Competitive Research Article

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Entrepreneurial Team Diversity and Performance: Toward an Integrated Model

Abstract: A research need exists to systematically evaluate the status quo of research on the link between entrepreneurial team diversity and performance, identify challenges, and advance the entrepreneurial team research. By analyzing 31 empirical studies on entrepreneurial teams, the current study fulfilled three main purposes. First, we conduct a comprehensive, systematic review of the possible association between entrepreneurial team diversity and performance by summarizing, quantitatively synthesizing, and analyzing the quantitative studies in this area. Second, we further examine these theoretical accounts by evaluating whether diversity impact varies with situational factors. Third, we identify research gaps and propose an integrated model that directs future research.

Keywords: entrepreneurial teams, team diversity, team performance

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Introduction

There has been growing interest in studying entrepreneurial teams since Gartner et al. (1994) made the argument that the entrepreneur in entrepreneurship is typically plural, not singular. The assertion that the activities involved in establishing and growing a new business are more often taken by entrepreneurial teams than a solo entrepreneur is now generally acknowledged (Reich 1987; Kamm et al. 1990; Gartner et al. 1994; Ensley, Carland, and Carland 1998; Lechler 2001). For example, Hunsdiek (1987) reported that new high-tech

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ventures in Germany had a median of 2.2 entrepreneurs. In another study, Cooper et al. (1990) found that entrepreneurial teams were founders of 70% of the firms in the high-tech industries in the United States. According to the evolutionary perspective (Boeker 1988), the configuration of the founding team shapes subsequent entrepreneurial activities, strategies, and entrepreneurial performance. In a review of entrepreneurship studies, Martinez, Yang, and Aldrich (2011) concluded that the predominant unit of study is still the firm rather than the team and called upon researches on entrepreneurial teams. Kamm et al. (1990) concluded that there was a significant gap in the literature regarding how entrepreneurial teams are formed and how team composition is related to the development of new ventures. Thereafter, although still relatively limited, an emerging body of research has focused on team-level issues in order to examine the factors that contribute to venture success (Ensley, Pearson, and Amason 2002). In particular, there is growing interest in the diversity and complexity of entrepreneurial teams because of their potential to shape new business growth (Wright and Vanaelst 2009).

Researchers have used different approaches to categorize team diversity. These include a two-factor approach, in which diversity is defined in terms of two categories of differences. In applying this tactic, Jackson, May, and Whitney (1995) distinguished between visible differences, such as race, ethnicity, age, and gender, and nonvisible differences, including education, skills and abilities, values and attitudes, and personality differences. Another example of the two-factor approach is a distinction made between surface-level and deep-level diversity (Harrison et al. 2002; Harrison, Price, and Bell 1998; Bell 2007). Surface-level diversity refers to demographic differences among team members, while deep-level diversity includes differences in attitudes, beliefs, values, and personalities. One problem with two-factor approaches is that diversity is measured with a limited set of variables and often operationalized as only one focal characteristic (Mannix and Neale 2005). Another problem is that it is hard to categorize exclusively some individual characteristic variables in one of the two categories. For example, diversity in educational background might be surface-level or deep-level diversity. To overcome this problem, the current study adopted Jehn, Northcraft, and Neale's (1999) multifaceted approach which utilizes several clusters of categories: social-category diversity (or demographic diversity), informational diversity, and personality diversity. Social-category diversity refers to differences in demographic membership, including race, gender, and ethnicity. Informational diversity refers to differences in knowledge and perspectives that team members bring into a team. Informational diversity likely comes from team members' differences in education, training, and working experiences. Personality or value diversity presents when team members differ in personality traits or personal values. Therefore,

informational diversity and personality diversity generate different perceptions and views of team tasks and goals and would be expected to benefit entrepreneurial team performance.

Although the volume of entrepreneurial team research has been increasing, the empirical results are often controversial and inconclusive. Those outcomes may stem from the variety of theoretical frameworks, as well as methodological problems, devious study design, measurement issues, and/or non-comparable samples (Song et al. 2008). Thus, it is desirable to comprehensively review the current entrepreneurial team research literature and identify important theoretical and empirical issues for further study. Some outstanding review articles exist in broad organizational behavior and entrepreneurship fields. For example, Josh and Roh's (2009) review examined whether contextual factors at multiple levels, including industry, occupation, and team, influenced performance in terms of relations-oriented and task-oriented diversity. Bell et al. (2011) integrated different conceptualizations of diversity (i.e. separation, variety, disparity) into the development of their rationale and hypotheses for explaining specific demographic diversity variable–team performance relationships. The meta-analysis of Song et al. (2008) attempted to identify successful factors for new ventures. While these outstanding reviews focus on broad organizational behavior or entrepreneurship field, little attention has been paid to entrepreneurial teams.

There are three main purposes of this study. First, we conduct a comprehensive, systematic review of the possible association between entrepreneurial team diversity and performance by summarizing, quantitatively synthesizing, and analyzing the quantitative studies in this area. Second, we further examine these theoretical accounts by evaluating whether diversity impact varies with situational factors. Third, we identify research gaps and propose an integrated model that directs future research.

Methods

Literature search and coding

In an attempt to identify all potential empirical studies, both manual and computerized searches of relevant published and unpublished studies were conducted. Computerized searches were performed on ABI/INFORM, Business Source Premier, PsychInfo, and the Social Science Citation Index (as of March 2014), using the following keywords: entrepreneurial team and/or group,

founding team and/or group, new venture, start-ups, diversity, and heterogeneity. Other search strategies included the screening of bibliographies, conference proceedings, Internet searches, and manual searches in relevant books and research journals. In an attempt to minimize the “file drawer problem” (Rosenthal 1984), we performed a Google Scholar search to identify unpublished working papers.

To ensure coding accuracy, one author and one graduate assistant initially coded five articles independently and then discussed their work together to resolve any disagreement or discrepancies. Each coded the remaining articles separately but they jointly discussed and solved any process problems as they arose. Their work yielded 31 empirical studies in total. Table 1 gives an overview of the studies, describing all independent, dependent, moderating, and mediating variables.

Review of the current state of research

Entrepreneurial teams and performance

Considerable debate exists as to the precise meaning of the term “entrepreneurial team”. According to Kamm et al. (1990), entrepreneurial team refers to two or more individuals who jointly establish a firm in which they have a financial interest. Their definition was broadened by Gartner et al. (1994) to cover those individuals who have direct influence on a firm’s strategic choices. Ensley, Carland, and Carland (1998) combined the two definitions and defined entrepreneurial teams as fulfilling three criteria: their members (1) collectively establish a firm; (2) have a financial interest; and (3) have a direct influence on the strategic choices involved in creating and running the firm. According to this definition, entrepreneurial teams are distinct from top management teams (TMTs). TMTs are made up of individuals who hold executive titles, regardless of when they join a business. Although there is overlap between an entrepreneurial team and a TMT when all founders hold executive titles, the two types of teams are conceptually distinct (Wright and Vanaelst 2009).

While performance is a widely employed dependent variable in research on entrepreneurship, the way that the concept is operationalized varies across studies. Initially, researchers used both firm-level and team-level performance measures. Firm-level measures included key milestones (e.g. getting venture capital and IPO), organizational survival, growth, profitability, and product innovativeness. Instead of directly measuring financial performance, Beckman, Burton, and O’Reilly (2007) chose the ability to obtain venture capital funding

Table 1: Overview of included empirical studies

Study name	Year	Independent variables	Dependent variables	Moderating variables	Mediating variables
Leung, Foo, and Chaturvedi (2013) Zhou (2013a)	2013	Functional	HR values	Shared organizational experience	Shared leadership
	2013	Openness diversity Conscientiousness diversity Extroversion diversity Agreeableness diversity Emotional diversity	Team effectiveness		
		Task diversity Non-task diversity		Shared leadership	
Bjørnåli and Aspelund (2012)	2012	Age diversity Educational diversity Functional diversity Experience diversity	1. Securing international strategic alliances 2. Making international sales		
	2012	As control variables: Age diversity Educational diversity Gender Diversity	Venture growth		
		Gender diversity			
Zimmerman and Brouthers (2012) Foo (2011)	2012	Gender diversity	International diversification Team effectiveness		
	2011	Age diversity Experience diversity Functional diversity Racial diversity			

(continued)

Table 1: (Continued)

Study name	Year	Independent variables	Dependent variables	Moderating variables	Mediating variables
Davis, Aldrich, and Longest (2009)	2009	Age diversity	Team productivity		
		Gender diversity			
		Racial diversity			
Goethner and Stuetzer (2009)	2009	Experience diversity	Firm survival	Growth	
		Functional diversity			
Vissa and Chacar (2009)	2009	As control variables:	Revenue growth		
		Functional diversity			
		Functional diversity			
Li (2008)	2008		Management team restructuring	Pre-IPO	Firm growth
Zimmerman (2008)	2008	Age diversity	IPO performance		
		Tenure diversity			
		Educational diversity			
Beckman, Burton, and O'Reilly (2007)	2007	Functional diversity	Venture capital financing		
		Experience diversity			
		Functional diversity			
Hellerstedt, Aldrich, and Wiklund (2007)	2007	Age diversity	Member exit		
		Gender diversity			
		Racial diversity			
Henneke and Luthje (2007)	2007	Educational diversity	Innovativeness		
		Experience diversity			
		Educational diversity			
					Environmental scanning
					Strategic planning

Hmieleski and Ensley (2007)	2007	Informational diversity	Venture performance	Environmental dynamism Entrepreneurial leadership behavior
Kroll, Walters, and Le (2007)	2007	Ownership dispersion	Post-IPO performance	
Amazon, Shrader, and Tompson (2006)	2006	Age diversity Educational diversity Functional diversity	Profitability Sales growth Market performance	Novelty
Foo, Sin, and Yiong (2006)	2006	Educational	Team variability Satisfaction	Social integration
Aspelund, Berg-Utby, and Skjvedal (2005)	2005	Functional	Organizational death	
Chandler, Honig, and Wiklund (2005)	2005	Gender diversity Educational diversity Functional diversity Experience diversity	Addition and departure of team members	
Chowdhury (2005)	2005	Age diversity Gender diversity Functional diversity	Team effectiveness	
Ensley and Hmieleski (2005)	2005	Demographic	Firm growth	Type of business
Foo, Wong, and Ong (2005)	2005	Age diversity Gender diversity Employment diversity Education-level diversity Major diversity	Business idea status	Team size

(continued)

Table 1: (Continued)

Study name	Year	Independent variables	Dependent variables	Moderating variables	Mediating variables
Kor (2003)	2003	Founder-based specific experience in the top management team.	firm- Sales growth	Tenure diversity	
Ucbasaran et al. (2003)	2003	Functional diversity	Member entry and exit		
Watson, Stewart, and Barnir (Watsona, Stewart, and BarNira 2003)	2003	Experience diversity	Sales growth		
Ochani, Chowdhury, and Ponthieu (2002)	2002	Gender diversity	Team effectiveness		
Chandler and Lyon (2001)	2001	Functional diversity	Sales growth		
Ensley, Carland, and Carland (1998)	1998	Demographic diversity	Revenues		
		Skill diversity	Sales growth		
		Degree diversity	Profitability		
		Major diversity			
Eisenhardt and Schoonhoven (1990)	1990	Functional diversity	Sales growth		
		Experience diversity			

and take the firm public (IPO) as venture performance measures since they represent the most significant milestones in the life of a young start-up firm. Organizational death/business survival (Aspelund, Berg-Utby, and Skjevdal 2005) was also chosen as a dependent variable in the entrepreneurship literature. Growth is often cited as the most important objective of new ventures (Brush and Vanderwerf 1992) and is measured as sales growth (Chandler and Lyon 2001; Ensley, Carland, and Carland 1998), revenue growth (Ensley and Hmieleski 2005; Hmieleski and Ensley 2007), and employment growth (Hmieleski and Ensley 2007; Ensley, Carland, and Carland 1998). Other firm-level performance measures are financial or accounting metrics, including cash flow (Ensley and Hmieleski 2005), revenues (Ensley, Carland, and Carland 1998), and 24-month holding period returns (HPRs) (Kroll, Walters, and Le 2007). Productivity and product innovativeness were also used in some studies (Henneke and Lüthje 2007; Davis, Aldrich, and Longest 2009).

Team-level performance measures included team effectiveness, team productivity, and team stability. How members evaluate their team may be important because if members regard their team negatively, the team may dissolve (Foo 2011). Self-rated team effectiveness (Chowdhury 2005; Foo, Sin, and Yiong 2006; Foo 2011) and team productivity (Davis, Aldrich, and Longest 2009) were both used as team-level performance measures in some studies. Another team-level performance indicator is team stability, usually measured as team member entry and exit (Ucbasaran et al. 2003; Hellerstedt, Aldrich, and Wiklund 2007). According to Ucbasaran et al. (2003), team member entry or exit is related to the total amount of human capital within an entrepreneurial team.

Both objective and subjective measures of performance have been used in entrepreneurial team research. For new ventures, objective performance measures, such as sales, revenues, and profits, may not be relevant because the start-up is unlikely to have substantial sales. The main concern is to establish the new venture, team membership, identity, and commitment (Carter, Gartner, and Reynolds 1996). In light of those priorities, several studies employed subjective measures of entrepreneurial team performance. For example, Chowdhury (2005) used members' ratings of the team's knowledge of tasks, quality of work, quantity of work, initiative, interpersonal skills, and overall performance. Foo, Sin, and Yiong (2006) used member ratings of team effectiveness. Ensley and Hmieleski (2005) defined team effectiveness as the degree of collective efficacy toward achieving the team's goals.

Clearly, entrepreneurial team performance is a multi-dimensional concept. Studies adopting a single measure of performance cannot capture the complexity entrepreneurial teams. Three general gaps exist regarding performance measurement in entrepreneurship research. First, studies using firm-level

measures of performance have usually adopted a cross-level design in which individual- or team-level characteristics were used to explain firm-level performance (Davidsson 2007). However, team-level variables should relate more strongly to team-level performance because firm-level performance is influenced by a broad range of factors, including interest rates or regulations, many of which cannot be influenced by the individual's or team's characteristics. Second, while objective measures, such as financial and accounting measures of performance, were preferred by some researchers, subjective measures may be more appropriate when the focus of the study is examination of entrepreneurial teams' functioning. Studies adopting objective performance measures have been built consistently around a model of profit-seeking individuals (e.g. Heaton and Lucas 2000; Cagetti and De Nardi 2006). However, the quest for profits is often revealed to be a secondary concern (Ruef 2010) in entrepreneurship studies. More typically, entrepreneurs are motivated by subjective factors such as distaste for working for others (Shane 2008). Therefore, measures such as perceived performance are equally or more important than objective indicators. Third, implications of independent variables might vary across different performance measures. For instance, personality or value differences among entrepreneurial team members may have a stronger relationship with team-level performance than with firm-level performance. Table 2 shows the summary of the diversity–entrepreneurial team performance link.

Demographic diversity and entrepreneurial team performance

Researchers typically relied on two perspectives to explain the advantages and disadvantages of demographic diversity. Some studies drew upon social categorization theory and hypothesized that demographic heterogeneity was problematic because it disrupted group processes and produced relationship conflict, conflict over team members' personal preferences or disagreements about interpersonal interactions (typically about non-work issues such as gossip, social events, or religious preferences) (Jehn 1995, 1997). Other studies held optimistic views of demographic diversity and proposed that it would benefit entrepreneurial team performance because it brought together people with different perspectives, cognitive styles, skills, and abilities. The review of empirical studies (Table 2) showed inconsistent and inconclusive results regarding the relationship between demographic diversity and entrepreneurial team performance.

Table 2: Summary of entrepreneurial studies by type of diversity and type of performance measure

Diversity type	Firm-level performance			Team-level performance				
	Key milestones	Organizational survival	Growth	Profitability	Product innovativeness	Team effectiveness	Team productivity	Team stability
Demographic								
Age	+		+ --/	//		+ -/ ///	/	-
Gender			+			-	-	+
Race			+			-	/	/
Tenure			/					
Informational								
Educational level			+ --/			+/ +		/
Educational background	-		+ + -- -/	--/ ///	/	+/ +/ +//		-
Functional	+	+	+ - ///	///		/	+	+ -/ --
Experience	+	+	+			--	--	--
Skills			//	/				
Personality								
Openness						-		
Conscientiousness						-		
Extraversion						+		
Agreeableness						+		
Emotional stability						+		

Notes: + : positive effect; - : negative effect; / : no effect.

Age diversity

Overall, 11 empirical studies examined the relationship between age diversity and entrepreneurial team performance. One study showed a positive relationship with team effectiveness (Foo 2011). Three studies revealed negative relationships with growth (Amason, Shrader, and Thompson 2006), team effectiveness (Foo, Wong, and Ong 2005), and team stability (Hellerstedt, Aldrich, and Wiklund 2007). Four studies, however, failed to demonstrate significant results. Although team members of similar age were more likely to share common experience and thus could facilitate better communication among team members (Zenger and Lawrence 1989), no conclusion could be drawn regarding the relationship between age diversity and entrepreneurial team performance due to inconsistent research results.

Gender diversity

Six studies explored the relationship between gender diversity and entrepreneurial team performance. One study showed a positive relationship with team stability (Hellerstedt, Aldrich, and Wiklund 2007), one study displayed a negative relationship with team productivity (Davis, Aldrich, and Longest 2009), while another two studies discovered non-significant results (Chowdhury 2005; Foo, Wong, and Ong 2005). Due to the limited number of studies and inconsistent results, no conclusion could be made regarding entrepreneurial team gender diversity.

Racial diversity

Only four studies examined the racial composition and entrepreneurial team performance. One possible reason for this lack of research is that very little racial diversity exists in entrepreneurial teams (Williams and O'Reilly 1998). Two of the four studies failed to find significant relationships between racial diversity and entrepreneurial team productivity (Davis, Aldrich, and Longest 2009; Hellerstedt, Aldrich, and Wiklund 2007). Foo (2011), however, found that racial diversity was negatively related to entrepreneurial teams' self-rated effectiveness. No conclusion could be drawn due to the inconsistent results.

Dispersion of ownership

Since each entrepreneurial team member (usually) holds partial ownership of new ventures, the dispersion of ownership among team members may have an

impact on a team's effectiveness. Kroll, Walters, and Le (2007) examined this relationship in a study of entrepreneurial firms completing IPOs in 1996 and 1997 and found that ownership dispersion among team members was not significantly related to firms' post-IPO performance.

In sum, empirical studies demonstrated inconsistent and thus inconclusive results regarding relationships between demographic diversity and entrepreneurial team performance. One possible explanation for the inconsistent results is that less demographic diversity is expected in such teams because entrepreneurs prefer to form start-ups with friends or acquaintances of similar demographic backgrounds (Ruef 2010). Another possible explanation is that demographic variables are not reliable proxies for informational or psychological dimensions of team diversity. Hambrick and Mason (1984) were aware of this issue and acknowledged that "observable demographic factors simply do not provide a reliable portrayal of a person's make up." Therefore, while more empirical studies are needed to examine the relationship between demographic diversity and entrepreneurial team performance, studies of entrepreneurial teams should also focus directly on informational and personality diversity instead of relying on diversity in demographic characteristics only.

Informational diversity and entrepreneurial team performance

Studies proposing positive effects of demographic diversity on entrepreneurial team performance often employed that characteristic as a proxy for informational diversity or cognitive diversity of a team. While demographic diversity brings together people of different backgrounds, it does not necessarily produce diversity of perspectives and ideas (Chowdhury 2005). Therefore, several studies attempted to examine directly the effects of different types of informational diversity on entrepreneurial team performance. Such studies generally focused on information processing and decision-making and hypothesized positive effects of informational diversity. Unfortunately, the empirical results were quite inconsistent and therefore inconclusive. For example, using two independent samples, Ensley and Hmieleski (2005) examined the effect of general diversity in terms of education, industry experience, functional experience, and skills on new ventures' performance, measured as net cash flow. Positive effect was found in the nationally representative sample of independent start-ups, including high-technology new ventures with at least 20% growth over a three-year period. However, the study failed to demonstrate significant relationships between informational diversity and entrepreneurial team performance in

the university-based sample that included high-technology start-ups located in a university incubator or technology park in the southeastern United States. Instead, general informational diversity was found to be negatively related to revenue growth and employment growth (Hmieleski and Ensley 2007). The effect of informational diversity also differed according to how diversity and performance were measured.

Educational-level diversity

Varying educational levels within a team may be viewed as sources of informational diversity that produce conflicts over task content, goals, and task processes (Jehn 1994; Jehn, Chadwick, and Thatcher 1997). Conversely, diversity of educational level might be seen as broadening the networks associated with entrepreneurial team members (Hellerstedt, Aldrich, and Wiklund 2007), a favorable effect. Two studies showed a positive association of team educational-level diversity with (1) external assessment of start-up ideas in a business plan competition (Foo, Wong, and Ong 2005) and (2) sales growth in a new venture (Amason, Shrader, and Thompson 2006). However, Ensley, Carland, and Carland (1998) found the opposite impact of educational-level diversity on sales growth. In other three studies, no significant results were supported. Therefore, the association between educational-level diversity and entrepreneurial team performance remains inconclusive.

Educational-background diversity

It could be expected that educational-background diversity would provide entrepreneurial teams with a wide array of procedural and instrumental knowledge. For example, technology-related educational knowledge could provide the foundation for innovation, while education in general management might enable entrepreneurial teams to integrate market opportunities with technological innovation (Henneke and Lüthje 2007). Empirical results, however, do not support conclusively this expected positive effect. Only two studies showed a positive impact of educational diversity on team variability (Foo, Sin, and Yiong 2006) and new venture sales growth (Amason, Shrader, and Thompson 2006). Another two studies discovered negative relationships between education-background diversity and new venture revenues (Ensley, Hmieleski, and Pearce 2006) and team stability (Hellerstedt, Aldrich, and Wiklund 2007). More significantly, six empirical studies failed to associate educational diversity with

entrepreneurial team innovativeness (Henneke and Lüthje 2007), member satisfaction (Foo, Sin, and Yiong 2006), external evaluation of business ideas (Foo, Wong, and Ong 2005), or profitability and market performance (Amason, Shrader, and Thompson 2006). Overall, the usually hypothesized positive relationship between educational-background diversity and entrepreneurial team performance was not supported by empirical studies.

Functional diversity

Because diverse teams are expected to contain more relevant expertise than homogeneous groups, teams with diverse functional backgrounds should be more effective in making decisions (Jackson 1992). From this perspective, increased functional diversity should be positively associated with entrepreneurial team performance. Four empirical studies provided support for this argument (Beckman, Burton, and O'Reilly 2007; Aspelund, Berg-Utby, and Skjevdal 2005; Ucbasaran et al. 2003; Davis, Aldrich, and Longest 2009). The empirical evidence, however, did not show consistent support for this prediction. Three other studies revealed that functional diversity was negatively related to new venture revenues (Ensley, Carland, and Carland 1998), firm survival (Goethner and Stuetzer 2009), and team stability (Goethner and Stuetzer 2009). In another five studies, non-significant effects were found between functional diversity and entrepreneurial team performance in terms of team effectiveness (Chowdhury 2005; Foo 2011), new venture sales growth, profitability, and market performance (Amason, Shrader, and Thompson 2006; Chandler and Lyon 2001; Ensley, Carland, and Carland 1998). Thus, empirical findings regarding relationships between functional diversity and entrepreneurial team performance may be described as divergent and inconsistent.

Experience diversity

Entrepreneurial team members' prior industry experience may be considered assets as well as liabilities (Starr, Bygrave, and Tercanli 1993). On the one hand, such experience may considerably enhance a member's human capital, and the diversity of prior experience among team members may enhance the human capital of the team as a whole (Ucbasaran et al. 2003). Human capital is significantly associated with an increased level of productivity (Becker 1975), and therefore, experience diversity should be expected to increase firm-level entrepreneurial team performance. This positive relationship was supported by a

Beckman, Burton, and O'Reilly (2007) study. The authors examined the effect of affiliation diversity, a special type of experience diversity, on new ventures' probability of reaching critical entrepreneurial firm milestones and found that entrepreneurial teams with diverse prior company affiliations received venture capital financing and went public at higher rates than homogeneous entrepreneurial teams.

On the other hand, diversity of prior experience may create conflict between experienced and inexperienced team members and therefore hurt team cohesion and effectiveness. Five empirical studies provided consistent support for a negative relationship between experience diversity and team-level entrepreneurial team performance, including team effectiveness (Foo, Wong, and Ong 2005; Foo 2011), team stability (Hellerstedt, Aldrich, and Wiklund 2007; Ucbasaran et al. 2003), and team productivity (Davis, Aldrich, and Longest 2009). From the empirical evidence it therefore appears that associations between experience diversity and entrepreneurial team performance may vary depending on whether performance is measured at team or firm level.

Although informational diversity has often been assumed to be beneficial for firm-level as well as team-level entrepreneurial team performance, here again empirical evidence is inconsistent and therefore inconclusive. A possible explanation for the conflicting results of informational diversity research on entrepreneurial teams might be the "black box" problem (Lawrence 1997), whereby researchers assume that some team process variables (e.g. team conflict or trust) can explain the relationship between entrepreneurial team diversity and team performance. However, these process variables are not directly measured (Nielsen 2010). Therefore, research is needed to identify the conditions under which informational diversity benefits entrepreneurial team performance.

Personality diversity and entrepreneurial team performance

In group research, the relationship between personality diversity and team performance has been confirmed by meta-analytic reviews (Stewart 2006; Bell 2007). Bell's (2007) meta-analysis indicated that personality diversity, described in terms of conscientiousness, agreeableness, or openness experience, was negatively related to team performance in work settings. Personality diversity has been widely examined in group research (cf. Barrick et al. 1998; Bell 2007). For example, Barrick et al. (1998) revealed that less diversity in conscientiousness was related to better team performance and diversity in agreeableness was negatively related to team cohesion and workload sharing. Mohammed and

Angell (2003) reported that higher variability on agreeableness and emotional stability resulted in lower oral presentation performance for student teams.

Studies exploring implications of personality diversity in entrepreneurial teams remain limited (Simsek, Heavey, and Veiga 2010), however. Only one empirical study (Zhou 2013a) was found to examine the relationship between personality diversity and entrepreneurial team performance. The findings showed that diversity in openness and conscientiousness related negatively to entrepreneurial team performance, while diversity in agreeableness and emotional stability appeared positively related. York, McCarthy, and Darnold (2009) authored a case study in which they observed business students working in cross-disciplinary project teams in the technology commercialization process. They found that personality diversity seemed to increase conflict in teams and was quite difficult to overcome, even over time.

The paucity of studies exploring personality diversity in entrepreneurial teams is explained, in large part, by the obstacles to studying entrepreneurs' personality traits. Although several empirical studies have examined the impact of various facets of CEO personality including self-esteem and locus of control (Miller 1983; Miller and Toulouse 1986), emotional stability and hubris (Hayward and Hambrick 1997), overconfidence (Simon and Houghton 2003), and narcissism (Chatterjee and Hambrick 2007), often researchers have had to rely upon secondary data (e.g. analysis of published biographies) rather than direct measurements of these personality traits. Since studies using demographic variables as proxies for psychological dimensions of entrepreneurial team diversity have failed to find significant relationship between team diversity and entrepreneurial team performance and personality diversity has been shown to be important to team performance (Bell 2007), it is desirable to examine the relationship between personality diversity and entrepreneurial team performance.

Moderators and mediators

Given the evidence that diversity may have both positive and negative effects on entrepreneurial team performance, we need to understand further the conditions and mechanisms under which different types of diversity affect performance.

Some entrepreneurial studies examined possible moderators that could affect the relationship between diversity and entrepreneurial team performance. Moderator variables at the firm level included firm growth (Li 2008), new venture novelty (Amason, Shrader, and Thompson 2006), and environmental dynamism (Hmieleski and Ensley 2007). Li (2008) found that pre-IPO firm growth tempered the negative relationship between TMT functional diversity

and new ventures' pre-IPO management team restructuring. Amason, Shrader, and Tompson (2006) examined the moderation effect of venture novelty on the relationship between TMT diversity and new venture performance and discovered that different levels of novelty represent different challenges for new ventures. Highly novel ventures create value by introducing new products and services, while less novel ventures create value by improving existing operations. Chaganti and Sambharya (1987) predicted that the fit between entrepreneurial team composition and the requirements of its strategy should affect performance. Results of their study showed that new ventures in the early stages of highly novel strategies benefit from homogeneity within entrepreneurial teams. Hmieleski and Ensley (2007) found that the value of entrepreneurial team informational diversity was also context-dependent; it varied with environmental dynamism and entrepreneurial leadership behavior. In dynamic environments, more diverse entrepreneurial teams performed better when led by individuals high in directive leadership behavior and low in empowering leadership behavior. In stable environments, the inverse relationships were found. Some team-level characteristics, such as leadership behavior (Hmieleski and Ensley 2007) and team size (Foo, Wong, and Ong 2005), moderated the link between diversity and entrepreneurial team performance. Foo, Wong, and Ong (2005) found that the positive relationship between diversity of education background and evaluation of business ideas is greater for larger teams than for smaller teams. In a more recent study (Zhou 2013b), task-related informational diversity was found to improve entrepreneurial team performance. This relationship was stronger when the teams had higher level shared leadership.

Studies examining the mechanism through which diversity affects entrepreneurial team performance remain limited. In the group research literature, task and emotional conflicts among team members were supposed to mediate the relationship between team diversity and team performance (Williams and O'Reilly 1998). Such a relationship may not hold for entrepreneurial teams however, because they have some choice of whom to admit, and this would seem to mitigate emotional conflict among team members (Foo 2011). Individuals prefer to form entrepreneurial ventures with friends and are therefore less likely to involve individuals who have emotional conflict with others on the team (Ruef 2010). Only one entrepreneurship study was found to examine the conditions under which that tendency might be counter-indicated. Henneke and Lüthje (2007) suggested that team heterogeneity was indirectly related to product innovativeness through the quality of the intervening strategic planning processes because a diverse entrepreneurial team was supposed to allow for comprehensively assessing the market as well as the technological and financial environment of a new venture. Using 144 entrepreneurial teams as sample, Zhou

(2013a) found that shared leadership mediated the conscientiousness diversity and performance link as well as the extraversion diversity and performance link.

An integrated model and directions for future research

This review of literature indicates that although there is an impressive amount of research on entrepreneurial team diversity, the results of empirical studies remain inconclusive regarding how team formation and composition are related to the entrepreneurial team performance. Research gaps still exist and call for future studies. In this section, we will discuss the possible reasons for the inconclusiveness of entrepreneurial team diversity research and propose an integrated model for future research.

Theoretical foundations for studying entrepreneurial team diversity

A possible explanation for inconsistent conclusion regarding the effects of team diversity on entrepreneurial team performance might be due to the theoretical perspectives used in this area of research. In studying groups, researchers have used a number of theories to explain the performance effects of and relations among different types of team diversity. The four most common theoretical bases for explaining these performance effects are social categorization, similarity/attraction, information and decision-making theory, and upper echelons theory.

According to social categorization theory (Tajfel 1982), team members are assumed to desire to maintain a high level of self-esteem by a process of social comparison with others in terms of age, race, status, and other attributes. This process permits the individual to assume a positive self-identity, maximize intragroup or intergroup distinctions and to perceive others as less attractive (Kramer 1991). In heterogeneous teams, effects of self-categorization have been shown to produce decreased satisfaction, increased turnover, lowered levels of cohesiveness, reduced communication and cooperation, and higher level of conflict (Crocker and Major 1989; Martin and Shanrahan 1983; Moreland 1985; Stephan and Stephan 1985; Triandis, Kurowski, and Gelfand 1994). Empirical studies adopting social categorization theory typically confirmed the negative effects of demographic diversity on team process and outcomes.

Another theoretical framework used in studies of diversity is the similarity/attraction theory (Berscheid and Walster 1978; Byrne 1971). According to this perspective, similarity on attributes ranging from values to demographic variables increases interpersonal attraction and liking (Byrne, Clore, and Worchel 1966). Since individuals will avoid communicating with those they dislike (Rosenbaum 1986), heterogeneous groups are less effective because dissimilarity among group members often results in group process and performance loss, including less positive attitudes, less frequent communication, and a higher likelihood of turnover (Jehn, Chadwick, and Thatcher 1997).

A third theoretical framework explores how information and decision-making can be affected by group composition (Gruenfeld, Mannix, Williams, & Neale 1996; Wittenbaum and Stasser 1996). According to this perspective, members in a diverse team may bring in more information and different perspectives than those in a homogeneous team. This added information enhances task and team performance when multiple perspectives generate benefits such as innovative or complex problem-solving (Williams and O'Reilly 1998). Moreover, diversity also improves the breadth of cognitive ability that is important for problem-solving and decision-making. Thus, this line of research has focused on the utility of informational diversity as well as demographic diversity and personality diversity (Wittenbaum and Stasser 1996).

Empirical studies adopting this perspective also help us better understand the relations among different types of diversity. Demographic diversity may bring people together with diverse backgrounds but does not ensure relevant team-level cognitive diversity (Chowdhury 2005). Any diversity of perspectives may arise from factors other than demographic attributes, such as informational diversity or personality diversity. In addition, people with similar demographic backgrounds may differ in their thinking styles (Abraham 1997). Therefore, a team lacking in demographic diversity may still present a diverse range of cognitive attributes.

Upper echelons theory (Hambrick and Mason 1984) specifically explored the effect of TMT diversity on various organizational outcomes. This theory mainly focuses on the diversity of observable characteristics (demographic and informational) in TMTs and posits that TMT diversity benefits performance in turbulent environments, as opposed to stable environments. Despite the large number of studies on TMT heterogeneity, empirical research has yielded inconsistent results (Cannella, Park, and Lee 2008). While the TMT studies have limited utility for entrepreneurial research due to the conceptual distinction between entrepreneurial and TMTs (Wright and Vanaelst 2009), the literature reviewed in the current study includes empirical studies in TMT literature as long as the samples comprised entrepreneurial teams.

While these theoretical perspectives improve our understanding of the team diversity–entrepreneurial team performance relationship, research gaps exist that need to be addressed in future research.

An integrated model and directions for future research

In the field of organizational behavior, research on team composition and team processes stemmed from the input–process–outcome (IPO) framework (McGrath 1984), and later the inputs–mediators–outcomes (IMO) framework (Mathieu et al. 2008). According to the IMO perspective, team composition (as team input) shapes subsequent team activities and processes and influences team effectiveness. In research on teams, an important focus has been the study of team composition, especially in terms of team diversity. On the basis of this literature review, an integrated model for entrepreneurial team diversity research was developed as shown in Figure 1 by integrating the traditional entrepreneurial team diversity research with the IMO framework.

Figure 1: An integrated model of entrepreneurial team diversity

Entrepreneurial team input

Adopting the IMO perspective, most studies viewed team diversity as an independent variable and investigated its impact on team process and team effectiveness (cf. Mathieu et al. 2008 for a comprehensive review). Consistent with the integrated model, as shown in Figure 1, most entrepreneurial team research has viewed team diversity as team input variable that influences entrepreneurial team performance. The current review indicates two research questions that

need to be addressed in future research. On the one hand, although some studies have suggested the importance of team personality composition to team performance (Harrison et al. 2002; Bell 2007), research on personality diversity of entrepreneurial teams remains limited. Therefore, it is desirable to empirically explore the relationship between entrepreneurial team personality diversity and performance. On the other hand, prior research generally indicates that demographic diversity is not significantly related to entrepreneurial team performance. However, this does not mean that demographic variables are unimportant. The common practice of research on entrepreneurial teams is to use demographic variables as proxies for psychological dimensions of entrepreneurial team diversity, but it is evident that “observable demographic factors simply do not provide a reliable portrayal of a person’s makeup” (Hambrick and Mason 1984, 204).

Direction for future research 1: Do demographic, informational, and personality diversity have different impacts on entrepreneurial team performance?

Direction for future research 2: What’s the relationship among three types of entrepreneurial team diversity?

Entrepreneurial team processes

As indicated in the current review, another research gap is that most of the entrepreneurial team research has simply focused on relationships between team inputs and outcomes while overlooking the critical mediating mechanisms and moderating factors. However, since team diversity may interact with team social dynamics to affect team performance, it will be beneficial to investigate the process through which team diversity may influence entrepreneurial team performance (Smith et al. 1994). Therefore, the important challenge is to measure the link between specific demographic variables, underlying psychological constructs, and proposed mediators (Mannix and Neale 2005). Specifically, more precise theorizing around factors that are presumed to be related to team processes and team performance, e.g. personal identity or attitude differences, is needed.

As illustrated in the proposed IMO model in Figure 1, different types of team process variables are included in the model. Team processes refer to team activities through which team members work together to convert team inputs into desirable outcomes (LePine et al. 2008). Team process variables have been widely studied in the field of group research. The proposed model in Figure 1 is not trying to provide a comprehensive list of team processes variables that is relevant for the team diversity – performance link (cf. Mathieu et al. 2008 for a

comprehensive review). As reviewed in this study, although some research examined team process variables, such as conflict, strategic planning, and shared leadership, future research should seek to examine more process variables. Especially, future research should pay more attention to process variables that are more relevant to entrepreneurial teams. For example, as a process variable, shared leadership across multiple team members could determine how team diversity affects entrepreneurial team performance. Pearce and Conger (2003) described shared team leadership as a dynamic, interactive influence process among individuals in work groups in which the objective is to lead one another to achieve group goals. However, this potential intervening effect of shared leadership has not been empirically investigated yet. One direction for future studies is to test the mediation role of shared leadership in the relationship between personality diversity and team performance. In the leadership literature, personality traits appear related to individual leadership behavior (Judge et al. 2002). However, the issue of whether personality diversity among team members affects shared leadership behavior has not been empirically examined. Research in this area helps us understand the process through which the personality diversity affects entrepreneurial team performance.

Direction for future research 3: What team process variables are more important for entrepreneurial team performance?

Direction for future research 4: Would the process variables work together to mediate the team diversity–entrepreneurial team performance link?

Contextual factors

The current review evidenced that the effect of team diversity is inconclusive. While Bell et al. (2011) indicated that diversity of functional and educational backgrounds was consistently and positively related to team performance in general and to TMTs and innovation in particular, this literature review did not consistently support those findings. A possible explanation is that entrepreneurial team performance is related to the extent to which a team recognizes the importance of elaboration in terms of decision-relevant information (van Ginkel and van Knippenberg 2008). It could be that team members are less aware of other team members' expertise or possession of unique information in the absence of situational cues drawing attention to members' differences. Therefore, research is required to identify conditions under which team diversity benefits entrepreneurial team performance.

One contextual factor that would moderate the team diversity–team process–entrepreneurial team performance link is the entrepreneurial developmental

stages. One trend in entrepreneurship research is to view entrepreneurship as a process (Moroz and Hindle 2012). Throughout the entrepreneurial process, entrepreneurial teams qualitatively change and are differentially influenced by various factors as they mature over time (Kozlowski et al. 1999; Mathieu et al. 2008). According to Shane (2003), entrepreneurial process includes four stages: entrepreneurial opportunities, discovery, opportunity exploitation, and execution. At different stages, entrepreneurial teams must perform different tasks depending on the demands. Therefore, it is desirable to investigate whether team diversity will influence team processes and entrepreneurial team performance differently at different stages.

Direction for future research 5: Would the team diversity–team processes–entrepreneurial team performance relationship differ at different entrepreneurial developmental stage?

Conclusions

The primary issue of this study is when and how team diversity might enhance entrepreneurial performance. This issue is an important one, since the composition of entrepreneurial teams is traditionally viewed as a fundamental factor that shapes consequent performance of start-ups competing in rapidly changing, highly competitive markets. Despite widespread interest in entrepreneurial teams, the mechanism that links team diversity and entrepreneurial team performance has not been examined both theoretically and empirically. This study systematically reviewed the literature on entrepreneurial team diversity research and proposed an integrated model that could direct future research.

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