Demographic diversity for building an effective entrepreneurial team: is it important?

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Abstract

Although traditional entrepreneurship literature often views entrepreneurship as an economic battle of a “lonely hero”, the prevalence of entrepreneurial teams is an emerging economic reality. This study examines the influences of demographic diversity variables in terms of age, gender, and functional background and team process variables in terms of team-level cognitive comprehensiveness and team commitment on entrepreneurial team effectiveness. With field interview data from 174 entrepreneurs representing 79 entrepreneurial teams, this study suggests that demographic diversity is not important for entrepreneurial team effectiveness, whereas the team process variables positively influence team effectiveness. The findings also suggest that the diversity in terms of gender, age and functional background does not contribute to the team-level cognitive comprehensiveness and team commitment. Finally, the study explores implications of the findings for practice and future research.

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Keywords: Entrepreneurial team; Diversity; Cognitive comprehensiveness; Commitment

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1. Executive summary

Although relatively limited, an emerging body of entrepreneurship literature has started focusing on team-level issues (Frances and Sandberg, 2000; McGrath et al., 1994, 1995, 1996; Higashide and Birley, 2002; Lechler, 2001; Watson et al., 1995). This stream of research mainly examined team process and effectiveness. While scholars suggest that diversity is an important topic in both academic research and practice (Cox, 1993; Knouse and Dansby, 1999; Pelled et al., 1999) and team heterogeneity has important influence on firm performance (Ensley et al., 1998). However, research on demographic diversity in entrepreneurial teams is very limited (Lyon et al., 2000).

The present article focuses on demographic diversity in entrepreneurial teams and its influence on team effectiveness. With an extensive literature review this article argues that the diversity of composition is not as important as team commitment and the process of cognitive comprehensiveness that utilizes diverse decision criteria. Specifically, the article examines the influences of demographic diversity variables in terms of age, gender, and functional background and team process variables in terms of team-level cognitive comprehensiveness and team commitment on entrepreneurial team effectiveness.

The article tests these influences with field interview data from 174 entrepreneurs representing 79 entrepreneurial teams. The result shows that demographic diversity variables are not significantly related to entrepreneurial team effectiveness; whereas, team commitment and cognitive comprehensiveness are both positively and significantly related to entrepreneurial team effectiveness. Furthermore, the results show that demographic diversity in terms of gender, age and functional background does not significantly contribute to either cognitive comprehensiveness or team commitment.

The outcomes of the study have several important implications for research and practice. The findings suggest that scholars and practitioners should reconsider the effect of diversity in team effectiveness. Specific results of this study show that team diversity (gender, age, functional background) by itself does not positively influence entrepreneurial team effectiveness. The findings also suggest that scholars and practitioners must focus on team process that builds commitment and that promotes comprehensiveness in team decision-making. Specifically, results show that effective entrepreneurial teams are those that have high member commitment and that develop a process that uses diverse perspectives on problems, a variety of potential solutions and a variety of criteria for evaluating solutions to make complex and innovative decisions.

Hence, entrepreneurial teams must create an environment of trust and loyalty for improving team commitment. Additionally, entrepreneurs should collectively formulate an agreed-upon system of team interaction that not only would ensure that each member proposed different approaches, points of views, alternatives, etc., but would also encourage members to compare the diverse alternatives and approaches and weigh them against each other.

Future entrepreneurship research that studies diversity should focus on personality and thinking style in addition to demographics, since the effect of diversity seems to be a complex function of demographic and other individual traits (Tolbert et al., 1995). Hence, a
comprehensive study of diversity and its influence on both entrepreneurial team dynamics and team effectiveness would be a promising direction for future research.

2. Introduction

High-tech entrepreneurial firms play a significant role in the Western economy because they account for a considerable portion of new product innovations. These ventures are continuously confronted with diverse challenges originating from uncertainties in terms of business processes, markets and technologies. An entrepreneurial team rather than a single entrepreneur seems better suited to deal with the uncertainties and volatilities associated with new ventures that require flexibility and complexity of decision making (Vesper, 1990). Accordingly, the existence of entrepreneurial teams is widespread and well documented in the Western economy. For instance, Charles Pfizer and Charles Erhart co-founded Pfizer in 1849, and Dr. Eugen Lucius, Carl Meister and Ludwig Miller founded Hoechst in 1863, and more recently David Filo and Jerry Yang co-founded YAHOO in 1995.

However, popular opinion generally characterized entrepreneurship as an economic battle of a “lonely hero” (Johannisson, 1998). In addition, traditional entrepreneurship literature that examined entrepreneurship characteristics often focused on individual characteristics (Kisfalvi, 2002; Lee, 2001; Low and MacMillan, 1988) as opposed to team-level variables (Davidsson, 2001). But, teams of entrepreneurs are more common than the entrepreneurship literature suggests (Lau, 2000; Lechler, 2001; Watson et al., 1995). In fact, the presence of entrepreneurial teams is a prominent economic reality especially in high-tech industry. Cooper et al. (1990) have found that entrepreneurial teams were founders of a vast majority of firms in the high-tech industry.

Although relatively limited, an emerging body of literature in entrepreneurship has started focusing on the team-level issues (Ensley et al., 2002; Frances and Sandberg, 2000; McGrath et al., 1994, 1995, 1996; Higashide and Birley, 2002; Lechler, 2001; Watson et al., 1995). While most of these studies have examined team process and effectiveness, they did not pay particular attention to the diversity of the team composition and its influence.

However, an important focus of team research has been the study of team composition, especially in terms of diversity (Pelled et al., 1999). Heterogeneous teams, with their suggested benefits of improved creativity and innovativeness (Sethi et al., 2002), should be well suited for entrepreneurial venture performance. On the other hand, heterogeneity might also produce conflicts and emotions among members of the entrepreneurial team resulting in poor performance.

Team composition may have been recognized as important for team effectiveness (Bantel and Jackson, 1989; Wanous and Youtz, 1986), but its role has not yet been widely investigated (Metzemaekers, 2000). In addition, research on team composition remains inconclusive since this research provided contradictory findings regarding effects of demographic diversity on team effectiveness (Pelled et al., 1999; Simons et al., 1999; Yu, 2002). Accordingly, diversity is often regarded as a “double-edged sword” (Milliken and
Heterogeneous teams are regarded as more effective in solving complex, non-routine problems, which are common to entrepreneurial firms. This is because the diversity in perceptions, skills, abilities and knowledge that exists in a heterogeneous team is important for solving complex and ambiguous problems (Gladstein, 1984; Hackman, 1987; Pearce and Ravlin, 1987; Wanous and Youtz, 1986). Consequently, diversity is also perceived to link positively with cognitive task performance, which involves formulating plans, generating creative ideas, solving critical problems or making complex decisions (Bantel and Jackson, 1989; Eisenhardt and Schoonhoven, 1990; Murnighan and Conlon, 1991). The underlying assumption here seems to be that diversity improves the breadth of cognitive ability important for entrepreneurship.

While many scholars suggest that increased diversity provides a variety of benefits, others indicate that homogeneity may lead to better outcomes when considering satisfaction, communication, conflict (Pearce and Ravlin, 1987) and turnover (Jackson et al., 1991). Accordingly, it is unclear whether diversity in team composition always improves complex and/or non-routine problem-solving ability. Additionally, diversity in a team merely brings together people with different perspectives, cognitive styles, skills and abilities, but it does not ensure that the team harnesses all these into extensive team-level cognitive attributes.

Moreover, a team can achieve diversity without having different demographic characteristics among its members. Differences in personality traits and thinking styles can also create diversity of cognitive attributes within a team (Harrison et al., 2002; Neuman et al., 1999; Triandis, 1995). Thus, a demographically homogeneous team can achieve diverse cognitive attributes important to making novel and creative entrepreneurial decisions.

Therefore, it is appropriate to be skeptical about the benefits of demographic diversity for entrepreneurial team effectiveness. Accordingly, the current study addresses this issue by proposing that demographic diversity in terms of age, gender, and functional background may not be as important in predicting entrepreneurial team effectiveness as team-level cognitive comprehensiveness and team commitment. Hypotheses developed in this study were tested using data from 174 individual entrepreneurs representing 79 high-tech entrepreneurial teams.

3. Theory development

An entrepreneurial team is often characterized as two or more individuals with equity interest jointly launching and actively participating in a business (Kamm et al., 1990; Watson et al., 1995). Western economies are dominated by entrepreneurial teams and this dominance is particularly common in high-tech industry. Since the majority of high-tech start-ups are founded by teams of entrepreneurs, entrepreneurship research should examine this phenomenon in more detail (Lechler, 2001).

Research on entrepreneurial start-ups suggests that firms founded by entrepreneurial teams generally outperformed those founded by individual entrepreneurs (Bird, 1989; Kamm et al.,
The success of high-tech entrepreneurial teams can be attributed to the logic that “high technology industries might require more skills than an individual would be likely to have, necessitating that individuals combine their abilities in teams in order to start an organization successfully” (Gartner, 1985, p. 703). Consequently, entrepreneurship scholars have suggested that the advantage of start-up teams comes from the diversity of characteristics, knowledge, skills, etc. (Timmons, 1990; Vesper, 1990). In addition, research also suggests that team heterogeneity is an important factor for firm performance (Ensley et al., 1998). However, research on demographic diversity in entrepreneurial teams is very limited (Lyon et al., 2000).

Diversity is an important topic in both academic research and practice (Cox, 1993; Knouse and Dansby, 1999; Pelled et al., 1999). Demographic diversity refers to the degree of heterogeneity with respect to demographic “immutable characteristics such as age, gender and ethnicity; attributes that describe individuals’ relationships with organizations, such as organizational tenure or functional areas; and attributes that identify individuals’ positions within society, such as marital status” (Lawrence, 1997, p. 11).

The importance of demographic diversity in academic research and practice arises from the assumption that diversity enhances team effectiveness. One of the key factors in this line of research is the amount of diversity present in teams (Knouse and Dansby, 1999). However, the literature appears to be divided into two contradictory schools of thoughts on this issue: one suggests diversity in team members would lead to team-level diversity of perspectives and, thereby, team effectiveness; the other suggests diverse teams are less cohesive and, therefore, ineffective (Yu, 2002). Several examples from the diversity literature demonstrate such divergent and inconclusive findings. Studies by Bantel and Jackson (1989) and by Murnighan and Conlon (1991) have found positive and negative relationships between the amount of demographic diversity and cognitive task performance in teams. Moreover, Watson et al. (1993) have found both positive and negative influence of team demographic heterogeneity on task performance.

Many researchers have suggested that diversity in a team improves team effectiveness because diversity enhances team decision-making by bringing broader perspectives and a greater pool of alternative solutions and innovative ideas together (Knouse and Chretien, 1996; Milliken and Martins, 1996). This logic can be traced back to an argument originally proposed by Hoffman and Maier (1961) that diversity enhances a team’s breadth of perspective, cognitive resources and overall problem-solving capacity.

However, for increasing cognitive breadth, teams with diversity should create synergistic processes (Barry and Stewart, 1997; Campion et al., 1993). A synergistic process is characterized by flexibility and open communication that encourages members to share, and build on one another’s divergent ideas and perspectives (Stewart and Barrick, 2000). Accordingly, this synergy builds a broad, team-level cognitive capability, which is defined as a team’s ability to utilize broad perspectives, alternatives and ideas in solving complex problems and formulate plans.

Previous research has found teams with diverse cognitive capabilities in terms of skills, knowledge, abilities and perspectives made more innovative and higher quality decisions compared to those with less diverse cognitive capabilities (Bantel and Jackson, 1989; Murray, 1989). In addition, for achieving team-level diverse cognitive capabilities, the team interaction
process is at least as important as having members with a variety of cognitive attributes. Extensive research exists on such techniques as devil’s advocacy and dialectical inquiry that enhance critical and analytical interactions designed to formulate a strategy using a variety of diverse skills, ideas and perspectives (Schwenk and Cosier, 1980).

A team’s diverse cognitive resources are captured in a team-level capability through the team-interaction process that not only exhibits divergent belief structure and dissimilar priorities and assumptions, but also leads to contrasting views of what is important. Accordingly, this process introduces the team to many opposing points of view that might enable members to develop a broader understanding of the issues and the variety of alternatives the team faces (Amason, 1996; Jehn, 1995). The team interaction process that brings together contrasting points of view is also important for developing a broader team level understanding in that it provides constructive criticism and minimizes “groupthink” (Janis, 1982).

Additionally, entrepreneurship research has found that such team process variables as team comprehension and deftness are important contributors to team competency and ultimately new venture performance (McGrath et al., 1994, 1995, 1996). Team comprehension is defined as a team’s collective understanding of the important drivers of its venture and deftness is defined as the “emergence of a collective mind” that creates effective relationships among teammates and that allows effective execution of interrelated activities. Accordingly, a team with high comprehension and deftness would have a diverse team-level cognitive capability in terms of the team’s ability to understand and utilize a variety of perspectives, ideas and alternatives in solving complex problems and executing plans.

The team-level diverse cognitive capability is conceptualized here as the team-level cognitive comprehensiveness. According to Fredrickson (1984), decision comprehensiveness is regarded as “exhaustive” and “inclusive” in making strategic decision. Team-level cognitive comprehensiveness is a team process that examines critical issues with a wide lens and formulates strategies by considering diverse approaches, decision criteria and courses of actions (Miller et al., 1998; Simons et al., 1999). Hence, a team enhances its cognitive comprehensiveness with an interaction process that systematically analyzes the diverse cognitive attributes presented by its members.

Cognitive comprehensiveness is suggested as a highly influential team process variable (Miller and Cardinal, 1994; Miller et al., 1998) and has been found to have a positive influence on sales growth and profit growth (Simons et al., 1999). Research has found strong relationship between cognitive ability and performance of novel and complex tasks (Hunter and Hunter, 1984). Additionally, West and Meyer’s (1997) empirical study concluded that the interaction processes within technology-based ventures should substantially emphasize identifying, embracing and widely communicating a variety of ideas. Thus, team-level cognitive comprehensiveness, by ensuring such a process that embraces diverse cognitive abilities and ideas, is likely to improve entrepreneurial team effectiveness. Accordingly, the above discussion can be used to develop the following hypothesis:

**Hypothesis 1.** Team-level cognitive comprehensiveness will be positively related to the entrepreneurial team effectiveness.
Idiosyncratic dynamics within heterogeneous teams may divergently influence team synergy building. This may result in high level of cognitive comprehensiveness in some teams but not in others. Hence, demographic diversity merely brings people with diverse background but does not ensure team-level cognitive comprehensiveness.

In addition, the diversity of perspectives and ideas so important to the breadth of team-level cognitive comprehensiveness may also arise from factors other than demographic attributes. Diversity of personality traits within a team is also likely to contribute to the variety of perspectives and ideas available to the team just as people with different personality characteristics differ in their styles and abilities to do different things (Hackman, 1987; Shaw, 1981). Hence, each member in a team with high personality diversity brings unique cognitive attributes (Muchinsky and de Monahan, 1987; Neuman et al., 1999).

Demographically similar people may differ in their thinking style as well (Abraham, 1997; Sternberg, 1988). Thinking style differs from personality characteristics (Johnson, 2002); hence, people with similar personalities may have different ways of thinking about problems and possible solutions. Therefore, it can be argued that a team lacking demographic diversity may have access to a diverse scope of cognitive attributes.

Furthermore, demographic diversity may also create dissonance that makes the team interaction process difficult (Ancona and Caldwell, 1992). Occasionally, heterogeneity may create distrust and acrimony, as dissimilar team members may have divergent vocabularies, priorities and paradigms. Thus, their aggregate cognitive contribution has the potential to become a liability instead of building team-level cognitive comprehensiveness and negatively influence organizational innovation resulting in a poor entrepreneurial performance.

Research suggests that demographic diversity has the potential to create emotional conflicts within teams (Ancona and Caldwell, 1992; Eisenhardt et al., 1997), which is found to negatively influence team effectiveness (Pelled et al., 1999). Emotional conflicts arise from the subconscious tendency of people to place individuals into social categories based on demographic characteristics (Tajfèl, 1982). People then perceive their own category as superior and tend to stereotype members of other categories. This, in turn, creates resentment in members of other categories, resulting in hostile interactions between social categories within teams. The hostile interactions from these emotional conflicts within teams are likely to produce anxiety, non-cooperation and ineffective communication resulting in a negative influence on team effectiveness (Eisenhardt et al., 1997).

In summary, demographic diversity is not the only source of diverse cognitive attributes and neither does it guarantee a high team-level cognitive comprehensiveness. Although an entrepreneurial team with high demographic diversity brings entrepreneurs with a variety of cognitive attributes together as members, it may also produce distrust, acrimony and emotional conflict among team members, which may in a lack of innovation, creativity, team effectiveness and overall performance.

Innovation, creativity and overall performance are essential elements of success for an entrepreneurial team. As a result of demographic diversity’s ability to enrich a team with diverse cognitive endowment as well as to weaken a team with emotional conflicts, such diversity has the potential to both aid and impair innovation, creativity and overall
performance. Therefore, this study does not expect to find a positive relationship between demographic diversity and entrepreneurial team effectiveness.

Additionally, entrepreneurship research on personality suggests that demographic diversity may not positively influence entrepreneurial team effectiveness. Entrepreneurship literature has extensively studied the personality characteristics of successful entrepreneurs (Brockhaus, 1980; Hornaday and Aboud, 1971; Kickul and Gundry, 2002). Such traits as autonomy, dominance and low need for difference are among many personality characteristics proposed in the literature as common to most successful entrepreneurs (Caird, 1993). Occasionally, entrepreneurs have also been branded as mildly sociopath (Winslow and Solomon, 1987). These characteristics make an entrepreneur unlikely to work effectively with people that have different demographic characteristics. Additionally, previous research has found that entrepreneurs engaged in high-tech businesses are similar in terms of such demographic characteristics as age, experience level and education level (Colombo and Delmastro, 2001). Accordingly, demographic diversity might not increase entrepreneurial team effectiveness. Hence, the above argument can be summarized as the following null hypothesis:

**Hypothesis 2.** Demographic diversity in terms of age, gender and functional background will not be positively related to entrepreneurial team effectiveness.

Furthermore, whenever a group of people works on a challenging project, emotional conflict is possible. This is particularly true for entrepreneurial teams, whose tasks are challenging, novel and innovative, and involve a high level of risk and potential return (Drucker, 1985; Gartner, 1990; Hornaday, 1992). Therefore, entrepreneurs must pay serious attention when forming a team, as the possibility of emotional conflict in such a team is very high. The team process variable that minimizes emotional conflict and enhances cooperation among team members should play an important role in improving team effectiveness. Team commitment is such an important team process variable (Pettigrew, 1998). Team commitment is suggested to enhance cohesion, loyalty and synergy, and minimize emotional conflicts between team members; therefore, it should increase entrepreneurial team effectiveness. Thus, the following hypothesis can be developed from the above discussion:

**Hypothesis 3.** Team commitment will be positively related to entrepreneurial team effectiveness.

Although team commitment and team-level cognitive comprehensiveness may be related, they are different constructs. Team commitment is a process in which team members feel loyalty and trust towards one another. In contrast, team cognitive comprehensiveness is a process in which team members consider multiple decision criteria, multiple courses of action and multiple perceptions in making decisions. While trust and loyalty within team members may sometimes encourage members to consider each member’s ideas and perceptions in a decision-making process, it is also possible that team commitment may be present without cognitive comprehensiveness. A high level of trust and loyalty within a team may cause members to reduce debate and not weigh ideas of different members against one another. Similarly, it is possible to have cognitive comprehensiveness without team commitment.
Teams may have a well-established system that requires members to brainstorm and systematically weigh pros and cons of one another’s ideas.

4. Methodology

4.1. Sample and data collection

The study employed a structured field-interview method to collect data. Subjects were high-tech venture owners, whose businesses were registered with a major Midwestern statewide association for information technology economic development. Most of these ventures were in the computer related industry (software development, computer peripherals, website development, internet providers, etc.). To ensure that the findings are relevant to entrepreneurship, the following characteristics were considered in selecting firms for this study: sample firms are between 2 and 5 years old, sample firms must have multiple founders, founders must be participants in decision making, and founders must hold equity shares.

Some of these characteristics were derived from the definition of an entrepreneurial team. Following other empirical studies on entrepreneurial teams, subjects for this study were restricted to firms that are at the most 5 years old (Hansen and Bird, 1997). Less than 2-year-old firms were not considered for this study as the study intended to collect data on sales growth based on the previous 2 years of sales.

Since the study was based on a team-level unit of analysis, data had to be collected from every member of the teams used in this study. To ensure participation of all members of a venture team, it was necessary to get prior permission from each of the members and conduct interviews on the business premises.

Finally, data gathered from 79 ventures with multiple founders were used for this research. All members from these venture teams participated in this study. Altogether 174 individual entrepreneurs participated in the interview process. In addition to the interviews, data came from company publications (business plans and other company reports) to confirm some of the interview information.

4.2. Measurement

The study collected data on independent (three demographic characteristics, team commitment, and team-level cognitive comprehensiveness), control (team size) and dependent (team effectiveness) variables. Demographic data were collected on age, gender, and functional background. Data on ethnic background were collected but not used as they produced negligible variability within teams.

Once interview data were collected on demographic variables, they were then cross-checked with information from the firms’ publications (business plans and/or company reports). Next, specific calculations were performed to convert the demographic data into team heterogeneities. Data on two other independent variables—team commitment and team-level cognitive comprehensiveness—were collected using two specific measurement instru-
ments. Finally, data on the dependent variable were collected from interviews using a team-effectiveness questionnaire.

4.2.1. Demographic heterogeneity

Functional background was measured as the field in which the person had the most experience (e.g., see Bantel, 1993; Bantel and Jackson, 1989). From an extensive list of categories (e.g., finance, accounting, MIS, engineering, legal, medicine, etc.), the respondents chose the category in which they had the most experience. Data on age were collected as a categorical variable and respondents were grouped based on these age categories. Finally, respondents were categorized as 0 and 1 for male and female, respectively.

Although heterogeneity can be measured in a number of ways (Blau, 1977; Taagepera and Ray, 1977; Teachman, 1980), heterogeneities of the demographic variables for this study were calculated using Blau’s index (1977). Blau’s index has been cited as reliable and consistent with other acceptable indices of heterogeneity (Bantel and Jackson, 1989). It is calculated as: \[ \frac{1}{C_0} \sum_{i} p_i^2 \]. Where \( p \) is the proportion or percent of team members in a category and \( i \) is the number of different categories represented in the team. The demographic variables of age heterogeneity (five categories) and functional background heterogeneity (eight categories) were each measured using Blau’s (1977) index described above. For instance, if a team has three members and each member has a different functional background, the team received a score of \( \frac{1}{C_0} \left(\frac{1}{9}+\frac{1}{9}+\frac{1}{9}\right) \) 0.67, whereas a team that has three members with the same functional background received a score of 0. Gender heterogeneity was measured as the percentage of the smaller gender representation. For example, an entrepreneurial team with two females and one male received a score of 0.33.

4.2.2. Team commitment

Team commitment is measured using an existing instrument (Shapiro and Kirkman, 1999; Mowday et al., 1979). Items of the instrument were adjusted to make them suitable for the purpose of the current study. The team commitment instrument for the current study used three items to measure: the extent to which members felt loyal, felt that they expected to stay with the same team for a long time, and felt that they trusted the team. Each entrepreneur rated his/her team on each of these items based on a five-point, very high/very low scale. This instrument has produced a good reliability with an \( \alpha \) of 0.87.

4.2.3. Team-level cognitive comprehensiveness

A team’s cognitive comprehensiveness is a team-level variable and proposed to be important for complex and innovative decision-making. The measurement instrument developed for this study used existing literature on team effectiveness (Miller et al., 1998; Simons et al., 1999). The four items used to collect data on the team-level cognitive comprehensiveness measured a team’s breadth of perspectives on the problem at hand, the size of the pool of potential solutions to examine, the extent of innovative ideas and the variety of criteria for evaluating a possible solution. A five-point agree/disagree scale was used to collect data on these four items. This instrument has produced a good reliability with an \( \alpha \) of 0.82.
A factor analysis with “varimax” rotation suggested that team commitment and cognitive comprehensiveness were separate constructs as proposed earlier. Table 1 presents the results of the factor analysis. Eigenvalues of both the principal components were more than one and they accounted for 74% of the variance in responses.

4.2.4. Control variable

Team size served as a control variable for this study. Venture team size was measured as the total number of active partners having an equity interest in the venture. Respondents provided the number of individuals who were active partners in their venture. These numbers were cross-checked with the data gathered from company reports.

4.2.5. Dependent variable

The study used team effectiveness as the dependent variable. An instrument was adapted from existing research to measure this variable (Cardy and Dobbins, 1994; Stewart and Barrick, 2000). Individual items of this instrument were adjusted to fit the specific requirements of this study. Team outcomes and team behaviors representing team performance were both included as items for this instrument. Altogether seven items measured a team’s knowledge of tasks, quality of work, quantity of work, initiative, interpersonal skills, planning and allocation, and overall performance. Each entrepreneur rated his/her team on each of these items based on a five-point behavior-anchored scale (1=consistently exceeds expectations, 5=consistently below expectations). A confirmatory factor analysis resulted in only one factor with eigenvalue more than one. This instrument also showed a high degree of reliability with an α of 0.86.

This study initially planned to use sales growth as an additional dependent measure; however, only 29 out of 79 firms that participated in the interview agreed to share their actual sales information for the last 2 years. As a result, this information was not used for the final data analysis. However, a bivariate correlation between sales growth rate and team effectiveness as measured here for those 29 firms that shared data showed a statistically significant correlation of

<table>
<thead>
<tr>
<th>Items</th>
<th>Componenta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variety of perspectives on the problem at hand</td>
<td>0.769</td>
</tr>
<tr>
<td>The size of the pool of potential solutions to examine</td>
<td>0.922</td>
</tr>
<tr>
<td>Extent of innovative ideas</td>
<td>0.905</td>
</tr>
<tr>
<td>Variety of criteria used to evaluate possible solution</td>
<td>0.637</td>
</tr>
<tr>
<td>I feel very loyal to the existing team of entrepreneurs</td>
<td>0.117</td>
</tr>
<tr>
<td>I expect to stay with this team for an extended period of time</td>
<td>0.205</td>
</tr>
<tr>
<td>I feel this team of entrepreneurs is very trustworthy</td>
<td>0.296</td>
</tr>
<tr>
<td>Eigenvalue</td>
<td>3.80</td>
</tr>
<tr>
<td>Percentage of variance explained</td>
<td>40.1</td>
</tr>
<tr>
<td>Cumulative percentage of variance explained</td>
<td>40.1</td>
</tr>
</tbody>
</table>

a Values in bold define a component.
0.87 ($p<0.001$). This finding, although not definitely, suggests predictive validity of the team effectiveness measure used in this study.

A composite score per team was calculated for all multiple-item, team-level variables (team commitment, team-level cognitive comprehensiveness, team effectiveness). First, for each team an average score on each measurement item was calculated, since multiple responses (each entrepreneur was a respondent) were collected from each team on these items. Finally, the response averages on all items were averaged to create a single score representing each team-level variable.

5. Data analysis and results

5.1. Descriptive statistics and correlations

Table 2 presents descriptive statistics and bivariate correlation coefficients for all studied variables. Team effectiveness correlated negatively with team size and age heterogeneity and positively with team commitment and team-level cognitive comprehensiveness. Team commitment and team-level cognitive comprehensiveness also showed significant correlation. Concern for a multicolinearity (a violation of regression assumption) problem exits as the data show significant correlations between the independent variables. Therefore, variance inflation factor (VIF) was computed for all independent variables to test the existence of multicolinearity. Results show VIF values for all independent variables to be well below the multicolinearity level.

5.2. Hypotheses testing

Hypothesized relationships were tested using the hierarchical regression analysis. To compute the extent of additional variance explained by study variables, the regression...
analysis was performed by entering the control variable (team size) in step 1, demographic heterogeneity variables (age heterogeneity, gender heterogeneity, and functional background heterogeneity) in step 2, and finally team commitment and of team-level cognitive comprehensiveness in step 3. Importance of a specific set of variables can be demonstrated by examining the changes in $R^2$ from step to step (Table 3).

Hypothesis 1 predicted that team-level cognitive comprehensiveness is positively related to team effectiveness. The data analysis results presented in step 3 of Table 3 show a significant positive $\beta$ ($\beta=0.24$, $\alpha<0.05$), suggesting that team-level cognitive comprehensiveness contributes positively to the team effectiveness. Hence, Hypothesis 1 was supported.

Hypotheses 2 proposed that demographic diversity in terms of gender, age and functional background does not positively influence team effectiveness. As presented in step 2 of Table 3, the change in $R^2$ is statistically not significant ($\Delta R^2=0.01$, $p>0.05$). Moreover, the $\beta$ coefficients for all of the three demographic heterogeneity variables are not statistically significant ($p>0.05$). Although not finding a statistically significant result does not mean an absence of relationship, this result failed to reject Hypothesis 2. Therefore, the data obtained for this study suggest that, while the team-level cognitive comprehensiveness contributed positively to the team effectiveness, demographic heterogeneities did not.

Hypothesis 3 stated that team commitment is positively related to team effectiveness. Regression results presented in step 3 of Table 3 show that the $\beta$ coefficient for team commitment is positive and statistically significant ($\beta=0.74$, $p<0.01$). Accordingly, the data for this study indicate that team commitment contributes positively to team effectiveness. Hence, Hypothesis 3 was supported.

Table 3
Hierarchical regression analysis results

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>Team effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\beta$</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>0.36**</td>
</tr>
<tr>
<td>2</td>
<td>Team size</td>
<td>-0.60**</td>
</tr>
<tr>
<td>3</td>
<td>Team size</td>
<td>-0.65**</td>
</tr>
<tr>
<td></td>
<td>Age heterogeneity</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Gender heterogeneity</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Functional background heterogeneity</td>
<td>0.02</td>
</tr>
<tr>
<td>3</td>
<td>Team size</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Age heterogeneity</td>
<td>-0.05</td>
</tr>
<tr>
<td></td>
<td>Gender heterogeneity</td>
<td>0.09</td>
</tr>
<tr>
<td></td>
<td>Functional background heterogeneity</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Team commitment</td>
<td>0.74**</td>
</tr>
<tr>
<td></td>
<td>Team-level cognitive comprehensiveness</td>
<td>0.24*</td>
</tr>
</tbody>
</table>

* $p<0.05$.
** $p<0.01$. 
Furthermore, the results of the hierarchical regression models presented in Table 3 show how much additional variance in team effectiveness was explained by team-level cognitive comprehensiveness and team commitment. As shown in step 3 of Table 3, addition of these two variables to the regression model resulted in a significant increase in the multiple square correlation coefficient ($\Delta R^2=0.44$, $p<0.01$). Thus, the addition of team-level cognitive comprehensiveness and team commitment significantly explained 44% of the team effectiveness beyond what the control variable and demographic heterogeneity variables explained.

6. Discussion

Results show that team-level cognitive comprehensiveness and team commitment produced significant positive influence on entrepreneurial team effectiveness. However, demographic heterogeneity variables did not significantly influence team effectiveness. It is evident from the results of regression analyses with or without the team-level variables in the model that the data clearly suggest that demographic diversity variables do not have any direct influence on team effectiveness. Additionally, to check if they have any indirect relationship, an examination of the influence of the studied diversity variables on the team-level process variables (team-level cognitive comprehensiveness and team commitment) is important (Baron and Kenney, 1986).

Accordingly, a post-hoc data analysis was performed with two regression models using two dependent variables: team-level cognitive comprehensiveness and team commitment. Results showed that diversity variables did not produce any significant influence on either of the team-level variables. Hence, these results indicate that diversity in terms of gender, age and functional background did not contribute either to the breadth of cognitive comprehensiveness or to the commitment of an entrepreneurial team (Table 4).

<table>
<thead>
<tr>
<th>Model</th>
<th>Predictor</th>
<th>Team commitment</th>
<th>Team-level cognitive comprehensiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\beta$</td>
<td>$R^2$</td>
<td>$\Delta R^2$</td>
</tr>
<tr>
<td>1</td>
<td>Team size</td>
<td>$-0.70^{**}$</td>
<td>$0.49^{**}$</td>
</tr>
<tr>
<td>2</td>
<td>Team size</td>
<td>$0.51^{*}$</td>
<td>$0.02$</td>
</tr>
<tr>
<td></td>
<td>Age heterogeneity</td>
<td>$0.16$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender heterogeneity</td>
<td>$-0.03$</td>
<td></td>
</tr>
</tbody>
</table>

* $p<0.05$.
** $p<0.01$. 

Table 4
Post-hoc regression analysis
The finding that failed to reject the absence of relationships between the studied demographic heterogeneity variables and entrepreneurial team effectiveness is not surprising. In fact, this was a prediction of this research, and several theoretically grounded arguments were made in support of these findings. Accordingly, these results seem to support the argument that demographic diversity may not necessarily contribute positively to entrepreneurial team effectiveness.

Overall, while demographic diversity appears to be unimportant for entrepreneurial team effectiveness, such team-level variables as the cognitive comprehensiveness and the team commitment show positive influence. Moreover, the results suggest that team diversity in terms of age, gender and functional background does not influence the team-level cognitive comprehensiveness and the team commitment. These findings are important; as they suggest that having team-level cognitive comprehensiveness and team commitment are independent of and more important than having members with different demographic characteristics. Hence, the study suggests that while it is important for entrepreneurial teams to consider developing team-level cognitive comprehensiveness and team commitment, it is not so important for entrepreneurs to team up with people that have differing demographic characteristics.

Like most other empirical studies, this study has limitations. First, this study did not include ethnic diversity as a part of demographic diversity. Known as one of the important demographic characteristics, ethnic diversity could have important influence on team effectiveness. However, the study of 79 teams resulted in a negligible variance in terms of ethnic background within teams. Most entrepreneurs formed teams with others from their own ethnic backgrounds. Only three teams showed some diversity in terms of ethnic characteristics. This scarcity may be due to the lack of ethnic diversity within entrepreneurial firms in general. Strong memberships of associations for Hispanic entrepreneurs, African American entrepreneurs and Asian Entrepreneurs, suggest that ethnic minorities tend to team up with members of their own ethnic group to start new businesses.

The next limitation is the use of self-reported data from the same source. Although company publications were used to cross-check interview data on team size and demographic variables, statistical analysis were performed using mainly the interview data provided by the same respondent on dependent and independent variables. This raises the possibility that common response bias might have inflated the findings of this study. Also, the use of perceptual data on team-effectiveness is a weakness. However, entrepreneurs are skeptical about revealing financial performance information. For instance, only 29 out of 79 firms have provided last 2 years’ sales information for this study. Dess and Robins (1984, p. 271) proposed that perceptual measures of performance are good substitutes of objective measures whenever “(a) accurate objective measures are unavailable and (b) the alternative is to remove the consideration of performance from the research design”. Additionally, prior research has found self-reported measures of performance correlate highly with secondary data on performance (Venkatraman and Ramanujam, 1986).

Another limitation of this study is the use of cross-sectional data. Researchers found that effects of diversity on team effectiveness could have a temporal element (Harrison et al., 1998). Harris and his associates have found that, with time, the effects of demographic
diversity decreased and the effects of diversity based on attitude increased. Hence, a control for team tenure could have refined the current findings.

A further limitation is the relatively small sample size. Although 174 entrepreneurs have provided interview data for this study, they represent only 79 high-tech entrepreneurial teams. As the study required team-level analysis, 79 data points were used for performing statistical tests. Even though most team-level studies have used comparatively smaller number of teams (Stewart and Barrick, 2000), the statistical power of this study was limited. However, the relatively strong effects produced by the statistical tests provide evidence for strong influences of team commitment and team-level cognitive comprehensiveness on entrepreneurial team effectiveness.

Despite these limitations; the findings have important implications for practice and future research. This study sought to fill an important gap in entrepreneurship literature as demographic heterogeneity is seldom examined in the context of entrepreneurial teams. Also, studying demographic heterogeneity in entrepreneurial teams and its influence on team effectiveness may help overcome the rather ambiguous results of most previous studies on this topic as they are based on large companies (Priem et al., 1999).

From a practical point of view, the findings begin to address an important issue: How important is it to build an entrepreneurial team with demographic diversity? The current study suggests that demographic diversity in terms of age, gender and functional background does not improve entrepreneurial team effectiveness, but team commitment and team-level cognitive comprehensiveness do. Hence, entrepreneurs should build teams focusing more on highly committed members who will value every member’s cognitive styles, perceptions and abilities than on members’ demographic diversity.

Members of an entrepreneurial team must focus on developing trust and loyalty toward the team. This might create team commitment and lower emotional conflict and consequently improve team effectiveness. Additionally, entrepreneurs should collectively formulate an agreed-upon system of team interaction that not only would ensure that each member proposed different approaches, points of views, alternatives etc., but would also encourage members to compare the diverse alternatives and approaches and weigh them against each other. This would ensure an entrepreneurial team process in which members will evaluate an issue with a wider lens resulting in cognitive comprehensiveness and ultimately entrepreneurial team effectiveness.

This study opens several avenues for related research. First, future studies on entrepreneurial teams should consider minimizing the limitations identified in this study. One way to reduce common-response bias would be to collect team effectiveness or performance data using an objective measure instead of the perceptual measure used in this study. A multi-method data collection technique could also alleviate this problem.

Moreover, future studies should examine diversity in terms of personality traits and thinking style in conjunction with demographic diversity. Entrepreneurs with different personality characteristics bring different cognitive attributes. For example, extroverts will differ in their abilities and styles when compared with introverts. Although extensive research on entrepreneurship is dedicated to finding an ideal entrepreneur based on personality
characteristics, studies on entrepreneurial team diversity based on personality characteristics are almost nonexistent.

Consequently, entrepreneurship research focusing on studying team diversity in terms of demographic, personality, and thinking style would be important as the effect of diversity seems to be a complex function of demographic and other individual traits (Tolbert et al., 1995). Hence, a comprehensive study of diversity and its influence on both entrepreneurial team dynamics and team effectiveness would be a promising direction for future research.

References


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