of specific individuals in the advice network as well as the relationships between network contacts we make a methodological contribution to the literature on entrepreneur's personal networks.

Our findings on the main effect of network density are also consistent with recent research on entrepreneurship in emerging economies. Traditionally, research on emerging economies has emphasised the importance of business groups as the key drivers of entrepreneurship (e.g. Chung, 2001; Leff, 1978) because they provide access to valuable information and other resources such as managerial talent and capital that is in limited supply in such settings. However, more recent research suggests that business group affiliation may not always be advantageous and firms created by entrepreneurs unaffiliated to business groups might even have an advantage (e.g. Chacar & Vissa, 2005) over affiliated firms. We extend research in this area by identifying one mechanism – the structure of the entrepreneurial team's external network – that unaffiliated entrepreneurs in emerging economies use to overcome informational voids and gain access to resources.

When investigating the contingent value of entrepreneurial teams' embeddedness, we focused on two questions: How does the team's internal dynamic matter and how does the external network contact's attributes matter? Our findings on the contingent effect of strategic consensus and team cohesion builds on prior research on social networks and entrepreneurship in several respects. A number of scholars have recently started to question the base case assumption of the embeddedness perspective that 'more is always better'. Thus, Moran (2005) reports managers' innovative performance is driven by cohesive ties while their execution performance is driven by sparse ties. Similarly, Podolny and Baron (1997) find that cohesive ties in managers' identity networks is beneficial while sparse ties in managers' task information networks is beneficial. While these studies of inter-personal networks considered task type and network type as contingencies, scholars examining inter-organizational networks have examined contingencies arising out of types of ties and financial market uncertainty. Thus, Gulati and Higgins (2003)

report that ties to venture capitalists are more beneficial to IPO success in cold markets while ties to prominent investment bankers are more beneficial in hot markets.

While these studies on inter-personal and inter-organizational networks have contributed immensely to a contingency perspective on when and how network ties matter, there is far less understanding of the contingencies that could arise in the context of *team level* networks as opposed to individual level network. We contribute to this body of research by focusing on how internal team dynamics is an important contingency factor. Whereas prior research suggests that prevailing industry 'logics' may focus the attention of firms' executives (e.g. Thorton & Ocasio, 1999), this research examines how executives' shared agreement on the key goals of the firm may shape their attention to external information and knowledge available via their social ties. To develop our contingency perspective, we thus built on theories of the social organization of attention and decision making (Ocasio, 1997). Our theory suggests that when strategic consensus within the entrepreneurial team is high, coordination within the team for better resource utilization is improved. In addition, our findings reiterate the importance of within-team cohesion in exploiting the benefits offered by low density external networks (Reagans & Zuckerman, 2001).

Our weak findings on the attributes of network contacts as a contingency factor may be driven by one of two reasons. First, the impact of contact trustworthiness and contact criticality might be more pronounced on more proximate outcomes such as perhaps choosing business models (Zott, 2001), boundary decisions of ventures (Santos & Eisenhardt, 2005), product development lead times etc. rather than venture growth, the performance outcome measured in this study. Second, the lack of findings may be due to measurement imperfections. In this study, we aggregate contact trustworthiness and contact criticality across all the contacts in the entrepreneurial team. It could be that this method of aggregation dampens the 'true' relationship. Alternatively, there could be measurement errors in the way we operationalized the variables.

CONCLUSION

This research demonstrated that entrepreneurial teams, and not just individual entrepreneurs, differ systematically in the structure of their external advice ties. These differences in top management teams are indeed an important source of firm heterogeneity (Barney, 1991; Castanias & Helfat, 1991) with performance implications. Moreover, although network structure is important, this and recent research (e.g. Gulati & Higgins, 2003) has shown that networks with identical structures will not have the same impact. Here we examined some key features of team dynamics and 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. Unfortunately, our weak empirical results prevent us from drawing clear conclusions as to the whether appropriately structured networks are more or less effective depending on the characteristics of network contacts.

The results we found have three practical implications for new venture management. First, this study suggests that density of the team's network structure is an attribute that entrepreneurs need to pay attention to as they build their venture's management team. This is particularly important because entrepreneurs generally tend to draw their team members from their close circle of friends and families (Ruef, Aldrich & Carter, 2003) making it more likely that the team has a relatively dense external network – which is detrimental for performance. Second, entrepreneurs need to pay attention to maintaining consensus within the team on the key goals of the venture since strategic consensus seems essential to leveraging benefits from external network ties. Reaching and maintaining agreement on the key goals is likely to be a difficult task in a new venture setting because the high uncertainty could lead to continual debate within the

team on these issues (e.g. are we a banking services business or a software product business?). Finally, entrepreneurs need to pay attention to creating cohesion within the team. In sum, if entrepreneurs can combine low density in their team's external network with strong strategic consensus and cohesion within the team they are likely to maximize the chances of success of their venture.

Since this is a first investigation of team versus individual level network of entrepreneurs, and one of the first investigations on the contingent value of network structure, many questions remain. For example, what is the optimal mix of individual level networks in an entrepreneurial team? Is it better to have a team where all team members rely extensively on large sparse networks or might it better to have a few individuals with small, cohesive ties while others have larger or sparser networks? Answers to this question would open up a totally new avenue for research. What other features of team dynamics or demographics moderate the impact of network structures? Top management team research has a rich history investigating team dynamics and demographics and could help orient researchers here.

In addition, the results of this study which suggests that network structure drives performance outcomes begs the question of what specific entrepreneurial networking activities or styles lead entrepreneurs to occupy particular network positions. Conceptualizing the notion of networking style and examining its impact on entrepreneurs' personal network structure and the resources accessed through them could help shed light on the early performance of new ventures.

Moreover, considering this research was done using a sample of new Indian ventures are these results generalizable? The findings here are interesting in and of itself with the rising global importance of the Indian software industry and are consistent with research on the importance of social ties in emerging economies. Nevertheless, the extent to which results generalize to other emerging economies (such as say China) or developed economies is an open question.

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Table 1: Descriptive statistics and correlation matrix [a]

Variable	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Revenue growth (log)	0.20	0.20	-								
2. Venture size	71	108	-0.24*	-							
3. Venture age	3.9	2.4	-0.21+	0.02	-						
4. Functional diversity	0.47	0.21	0.32*	-0.17	0.01	-					
5. Network size	9.4	3.1	0.25*	-0.16	-0.19+	0.17	-				
6. Network density	0.46	0.23	-0.34*	0.17	0.14	-0.14	-0.28*	-			
7. Team cohesion [b]	2.9	1.1	0.05	0.05	0.03	0.10	-0.20+	0.0	-		
8. Strategic consensus [b]	3.3	1.0	-0.11	0.13	-0.03	-0.19+	-0.14	0.11	0.22*	-	
9. Contact trustworthiness [b]	3.4	0.77	-0.02	0.23*	-0.0	-0.11	-0.26*	0.09	0.18	0.27*	-
10. Contact criticality [b]	3.6	0.51	0.06	0.07	-0.15	0.13	0.32*	0.08	-0.30*	-0.12	-0.02

[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

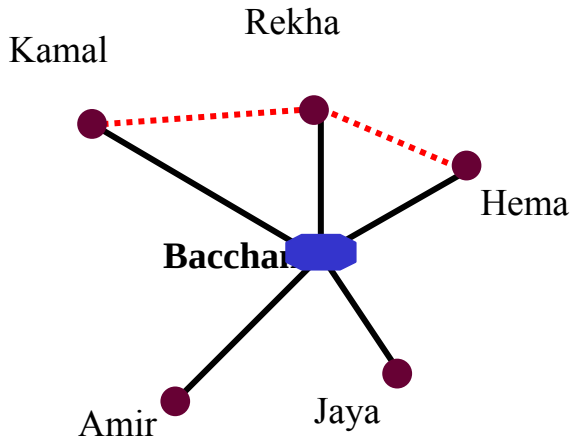
TABLE 2: Regression Results on the Drivers of Venture Growth

	Model 1 (Controls)	**Model 2** (Main effect of network density)	**Model 3** (Internal Team dynamics as contingence)	**Model 4** (External contact attributes as contingency)	**Model 5** (Full Model)
Venture Size	-0.00032*	-0.00027	-0.00027	-0.00018	-0.00023
	(0.00015)	(0.00017)	(0.00021)	(0.00014)	(0.00016)
Venture Age	-0.01555*	-0.0137*	-0.012*	-0.009	-0.009
	(0.00717)	(0.0067)	(0.006)	(0.007)	(0.007)
Functional Diversity	0.266**	0.246*	0.200^{+}	0.189^{+}	0.150
	(0.102)	(0.111)	(0.120)	(0.110)	(0.116)
Network Size	0.00881	0.00529	0.004	0.004	0.003
	(0.00656)	(0.00644)	(0.007)	(0.008)	(0.008)
Network Density		-0.213*	-0.227*	-0.207*	-0.225*
		(0.107)	(0.103)	(0.108)	(0.108)
Strategic Consensus			-0.012		-0.0226
			(0.019)		(0.0221)
Team Cohesion			0.006		0.0086
			(0.199)		(0.0181)
Contact Trustworthiness				0.036	0.0472
				(0.027)	(0.031)
Contact Criticality				0.008	0.0253
				(0.043)	(0.040)
Network Density X Strategic Consensus			-0.203*		-0.160*
			(0.087)		(0.079)
Network Density X Team Cohesion			-0.111^{+}		-0.130^{+}
			(0.080)		(0.080)
Team Network Density X Contact Trustworthiness				-0.331*	-0.274^{+}
				(0.168)	(0.167)
Team Network Density X Contact Criticality				0.049	-0.024
				(0.187)	(0.197)
Model F	9.4***	8.8***	7.1***	5.9***	4.7***
Adjusted R^2	0.17	0.21	0.24	0.24	0.27
N	84	84	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 centred.

$^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$ (two tailed t-tests for controls and one tailed t-tests for directional hypotheses)

FIGURE 1: Deriving the Team's Network from Member's Networks

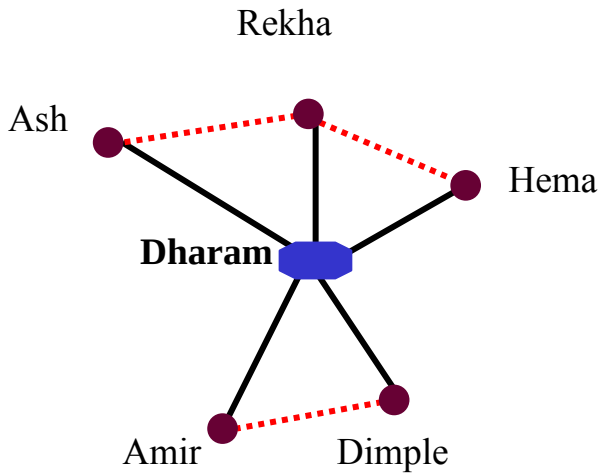


= Direct Tie

= Indirect Tie

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	1	0	0	0

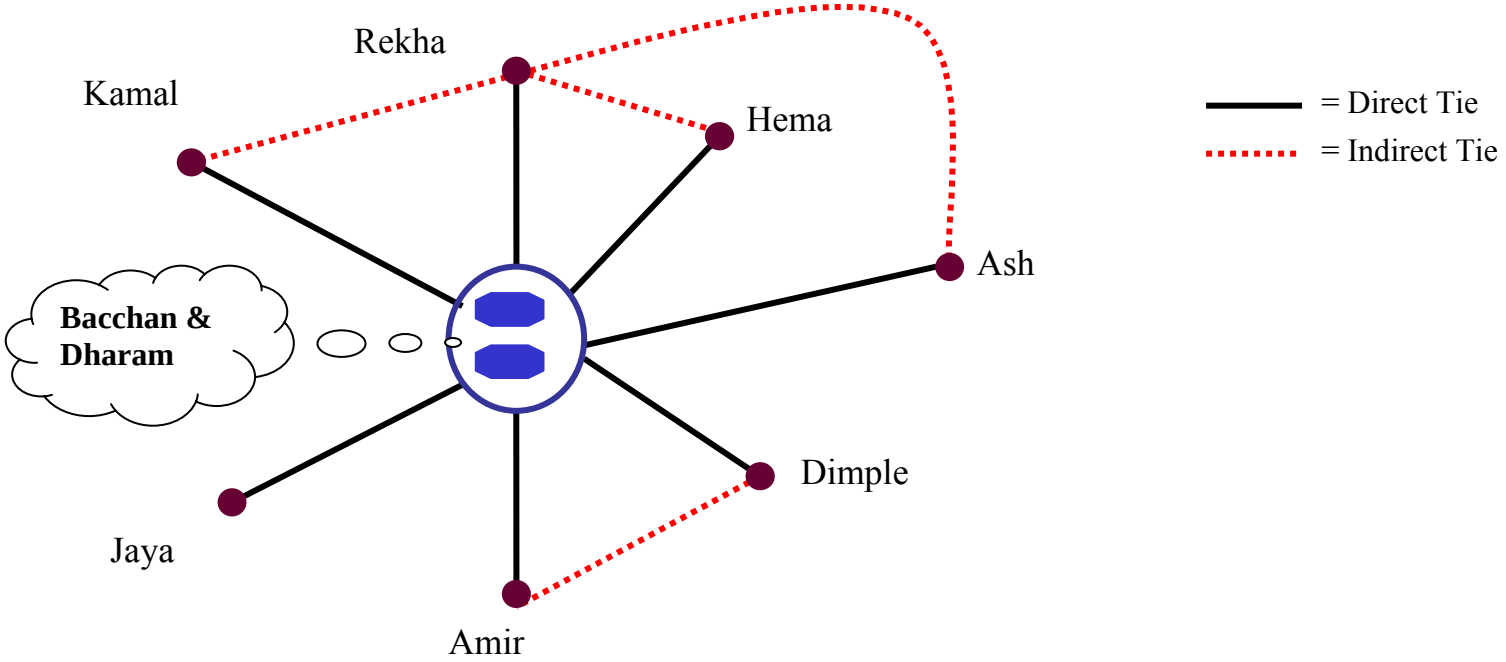


Dharam's Network

	Dharam	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

FIGURE 1: Continued

The Entrepreneurial Team's Network (Bacchan + Dharam)



	Bacchan & Dharam	Rekha	Hema	Jaya	Amir	Kamal	Dimple
Bacchan & 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