



Strategic networks of discovery and creation entrepreneurs



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ABSTRACT

Current research favors diversity within strategic networks as a source of idea generation and opportunity pursuit. However, diversity may not always be advantageous. Drawing from literature on entrepreneurial opportunities, social network theory, and cognitive psychology, it is argued in this paper that the level of diversity in entrepreneurial strategic networks differs based on the nature of the entrepreneurial opportunity context—discovery or creation. Competing hypotheses are developed for the nature of strategic networks in the discovery and creation opportunity contexts. The results from our two studies (using PSED II dataset and data collected from women entrepreneurs in India) show that entrepreneurial strategic networks differ based on whether entrepreneurs are pursuing discovery or creation opportunities, i.e., entrepreneurs operating in ‘discovery’ contexts tend to use networks ties with individuals who are relatively similar to themselves, while entrepreneurs in ‘creation’ contexts tend to use network ties with individuals who are relatively different from themselves. Further, the results also show that the diversity in strategic networks is not unidirectional in discovery and/or creation contexts but varies depending on the specific matters for which the entrepreneur seeks advice. Discussion and future research directions outline the unique findings of this study and potential implications for theory development.

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1. Introduction

Entrepreneurial networks have been of substantial interest to scholars both in the fields of entrepreneurship (Aldrich & Zimmer, 1986; Hite & Hesterly, 2001) and social networks (McEvily & Zaheer, 1999). Whether entrepreneurs intentionally create networks (Dyer, Gregersen, & Christensen, 2008; Stuart & Sorenson, 2007) or simply exploit the networks within which they already find themselves (Mayhew, 1980), prior work suggests that network contacts can provide entrepreneurs novel information, advice, and other critical resources, and can have important influence on entrepreneurial performance (Burt, 1992; Dyer et al., 2008; Stuart & Sorenson, 2007). In particular, this work has shown that entrepreneurs generally benefit most when their strategic networks are diverse, since diversity can provide entrepreneurs access to information that can be used to identify and exploit opportunities

(Aldrich & Zimmer, 1986; Dyer et al., 2008; Larson, 1992; Marsden, 1983; McEvily & Zaheer, 1999; Rodan & Galunic, 2004; Uzzi & Spiro, 2005; Vissa & Chacar, 2009).

However, prior research does not distinguish between the effects of different kinds of strategic networks in different entrepreneurial opportunity contexts. Specifically, recent work has distinguished between two entrepreneurial opportunity contexts: discovery (where opportunities are formed by exogenous shocks to pre-existing markets or industries) and creation (where opportunities are formed endogenously by an entrepreneur's actions) (Alvarez & Barney, 2007). It may be that different types of social networks are differentially effective for entrepreneurs operating in discovery and creation contexts.

The purpose of this paper is to develop and test theory about the relationship between entrepreneurial opportunity contexts and the effects of different types of strategic networks in these contexts. Competing arguments are developed for the impact of network ‘similarity’ and network ‘diversity’ on entrepreneurs operating in discovery and creation contexts. These arguments are then examined using two distinct datasets—the Panel Study of Entrepreneurial Dynamics (PSED II) and a survey of Indian women

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entrepreneurs. Consistent results are found in both these independent data sets: Entrepreneurs operating in ‘discovery’ contexts tend to use network ties with individuals who are relatively similar to themselves, while entrepreneurs pursuing ‘creation’ opportunities tend to use network ties with individuals who are relatively different from themselves.

2. Materials and methods

Prior work has recognized the importance of social networks for entrepreneurs, but has not examined how the nature of these networks might vary across opportunity contexts.

2.1. Entrepreneurs and strategic networks

Entrepreneurs rarely act as lone operators. More typically, they are embedded in social networks of interconnected relationships (Huovinen & Pasanen, 2010) that act as conduits of a wide variety of information and advice about potential opportunities and how those opportunities might be exploited. Examples of information obtained through networks include advice about technology trends, potential employees, sources of funding, and insights about competitors’ intentions (Aldrich & Kim, 2007; Baker, Miner, & Easley, 2003).

For entrepreneurs, networks may substitute for internal organization in aiding decision making. Unlike the case of large and established organizations, entrepreneurs often lack access to larger, well-developed internal organizational structures and resources that provide the information necessary for decision-making (Brush, Greene, Hart, & Haller, 2001). Networks fill these organizational support gaps by providing access to knowledge or experience to resolve problems and take advantage of opportunities (Granovetter, 1982; McGrath, Vance, & Gray, 2003). Consequently, we define strategic entrepreneurial networks as personal relations through which entrepreneurs access resources such as information, assistance, and guidance, that can be used in establishing their firms and help them gain and sustain competitive advantages.¹

In obtaining information from their networks, entrepreneurs can either exploit social ties they had before beginning their entrepreneurial activities, or they can seek to form new social ties that are likely to generate valuable information for their entrepreneurial efforts, or both (Hansen, 1999; Uzzi & Gillespie, 1999). In either case, networks are likely to have an important impact on the opportunities an entrepreneur is likely to identify (or form) and exploit (Baum & Wally, 2003; Eisenhardt, 1989; Fredrickson & Mitchell, 1984). When entrepreneurs access their pre-existing networks, these prior relationships are likely to influence the range of options entrepreneurs consider. When they develop new relationships, the information obtained through these ties can influence the path of entrepreneurs as they identify (or form) and exploit opportunities.

In general, prior research supports the idea that network diversity benefits entrepreneurs—whether they are exploiting their current networks and/or building new ones (Dyer et al., 2008; Filatotchev, Liu, Buck, & Wright, 2009). Network diversity provides access to non-redundant sources of information and helps entrepreneurs access a broad knowledge base of diverse ideas and perspectives (Dyer et al., 2008). This, in turn, can improve decision-making (Epple, Argote, & Devadas, 1991; Reagans & Zuckerman, 2001; Stuart & Podolny, 1996). However, prior work does not

recognize that diversity in networks may be more characteristic of certain opportunity contexts than others and that the value of the information through a network may vary with the context of the opportunity being pursued. In the sections that follow, the value of entrepreneurial strategic networks, contingent upon entrepreneurial opportunity contexts, is discussed.

2.2. Entrepreneurial opportunity contexts: ‘discovery’ and ‘creation’

Theoretically, entrepreneurial opportunity contexts have been largely characterized as ‘discovery’ opportunity contexts and ‘creation’ opportunity contexts (Alvarez & Barney, 2007; Welter & Alvarez, 2011). Discovery opportunities (or discovery opportunity contexts) arise from market imperfections due to exogenous changes in technology, consumer preferences, or some other industry or market level attributes (Kirzner, 1973). These opportunities exist independent of entrepreneurs and therefore entrepreneurs play a limited role, if any, in the formation of discovery opportunities. However, alert entrepreneurs can engage in search processes to discover opportunities formed by these exogenous shocks to a market or industry and then work to exploit these opportunities (Kirzner, 1989). The discovery search process is generally directed toward finding demand for existing supply or finding supply for existing demand (Miller, 2007; Sarasvathy, Dew, Velamuri, & Venkataraman, 2003). Although, the final outcomes of these efforts are rarely known with certainty ex-ante, the possible outcomes associated with these efforts, and their probability, can be known which enables entrepreneurs to have clear goals and objectives (Miller, 2007).

These search processes underscore the active role that entrepreneurs play in the pursuit of discovery opportunities. Recent research by Ardichvili, Cardozo, and Ray (2003) identified entrepreneurs’ personality traits, social networks, and prior knowledge as antecedents of entrepreneurial ‘alertness’ to business opportunities. Historically, research has suggested that those entrepreneurs that are “alert” (Kirzner, 1989), possess differential knowledge about opportunities (Hayek, 1946), and have favorable cognitions and personalities (Kirzner, 1997), are more likely to discover opportunities. The dual challenge for entrepreneurs pursuing discovery opportunities is to discover distinctive opportunities in an existing domain/industry and to efficiently exploit them (Romanelli, 1991).

Creation opportunities (or creation opportunity contexts), on the other hand, arise endogenously, by the actions, reactions, and enactment of entrepreneurs in both exploring ways to produce new products or services and generating demand for them (Baker & Nelson, 2005; Sarasvathy, 2001; Weick, 1979). This might involve the production of new products, services, processes, materials, or means of organizing (Schumpeter, 1934). In this opportunity context, neither supply nor demand exists a priori. The entrepreneur plays a causal role in creating both ‘supply’ and ‘demand’ (Venkataraman, 2003). By acting and then observing how consumers and markets respond, entrepreneurs form opportunities that could not have been known without their actions (Aldrich & Kenworthy, 1999; Alvarez & Barney, 2007; Berger & Luckmann, 1967). This process of creation involves problem solving with novelty, unconventionality, and persistence (Simon, 1981). Unlike discovery contexts, which are primarily about ‘search’, creation opportunity contexts entail the active role that entrepreneurs play in the formation of opportunities.

As suggested earlier, entrepreneurs are likely to have strategic networks that support their important strategic actions in respective opportunity contexts. These networks, like other entrepreneurial actions, may also be thought of as manifestations of the assumptions that entrepreneurs make about their opportunity

¹ This definition draws from works of Jarillo (1988) and Athanassiou and Nigh (1999). We consider ‘non-strategic’ networks as those comprised of relations that are not beneficial specifically to an entrepreneur’s pursuit of opportunities.

contexts, i.e., 'discovery' or 'creation'. However, it is not known whether entrepreneurs are likely to have greater similarity or diversity in their networks while operating in discovery and creation contexts. Indeed, arguments can be made in favor of diversity and similarity within strategic networks for both types of opportunity contexts. Since it is unclear a priori, which kinds of networks—those that are made up of people who are similar to an entrepreneur or those who are different from an entrepreneur—are most beneficial in which kinds of opportunity contexts, this ultimately becomes an empirical question. These different competing hypotheses are therefore examined empirically.

In the sections that follow, arguments are presented for the benefits of 'similar' and 'dissimilar' social networks in both discovery and creation settings. The arguments made do not depend on the network structure, strength of ties (weak or strong), or the individual's place within a network (Burt, 1992; Granovetter, 1973). In our conceptualization, both 'more diverse' and 'less diverse' networks could be 'strong' or 'weak' ties according to the conceptualization in Granovetter (1973). Therefore, our arguments are based on a 'content approach' to understanding entrepreneurial networks (Zaheer & Soda, 2009). In the context of this study, 'content' is the diversity in backgrounds of the entrepreneur and members in his/her network.

2.3. Discovery opportunities and strategic entrepreneurial networks

2.3.1. Argument 1: Entrepreneurs in discovery contexts have strategic networks of individuals similar to themselves

Networks assist entrepreneurs in identifying and exploiting opportunities (Burt, 2007; Kontinen & Ojala, 2011). Discovery entrepreneurs search for new opportunities that are embedded in a specific context, but which are not yet obvious to everyone (Burt, 1997; 2000). Since networks of individuals with similar backgrounds to the entrepreneur are likely to hold prior knowledge in the relevant domain of search, such individuals in these networks are more likely to recognize opportunities embedded in that domain (Venkataraman, 1997).² Building on the knowledge of these trusted and experienced conduits of information, it may be possible to identify focused market niches within an existing industry which an entrepreneur otherwise may not see if he/she is working alone or working with individuals with very diverse knowledge bases. Thus, similarity in networks is likely to benefit entrepreneurs under discovery by increasing the possibility of their finding distinctive exploitable opportunities.³

Further, networks of individuals with similar backgrounds as that of the entrepreneur are also likely to help the entrepreneur in efficiently exploiting embedded opportunities in the environment. These individuals are likely to bring their experience and exposure to provide knowledge about markets, ways to serve markets, and recommendations for dealing with customer problems (Venkataraman, 1997). This knowledge may help entrepreneurs in adopting consistent strategies, adjusting their marketing mix, and understanding risk and decision making practices pertaining to the exploitation of discovery opportunities.

Also, individuals with backgrounds similar to that of the entrepreneur may understand and are likely to know about specific human capital required to exploit the opportunity-at-hand and may help in recruiting such human resources. Thus, strategic networks comprised of individuals with similar backgrounds and

knowledge to that of an entrepreneur are likely to enhance the effectiveness of several entrepreneurial activities along the value chain in a discovery context. Therefore,

Hypothesis 1: In the pursuit of discovery opportunities, entrepreneurs are more likely to have strategic networks consisting of individuals that have similar backgrounds to themselves.

2.3.2. Argument 1 (alternative): Entrepreneurs in discovery contexts have strategic networks of individuals dissimilar to themselves

As outlined earlier, prior research leans in favor of heterogeneity within networks as being more beneficial than homogeneity within networks. Evidence suggests that firm leaders who seek advice from dissimilar thinkers and other firms' executives, with whom they are not personal friends, tend to improve the objective quality of their decisions which, in turn, leads to better firm performance (McDonald & Westphal, 2003). This beneficial quality of heterogeneity in strategic networks may also hold for entrepreneurs pursuing discovery opportunities.

Diversity within strategic networks is likely to benefit entrepreneurs in a discovery context because these entrepreneurs are searching for new opportunities that are embedded in a context, but are not obvious to everyone (Burt, 1997; 2000). If strategic networks consist of individuals who share similar views with the entrepreneur, they may not be able to see what the entrepreneur cannot see. In contrast, individuals from diverse backgrounds are more likely to point out how an entrepreneurial opportunity is distinctive because they bring a 'fresh eye' to view the opportunity. Individuals with diverse backgrounds enable entrepreneurs to become aware of more ideas, thereby increasing the possibility of finding exploitable opportunities, i.e., move away from local search to a more global search. This is similar in concept to geographic explorers. Those explorers that cover more ground are more likely to find new and interesting lands than the explorers that stay near home.

Further, individuals from diverse backgrounds are also likely to help discovery entrepreneurs in understanding how to efficiently navigate the environment in which the opportunity is embedded. Since discovery entrepreneurs are themselves likely to be experts in the particular industry/opportunity context, they may not have much to gain from a similar set of people (Alvarez & Barney, 2007; Kirzner, 1997; Shane, 2003).

Also, individuals with diverse backgrounds are likely to bring prior experience and exposure and provide information about best practices from diverse industries. Such information, when filtered by the entrepreneur, may apply to the entrepreneur's focal industry. Entrepreneurs may benefit from information and advice regarding best practices related to marketing mix and understanding risk and decision making practices in other industries. Further, individuals with diverse backgrounds in the networks are likely to know about specific human capital in different industry contexts, and can help in recruiting suitable human resources. They may also help in formulating ideas better and provide advice regarding diverse sources of funds in different industries thereby enhancing the effectiveness of several entrepreneurial value chain activities.

All these suggest that entrepreneurs pursuing discovery opportunities are likely to strategically have networks comprised of individuals who are different from themselves. This is likely to benefit the entrepreneur by ensuring that ideas are distinctive and aid in the effective navigation through the opportunity landscape. Therefore,

² Recall, these networks may exist for an individual when they begin their entrepreneurial efforts, may be created by an entrepreneur while engaging in entrepreneurial efforts, or both.

³ We used the terms 'exploitation' and 'formation' as plain English terms.

Hypothesis 1 (Alternative): In the pursuit of discovery opportunities, entrepreneurs are more likely to have strategic networks consisting of individuals that have dissimilar backgrounds to themselves.

The arguments made above are not dependent on the network structure or the individual's place within a network (Burt, 1992; Granovetter, 1973). They are based on a 'content approach' to understanding entrepreneurial networks (Zaheer & Soda, 2009). Content refers to the specific information and advice provided by the individuals in the networks to the entrepreneur.

2.4. Creation opportunities and strategic networks

2.4.1. Argument 2: Entrepreneurs in creation contexts have strategic networks of individuals dissimilar to themselves

Similar to the case of discovery opportunities, entrepreneurs are likely to seek information and advice from others in the pursuit of creation opportunities as well (Burt, 2007). The following argument can be made for diversity in strategic networks of entrepreneurs in creation contexts.

In pursuit of creation opportunities, entrepreneurs may be less likely to benefit from strategic networks with individuals similar to themselves. Since pursuit of creation opportunities involves creating new knowledge, prior knowledge of existing industries and markets is less likely to be helpful for these entrepreneurs (Aldrich & Reuf, 2006; March, 1991; Weick, 1979). It may actually be detrimental to be tied closely to the intricacies of the focal industries or people with similar backgrounds because such prior knowledge can make it difficult for individuals to think differently and recognize opportunities that lead to the creation of new industries or markets (Aldrich & Kenworthy, 1999; March, 1991; March & Simon, 1958; Mosakowski, 1997).

On the other hand, entrepreneurs are more likely to benefit from networks of individuals with diverse backgrounds as compared to themselves in the pursuit of creation opportunities. Individuals with diverse backgrounds bring in fresh perspectives and help in cross-fertilization of ideas which are essential in the process of creation (Cummins, 1965). They likely challenge the ideas of entrepreneurs so that the existing assumptions and biases can be re-evaluated in the formulation and reformulation of knowledge to construct the market (Surowiecki, 2005). Indeed, from a structural perspective, Dyer et al. (2008) have shown that innovative entrepreneurs are likely to seek diversity in networks. This is because diversity in networks provides early access to distinct, often contradictory, information and interpretations, which provides an advantage in identifying and developing novel ideas (Dyer et al., 2008). It is also shown that individuals with greater 'network range,' i.e., access to diverse pools of knowledge, are likely to have access to multiple perspectives on a matter which helps in discussion and development of ideas and their communication. Further, individuals who deal with contacts from diverse communities of practice have greater opportunity to learn through conveying complex and novel ideas than individuals that are limited to dealing with a single body of knowledge (Reagans & McEvily, 2003).

More specifically, decision making in the pursuit of creation opportunities is fraught with uncertainty and relies upon heuristics or biases (Busenitz & Barney, 1997; Shepherd, McMullen, & Jennings, 2007). Further, 'affordable losses' become important in gauging opportunity attractiveness (Dew, Sarasvathy, Read, & Wiltbank, 2009; Sarasvathy, 2001). In such circumstances, individuals with diverse backgrounds can help in evaluating the opportunity, as it takes shape, from diverse functional perspectives

before converging on the 'affordable loss.'

Further, pursuit of opportunities in creation contexts makes it difficult to have defined strategies (Sarasvathy, 2001). Strategy is usually emergent and changing in these contexts. Therefore, diversity in networks may help in developing a strategy that is flexible, allowing for change when it is appropriate. Also, individuals from diverse backgrounds may help in recruiting human resources with dissimilar knowledge bases that can enhance the creation process. Finally, appreciation of an opportunity by individuals with diverse backgrounds may bring in credibility to the entrepreneurial pursuit. This may help the entrepreneur in convincing friends and families to provide funds which may otherwise be difficult to obtain through external sources. Therefore,

Hypothesis 2: In the pursuit of creation opportunities, entrepreneurs are more likely to have strategic networks consisting of individuals that have dissimilar backgrounds to themselves.

2.4.2. Argument 2 (alternative): Entrepreneurs in creation contexts have strategic networks of individuals similar to themselves

Opportunity creation is about action and subsequent evaluation of how customers and markets respond to the action (Alvarez & Barney, 2007; Berger & Luckmann, 1967; Weick, 1979). The opportunity is neither known nor knowable ex-ante. Only through the enactment process does the creation opportunity emerge (Aldrich & Kenworthy, 1999). In a creation context, entrepreneurs are likely to spend much time trying to understand and enact a particular issue, technology, or problem, with the goal of creating a marketable product or service (Aldrich & Kenworthy, 1999; Baker & Nelson, 2005; Sarasvathy, 2001). The vague nature of creation opportunities is a liability to entrepreneurs in many ways. This nature of creation opportunities and their pursuit suggests that there may be risks associated with obtaining information and advice from individuals with dissimilar backgrounds in networks.

Creation opportunities unfold as a result of the entrepreneur's endeavors. The future is neither predictable nor predicted. Therefore, information and advice based on past or existing experience, however broad, may be based on situations that are far different from those which the entrepreneur faces during the pursuit of the particular opportunity. Also, because the creative idea itself may not be amenable to clear expression, it is likely to be hard for the entrepreneur to communicate with people from diverse backgrounds or industries and explain what is to be accomplished.

Further, decision making in pursuing creation opportunities is likely to be fraught with uncertainty and relies upon heuristics or biases (Busenitz & Barney, 1997; Shepherd et al., 2007) and 'affordable losses' become the gauge of opportunity attractiveness (Dew et al., 2009; Sarasvathy, 2001). In such circumstances, convergent thinking toward the concept of 'affordable loss' may become more important than gauging estimates of risk from diverse sources.

Since there are no defined strategies in the pursuit of creation opportunities, diverse opinions on strategy may end up complicating the matters for the entrepreneur. Further, because creative opportunities are social constructions and the market, which is itself a social construction, formed out of the perceptions and beliefs of numerous individuals (Alvarez & Barney, 2007), diversity in networks is unlikely to help in making decisions related to marketing mix or obtaining human resources.

On the other hand, it will be necessary in the iterative learning process in creation contexts to obtain some convergence for the opportunity to eventually produce results. At each stage, the entrepreneur tries to validate his/her ideas based on the outcomes of previous actions. In this path-dependent process, the

entrepreneur may need individuals who help in assessing the specifics and are likely to act as sounding-boards in the formulation and reformulation of knowledge. Individuals who are similar to the entrepreneur are likely to act as such sounding boards and are likely to help bring people from their pre-existing networks to cooperate with the entrepreneur in his or her creative endeavors. Further, they may help in convincing friends and families to provide the entrepreneur with funds which are difficult to be obtained through external sources.

Indeed, entrepreneurs pursuing creation opportunities may require information from networks that have fewer, focused, and similar individuals who 'try to see' what the entrepreneur 'tries to see' and help add value in the evolution and exploitation of the idea (Fliaster & Spiess, 2008). Thus,

Hypothesis 2 (Alternative): In the pursuit of creation opportunities, entrepreneurs are more likely to have strategic networks consisting of individuals that have similar backgrounds to themselves.

2.5. Methodology

This paper explores the nature of entrepreneurial networks in 'discovery' and 'creation' contexts. In order to test the competing hypotheses presented, we required data about entrepreneurs who started new businesses in their recent past, the way the entrepreneurs thought about their opportunities (to identify whether they believed they were operating in a 'discovery' context or a 'creation' context), and also data about the individuals they sought advice from in the pursuit of the opportunities (to understand diversity in the entrepreneurs' strategic network). Most importantly, the data had to allow for distinction between discovery and creation opportunities. Discovering opportunities requires one set of skills (data collection and analysis using risk-based decision-making tools) whereas creating opportunities requires a different set of skills (interactive, inductive, and intuitive decision making) (Alvarez, Barney, & Anderson, 2013).

We used two different studies in order to conduct this exploration. The first study was based on the second U.S. Panel Study of Entrepreneurial Dynamics (PSED II) dataset, implemented in 2005. This dataset provided a large and readily available sample to identify the context in which entrepreneurs believed they operated while starting their businesses, i.e., 'discovery' and/or 'creation' context. It also had some items that allowed us to understand the nature of the respondents' strategic networks. However, since the PSED II data was collected for more general purposes, very few specific items could be used to identify the backgrounds of the individuals in entrepreneurial networks. Therefore, we obtained a second dataset by surveying entrepreneurs regarding their perceptions of the context within which they were operating and also more specific information about the individuals in their networks. This survey generated a smaller sample with relevant items. However, it was more informative for testing the hypotheses regarding entrepreneurial networks. Both studies are described in greater detail in the following sections.

2.5.1. Study 1: PSED II dataset

2.5.1.1. Identifying the entrepreneurial opportunity contexts. Prior literature in entrepreneurship indicates ways to classify opportunity contexts (Casson, 2003; Delmar & Shane, 2004; Dew et al., 2009; Sarasvathy, 2001). However, limited progress has been achieved toward measurement of entrepreneurial opportunity contexts. Recently, Anokhin, Wincent, and Autio (2011) highlighted the need for development of measurement theories, in

addition to substantive theories in entrepreneurship. Their focus was on measurement of entrepreneurial opportunities, which are central to entrepreneurship research. They call for macro-level operationalization of opportunities and study innovative and arbitrage opportunities using macro-level data at the country level.

To our knowledge, no study has formally operationalized 'discovery' and 'creation' contexts of entrepreneurship for an empirical evaluation. Recently, Alvarez and Barney (2007) posited that one could identify whether an entrepreneur is pursuing an opportunity in a discovery context or a creation context by observing certain behaviors along their value-chain activities, i.e., decision making, strategy, marketing, finance, human resources, competitive advantage, and leadership. This categorization enabled us to separate entrepreneurial opportunity contexts into 'discovery' and 'creation'. We focused the arguments and testing on the extremes of opportunity types for conceptual clarity and because strategic networks are likely to be distinct in these extremes.

The PSED II dataset contained information that could be used for this study. The PSED II data identified individuals who considered themselves involved in the founding of an entrepreneurial venture. These 'nascent' entrepreneurs, acting alone or with others, were trying to start new businesses in which they anticipated being owners and had engaged in ongoing activities for organizing their businesses during the immediately preceding 12 months (Reynolds, 2009; 2011). We obtained a majority of the data for this study from the first wave of PSED II interviews conducted between September 2005 and March 2006. Where necessary, data were also obtained from the second wave of interviews conducted between October 2006 and March 2007. Together, the two PSED II waves had survey items that measured observable behaviors of entrepreneurs along the value chain activities as suggested by Alvarez and Barney (2007), with the exception of human resources and leadership. Such survey items were identified and used for developing scales that measured the dimensions for distinctly identifying 'discovery' and 'creation' opportunity contexts. The measures of 'discovery' and 'creation' opportunity contexts are 'reflective' in nature, i.e., the measures reflect the underlying constructs and vary with changes in the underlying constructs (Bagozzi and Fornell, 1982; Edwards & Bagozzi, 2000; Fornell & Bookstein, 1982).

There were 328 cases for which information was available on all 12 items. The survey items were coded so that entrepreneurial activities that were theoretically likely to be displayed in the pursuit of discovery opportunities had high scores and the activities displayed in the pursuit of creation opportunities had low scores. For example, survey item AD1 asks whether a business plan has been developed, will be developed, or will not be developed. Entrepreneurs operating in a discovery context (pre-existing business environment with ongoing activity and competitors) would likely understand the foreseeable future and have the information available to create a business plan. However, an entrepreneur operating in a creation context (an uncertain business environment with little history or known competitors) would likely struggle to formulate a business plan because the entrepreneur would have difficulty obtaining information and envisioning what future will unfold.

A confirmatory factor analysis (CFA) was then conducted on the 12 relevant items using principal components analysis with a varimax rotation. Inspection of the eigenvalues and scree plots suggested that three factors were represented in the data, corresponding to three of the hypothesized actions that differ in discovery and creation contexts. These are: decision making/marketing, competitive advantage, and finance. Two of the survey items (BA12 and AS2) were removed because they did not load heavily on any factor. Table 1 displays these results from the confirmatory factor analysis.

Table 1

Study one (PSED II Data): results from confirmatory factor analysis showing the three factors that help distinguish entrepreneurs pursuing opportunities in discovery and creation contexts.

Items	Factors		
	Decision making/ marketing	Finance	Source of competitive advantage
Competitive information has been collected (AD22)	0.664	–0.078	–0.123
Financial projections have been developed (AD26)	0.608	0.344	0.079
A business plan has been started (AD1)	0.612	0.119	–0.206
The business strategy has been consistent (BA12)	–0.017	0.370	–0.030
Marketing or promo efforts have been started (AD9)	0.618	–0.131	0.148
Market opportunities have been defined (AD24)	0.745	–0.157	0.059
Financial institutions have been asked for funds (AE1)	0.155	0.771	0.037
Funds will come from loans (AR27)	–0.226	0.700	–0.109
R&D is a major priority (AS5 rev)	–0.027	–0.075	0.556
Developing new prod/svc is a priority (AF9 rev)	–0.112	–0.003	0.763
Developing patent is a priority (AF10 rev)	–0.038	–0.057	0.743
Other businesses offer same prod/service (AS2)	0.095	0.019	0.463

n = 328.

Next, individual scores on the three standardized factor scores were entered into cluster analysis to identify groups of respondents who were similar to each other on these three dimensions. Cluster structures are frequently used in exploratory empirical research. For cluster analysis to be meaningful, a more theory-driven approach is possible and often preferable (Dowling & Midgley, 1988). This process involves a-priori specifying the expected cluster solution and then clustering the data to test the validity of this theoretical structure, rather than using the clustering program itself to test for the hypothesized structure. In this study, positive cluster means suggest practices that are theorized to be necessary to pursue ‘discovery’ opportunities and negative cluster means suggest practices that are theorized to be necessary to pursue ‘creation’ opportunities.⁴ The expectation was to observe a cluster in which each of the factors was positive at the centroid indicating discovery contexts and to observe a cluster in which each of the factors was negative at the centroid indicating creation contexts.

Table 2 displays the final mean value cluster centers of the cases assigned to each opportunity profile. The cluster profiles show the differences displayed by entrepreneurs in the respective activities while pursuing different entrepreneurial opportunities. Three cluster profiles are defined.⁵

The first cluster is characteristic of discovery opportunities. Two of the cluster centers are the highest positive among the respective factors of the three clusters. These include decision making/marketing (0.75), and finance (1.03). The second cluster is characteristics of creation opportunities. The cluster centers of two of the three factors are the lowest and negative for this cluster among the three clusters. These include cluster centers for decision making/marketing (–0.93), and competitive advantage (–0.48). Finally, the

⁴ Further, in order to identify meaningful cluster solutions, the guidelines established in prior literature have been followed (e.g., Romesburg, 2004). This involved minimizing intra-cluster differences and maximizing inter-cluster differences. The three factor scores were subjected to a cluster analysis using the SPSS Quick Cluster K-means routine (Henriques & Sadorsky, 1999). K-means cluster analysis uses ‘an iterative partitioning method that begins by dividing observations into a pre-determined number of clusters’ (Slater & Olson, 2001, p. 1058). Analyses specifying three-, four- and five-cluster solutions were performed. Cluster centers were updated iteratively. This cluster analysis relies on the squared Euclidean distance measure that equally weights all clustering variables. Therefore, standardized forms of the clustering variables were more appropriate for analysis.

⁵ In addition, the coherence and stability of the cluster solution was investigated by repeating the analysis on randomly ordered samples and randomly selected sub-samples (Kabanoff, Waldersee, & Cohen, 1995). Results were consistent and it gives confidence that the cluster results did not depend upon a particular sort order or any particular sub-sample characteristic.

Table 2

Study one (PSED II Data): final cluster centers showing differences between entrepreneurs pursuing opportunities in discovery, creation and mid-way contexts.

Factors	Clusters		
	Discovery	Creation	Mid-way
Decision Making/Marketing	0.75	–0.93	0.37
Competitive Advantage	–0.10	–0.48	0.50
Finance	1.03	0.13	–0.75
Number of entrepreneurs	80	109	139

n = 328.

third cluster was identified as ‘mid-way entrepreneurs’ because the cluster does not display dominant characteristics of either discovery or creation opportunities. It is possible that some opportunity contexts may have both elements of discovery and creation, without any one being a dominant context. This cluster belongs to such a category.

2.5.1.2. Strategic network diversity. Having identified different entrepreneurial opportunity contexts, we then calculated the strategic network diversity of individuals in each of the clusters in order to compare the levels of diversity in relation to opportunity context. Of the 328 cases used to identify entrepreneurial contexts above, 268 included details of strategic networks. The data employ an ego network perspective in that all network connections are identified by one respondent. This approach provides the opportunity to compare the characteristics of one respondent’s strategic network to another, which is the ego network perspective for comparing networks.⁶

The data allowed for the identification of individuals in strategic networks as co-owners, key non-owners, and helpers who provide advice or share ownership in the business. However, theory on networks focuses on outsiders (non-members of the organization) as relevant advisors to the entrepreneur. Therefore, we did not consider co-owners in coding the respondents’ networks. This set of relationships between respondents and their identified key non-owners and helpers constituted the respondents’ strategic networks. Also, the current functional role of each individual was available. This enabled the comparison of the functional roles of the

⁶ This approach, nevertheless, limits the ability to analyze the density of one social network and structural holes within that network. However, since this study adopts a content approach to analyzing network diversity, this is not a serious limitation.

respondent and the individuals in the respondents' network. Diversity in functional roles is likely to reflect diversity in areas of expertise among individuals in entrepreneurial strategic networks. Since our idea is to focus on diversity with regard to areas of expertise (i.e., knowledge) between the entrepreneurs and the individuals in the entrepreneurs' networks, we used 'functional diversity' as a measure of the diversity in the strategic network. We calculated functional diversity as the number of individuals in the respondent's strategic network who had different functional roles than the respondent divided by the total number of individuals in the respondent's strategic network.

2.5.1.3. Analysis and results. Table 3 displays the correlation matrix for the PSED variables. None of the variables are highly correlated with each other and, therefore, there are no collinearity problems in this data.

We used Analyses of Covariance (ANCOVA) with strategic network diversity as the dependent variable and one covariate, the number of network contacts, to examine the extent to which entrepreneurs have strategic networks that match the type of opportunity they pursue. Table 4 displays the ANCOVA results.⁷ Results show a significant difference between entrepreneurs operating in discovery contexts as compared to those operating in creation contexts with regard to the extent of diversity in their strategic networks ($F_{(2, 265)} = 5.18, p < 0.01$).

Results of the pairwise comparisons (Table 5) indicate that entrepreneurs operating in discovery contexts are likely to have less diversity (or greater similarity) in their strategic networks whereas entrepreneurs operating in creation contexts are likely to have greater diversity (or less similarity) in their strategic networks ($p < 0.01$). The ANCOVA results therefore support Hypothesis 1 and Hypothesis 2.

The results from the cluster analysis and also the ANCOVA pairwise comparisons suggest that there may be opportunity contexts that have both the characteristics of discovery and creation contexts as represented by the mid-way group. This indicates that opportunity contexts may not be a simple dichotomy of discovery and creation but rather range along a continuum with pure discovery and pure creation opportunity types at the extremes.

2.5.2. Study 2: Survey data from Indian women entrepreneurs

In order to gain a much deeper understanding of the entrepreneurial opportunity contexts and the strategic networks of entrepreneurs in different opportunity contexts (beyond that understood from study 1 using the PSED II dataset), we administered a survey to the Goldman Sachs 10,000 Women Entrepreneurs program participants in India.⁸ This was an appropriate target group for this study because the members were themselves involved in the operations of an entrepreneurial venture. Also, while most entrepreneurs had been in business for at least three years before they joined this program, they were actively involved in the ongoing activities for organizing their business during the immediately preceding 12 months (Reynolds, 2009; 2011).

2.5.2.1. Identifying the entrepreneurial opportunity contexts. The survey contained items that measured observable behaviors of entrepreneurs along all the seven theorized value chain activities

Table 3
Study one (PSED II Data): correlation matrix.

Variable	1	2	3	4
1. Functional diversity	1			
2. Decision making/Marketing	-0.13*	1		
3. Competitive advantage	0.08	0.01	1	
4. Finance	0.10	-0.04	-0.01	1
5. Number advisors	-0.03	0.14*	-0.15*	0.09

** $p < 0.01$, * $p < 0.05$, † $p < 0.10$.
n = 268.

used to classify discovery or creation contexts as in Alvarez and Barney (2007). Again, the measures were 'reflective' (Edwards & Bagozzi, 2000), i.e., based on the constructs of 'discovery' and 'creation' (Kirzner, 1973; Venkatraman et al., 1993). The face validity of these items was determined by two research associates and three entrepreneurs who we asked to review the questions prior to their participation in the survey. The online survey was announced via email to about 1100 women entrepreneurs by sending a weblink to the survey questionnaire. While 360 entrepreneurs initiated the survey, elimination of those cases with missing data resulted in an initial sample size of 160. There were 19 survey items reflecting the opportunity contexts within which the entrepreneurs were operating.

Consistent with Study 1, survey items were coded high to indicate theoretical discovery contexts and coded low to indicate theoretical creation contexts. For example, item Mkt2, which identified whether a firm's marketing approach was revised frequently, was coded on a 5-point Likert scale from 1) strongly agree to 5) strongly disagree. This coding is appropriate because in creation contexts, where entrepreneurs attempt to enact solutions, there are likely no existing competitors with which to compare the entrepreneurial business and no well-defined customer sets. Therefore, entrepreneurs are likely to modify their marketing strategies as target customer sets become clearer. Alternatively, discovery contexts, created by exogenous imperfections in existing markets, provide greater certainty in which competitors and customers are visible. Entrepreneurs operating in discovery contexts can likely gather appropriate information and maintain consistency in their marketing strategies (Alvarez & Barney, 2007).

To ascertain whether these items measured distinct underlying constructs, a confirmatory factor analysis (CFA) was conducted using principal components analysis with a varimax rotation. Although we expected seven factors to emerge, inspection of the eigenvalues and scree plots suggested that six factors were represented by 17 of the 19 items (Table 6). These correspond to strategy, marketing, finance, human resources, competitive advantage, and leadership. It is interesting that both variables representing decision making did not consistently load heavily on any one factor. This may indicate the need for a stronger theoretical distinction between discovery and creation contexts for this factor.

Individuals were then clustered based on these six factors. Consistent with study 1, we tried a 3-cluster solution. However, given the relatively smaller sample size, a 2-cluster solution was more consistent with the theoretical interpretation of results. Table 7 displays the final mean value cluster centers of the cases assigned to each opportunity profile.

The cluster profiles show the differences displayed by entrepreneurs in the respective activities while pursuing different entrepreneurial opportunities. The first cluster is characteristic of discovery opportunities. Five of the cluster centers are positive among the respective factors of the two clusters. These include strategy (0.01), marketing (0.46), finance (0.41), human resources (0.55), and leadership (0.14). The second cluster is symbolic of

⁷ Because the assumption of homogeneity of variances was violated (Leven's test, $F(2, 286) = 0.00$) we ran a post hoc analysis and performed pairwise comparisons using the Games Howell statistic. It produced the same significant relationships as reported in the general pairwise comparisons.

⁸ Goldman Sachs invested in a corporate social responsibility initiative of training 10,000 women entrepreneurs around the world on management skills. In India, over 1100 women entrepreneurs have been trained under their aegis.

Table 4
Study one (PSED II data): analysis of covariance of strategic network diversity (functional diversity).^a

Source	ANCOVA			
	df	Mean square	F	η ²
Entrepreneurial context	2	5.08	5.18**	0.035
Number of advisors	1	0.20	0.20	0.001
Error	285			

^{*}p < 0.05, ^{**}p < 0.01.

^a Includes control for number of advisors.

Table 5
Study one (PSED II Data): ANCOVA post hoc analysis Pairwise Comparisons of differences between strategic networks of entrepreneurs pursuing discovery, creation and mid-way opportunities.

(I) Cluster	(J) Cluster	Mean difference (I-J)	Std. error	Sig.
Discovery	Creation	-0.34	0.129	0.009
	Mid-way	-0.01	0.126	0.951
Creation	Mid-way	0.33	0.114	0.004
	Discovery	0.34	0.129	0.009
Mid-way	Discovery	0.01	0.126	0.951
	Creation	-0.33	0.114	0.004

creation opportunities. The cluster centers of five of the six factors are low and negative for this cluster. These include strategy (-0.18), marketing (-0.64), finance (-0.38), human resources (-0.41), and leadership (-0.19).

2.5.2.2. Strategic network diversity. Again, the data employ an ego network perspective (Scott, 2001) in that all network connections are identified by one respondent. In this survey, while there were questions pertaining to the functional backgrounds of entrepreneurs, respondents also provided information in terms of their educational backgrounds and specified engineering, medicine, law, among others. Since difference in educational backgrounds reflects the diversity with regard to areas of expertise (i.e., knowledge) between the entrepreneurs and the individuals in the entrepreneurs' networks, we used measures based on 'educational diversity' to capture the diversity in the strategic networks in this dataset.

The survey allowed for the identification of up to five individuals

Table 6
Study two (Indian women entrepreneurs data): results from confirmatory factor analysis showing the six factors that help distinguish entrepreneurs pursuing opportunities in discovery and creation contexts.

Items	Factors					
	Strategy	Marketing	Finance	Human resources	Source of competitive advantage	Leadership
Focused heavily on net present value analysis (DecMk1)	-0.365	0.489	0.156	0.034	0.423	0.036
Focused heavily on opportunity cost analysis (DecMk2)	-0.464	0.207	0.115	0.065	0.251	0.175
Defined only a general strategy (St1)	0.676	0.112	-0.133	0.125	0.081	-0.007
Allowed strategy to emerge over time (St2)	0.801	-0.013	0.016	-0.030	0.078	0.069
Modified strategy as our understanding changed (St3)	0.738	0.185	-0.112	0.026	-0.039	0.063
Marketing remained fairly constant (Mkt1)	0.087	0.773	0.008	-0.017	0.068	-0.035
Marketing was revised frequently (Mkt2)	0.226	0.628	0.048	0.012	-0.399	0.046
Acquired capital from external sources (Fin1)	-0.053	-0.114	0.659	-0.119	0.212	0.105
Easily described the opportunity (Fin2)	-0.119	0.056	0.936	-0.002	0.080	-0.090
Easily described financial implications (Fin3)	-0.120	0.095	0.943	-0.010	0.077	-0.107
Easily described opportunity risks (Fin4)	-0.075	0.093	0.901	-0.014	0.167	-0.113
Sought employees with general skills (HR1)	0.026	0.055	-0.009	0.854	-0.147	-0.031
Sought employees with flexible skills (HR2)	0.039	-0.054	-0.095	0.848	0.027	0.121
Pursued opportunity faster than our competitors (CA1)	-0.008	-0.053	0.207	-0.097	0.682	-0.023
Maintained secrecy in pursuing the opportunity (CA2)	0.071	0.024	0.066	0.012	0.823	0.127
Erected barriers to prevent competitors from imitating (CA3)	-0.002	-0.001	0.158	-0.057	0.812	-0.087
Knowledge of market history is most important (Ldr1)	-0.057	-0.154	-0.062	0.001	-0.014	0.729
Ability to inspire employees is most important (Ldr2)	-0.101	0.201	-0.051	0.044	0.002	0.700
Charisma is most important (Ldr3)	0.194	-0.021	-0.035	0.044	0.031	0.720

n = 160.

Table 7
Study two (Indian women entrepreneurs data): final cluster centers showing differences between entrepreneurs pursuing opportunities in discovery and creation.

Factors	Clusters	
	Discovery	Creation
Strategy	0.01	-0.18
Marketing	0.46	-0.64
Finance	0.41	-0.38
Human resources	0.55	-0.41
Competitive Advantage	-0.31	0.20
Leadership	0.14	-0.19
Number of entrepreneurs	44	55

n = 98.

in the entrepreneur's network who provided information and advice to the entrepreneur but had no ownership in the business. This allowed for comparison between the entrepreneur's network members. Strategic network diversity was calculated in two ways. First, we measured *strategic network diversity1* as the simple count of the number of different educational background types within an entrepreneur's network (Reagans & McEvily, 2003). Second, we accounted for the entrepreneur's educational background and performed a simple count of the number of different educational background types present among the individuals in the entrepreneurs' network with the entrepreneur included. This we labeled *strategic network diversity2*.

2.5.2.3. Analysis and results. Table 8 displays the descriptive statistics and correlations for the Indian women entrepreneurs data.

Table 8
Study two (Indian women entrepreneurs data): descriptive statistics and correlations.

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Strategic network diversity1	1.82	0.83	1										
2. Strategic network diversity2	2.17	0.95	0.86**	1									
3. Strategy	0.03	1.03	0.01	-0.08	1								
4. Marketing	-0.15	1.01	-0.09	-0.16	-0.01	1							
5. Finance	-0.05	0.99	-0.12	-0.11	-0.03	-0.04	1						
6. Human resources	0.05	1.04	-0.07	-0.09	-0.03	0.06	0.06	1					
7. Competitive advantage	-0.02	0.94	0.10	0.13	-0.01	-0.05	-0.09	0.07	1				
8. Leadership	-0.01	1.02	0.07	0.01	-0.04	-0.08	0.07	0.06	-0.03	1			
9. Age of the entrepreneur	40.15	7.73	-0.09	-0.03	-0.03	0.15	-0.07	-0.06	-0.12	-0.01	1		
10. Number years in business	2.48	0.94	0.01	-0.06	-0.07	0.08	-0.07	0.09	-0.13	-0.10	0.56**	1	
11. Number key network contacts	2.38	1.26	0.77**	0.75**	-0.06	-0.06	0.02	-0.04	-0.01	-0.07	-0.04	0.02	1
12. Firm size	18.04	30.98	0.14	0.05	0.27**	0.09	0.17 [†]	0.09	-0.05	0.12	-0.03	-0.02	0.11

**P < 0.01, *p < 0.05, [†]p < 0.10.
n = 98.

Table 9
Study two (Indian women entrepreneurs data): summary statistics and *t*-tests for significance of differences in means for discovery and creation samples.

	Discovery (n = 44)		Creation (n = 55)		Two-tailed <i>t</i> -test for significant difference in means
	Mean	S.D.	Mean	S.D.	Sig.
Strategic network diversity1	1.70	0.79	1.89	0.83	0.261
Strategic network diversity2	1.98	0.94	2.37	0.93	0.046
Summary of value-chain factors	1.25	1.95	-1.60	1.88	0.000
Strategy	0.01	0.88	-0.18	0.73	0.238
Marketing	0.45	0.89	-0.64	0.84	0.000
Finance	0.40	0.81	-0.38	1.01	0.000
Human resources	0.54	1.06	-0.41	0.79	0.000
Competitive advantage	-0.31	0.90	0.20	0.92	0.007
Leadership	0.14	1.01	-0.19	1.01	0.106
Age of the entrepreneur	41.23	7.76	39.75	7.65	0.344
Number of years in the business	2.60	1.07	2.41	0.82	0.330
Number of key network contacts	2.43	1.25	2.31	1.29	0.634
Firm size	22.75	40.14	16.62	30.01	0.387

Again, the table does not reveal any significant problems of collinearity among the variables. The only significant high correlations are between our alternative measures of strategic network diversity, and between the number of key network contacts and diversity, which are to be expected.

Summary statistics for the variables of interest for the discovery and creation entrepreneur clusters are in Table 9. We used the two tailed *t*-test to ascertain the significance of difference in means.

Results show that the mean of the strategic network diversity variables (strategic network diversity1 and strategic network diversity2) for creation entrepreneurs is higher than that for discovery entrepreneurs. This difference in means is significant at $p < 0.05$ for strategic network diversity2 variable for discovery and creation entrepreneurs. This variable captures diversity between the entrepreneur and his/her network contacts, which is the subject of interest. Therefore, consistent with study 1, hypothesis 1 and hypothesis 2 are supported in study 2.

Further, the means and *t*-test results also indicate that there are no significant differences in entrepreneur background variables such as entrepreneur's age, firm age, firm size, and the number of network contacts they reported. This shows that the discovery and creation clusters are fairly homogenous with regard to these variables.

As expected, the mean difference for the summary variable that captures discovery and creation characteristics along the value chain activities is highly significant. Among the factors that comprise the summary variable, there are significant differences in means between the discovery and creation entrepreneurs with regard to their approaches to marketing, finance, human resources, and pursuit of competitive advantage whereas there are no

significant differences in means in their approaches to strategy and leadership.

3. Summary of results

This paper presents two sets of competing hypotheses related to entrepreneurs' networks and the opportunity contexts in which they operate. These hypotheses are tested using two distinct datasets. The results from study1 and study 2 are consistent in that the networks of entrepreneurs vary by the context in which they operate. In general, the findings from both data sets support the hypotheses that entrepreneurs operating in discovery contexts have individuals in their strategic networks with similar backgrounds as themselves (i.e., greater homogeneity in their strategic networks), and entrepreneurs operating in creation contexts have individuals in their strategic networks with more diverse backgrounds as compared to themselves (i.e., greater heterogeneity in their strategic networks).

4. Discussion

This paper has a series of important theoretical and practical implications.

4.1. Entrepreneurial context and the benefits of network diversity

Prior work in social network theory on the impact of network range (i.e., diversity in access to different knowledge pools on the ability to convey knowledge to different participants) (Reagans & McEvily, 2003) and in entrepreneurship theory on the

relationship between network diversity and innovation (Dyer et al., 2008) seems to suggest that, on balance, network diversity benefits entrepreneurs. Consistent with these arguments, this paper shows that entrepreneurs in some settings—in particular, in creation settings—seek input from diverse social networks. Such networks might help entrepreneurs communicate their novel ideas to different sets of stakeholders, might help entrepreneurs gain access to diverse sources of knowledge, and might help entrepreneurs enroll stakeholders in enacting the entrepreneurial opportunity (Burns, Barney, Angus, & Herrick, 2016; Reagans & McEvily, 2003).

However, the results in this paper also suggest that not all entrepreneurs prefer to seek input from diverse networks. In particular, entrepreneurs operating in discovery settings prefer obtaining input from less diverse networks. In discovery settings, the benefits of obtaining input from a diverse network listed above are not that important, since entrepreneurs will be able to easily communicate the nature of the opportunity they are seeking to exploit, will not need diverse sources of knowledge to exploit these opportunities, and do not need the assistance of others to enact these opportunities.

Moreover, the—at best—modest benefits for entrepreneurs operating in a discovery setting seeking input from a diverse network may pale in comparison to the advantages such entrepreneurs may gain from seeking input from less diverse networks. Since entrepreneurs operating in this setting already know what resources they will need to exploit their discovery opportunities, they do not need broad ranging network ties. Instead, they need ties to specific individuals or institutions that have the resources—including knowledge, experience, and capital—they need to exploit their opportunities. And, if these individuals or institutions are similar to an entrepreneur in important ways, it may make it less difficult for the entrepreneur to gain access to the resources they need.

Of course, the reason that prior work on network diversity and entrepreneurship failed to document the contingent relationship between diversity and opportunity context is that previous work failed to distinguish among types of entrepreneurial context.

4.2. Operationalizing entrepreneurial context

To date, most work on discovery and creation opportunities has been theoretical (Alvarez, Barney, McBride, & Wuebker, 2017). Recently, a few papers have begun to explore these distinctions empirically, either through the use of case studies (Alvarez, Young, & Wooley, 2015) or through the use of indirect indicators of these constructs (e.g., how innovative a new product is in a product market (Angus, 2016)). This is one of the first papers to use survey data about entrepreneurial actions to identify creation and discovery settings. The results of this effort have been instructive.

For example, much of the prior literature has argued that these two opportunity contexts are dichotomous (Alvarez & Barney, 2007). The results of this study show that there can be a group of entrepreneurs who may be operating in opportunity contexts that have both ‘discovery’ and ‘creation’ characteristics. These entrepreneurs engage in some activities that are consistent with operating in a creation context, and some activities that are consistent with operating in a discovery context. These results suggest that creation and discovery may actually be extreme points on an underlying continuum, rather than the dichotomous categories suggested by previous work.

4.3. Structural versus content networks

Much of the work on the effects of networks on entrepreneurship have adopted a structural perspective. For example, Hite and

Hesterly (2001) examined the impact of the growth stage of an entrepreneurial activity on whether entrepreneurs draw from close friends or less well known connections in their networks. Herrick, Angus, Burns, Chen, and Barney (2016) focus on the effects of strong and weak ties in the same opportunity contexts discussed in this paper, namely creation and discovery. What these structural approaches to networks have in common is that they do not focus on the content of what an entrepreneur obtains from network ties, but instead, focus on the structure and nature of those ties.

This paper takes a content approach to the study of entrepreneurial networks (Reagans & McEvily, 2003). That is, it focuses more on what it is that entrepreneurs obtain from their network ties, and less on the structure and nature of those ties. For instance, in the first study, network diversity was measured by the number of different functional backgrounds represented in an entrepreneur's network. In the second study, network diversity was measured by the difference in educational backgrounds between the entrepreneur and advisers. Based on this measure, it was shown that the degree of diversity in entrepreneurs' strategic networks varies depending on the opportunity context in which entrepreneurs operate.

Of course, it is not being suggested that structural network approaches are inherently inferior to content network approaches, or vice versa. In this paper, the decision was made to focus on content because that seemed to be the most likely to vary between entrepreneurial networks under creation and discovery. As is always the case, the measures that should be used in research depend on the theoretical objectives of that research.

4.4. Network diversity versus founding team diversity

This paper has adopted the assumption that entrepreneurs draw on their networks to help exploit the opportunities they either create or discover. However, entrepreneurs rarely operate on their own. More typically, there is a founding team associated with an entrepreneur. This founding team may, in some circumstances, act as a substitute for networks.

For example, it may be the case that entrepreneurs operating in creation settings will create very diverse founding teams, and that the diversity of these teams may make drawing from a diverse network less important. Also, it may be the case that entrepreneurs operating in discovery settings may create less diverse founding teams, and the lack of diversity of these teams may make drawing from less diverse networks less important. In this way, the degree of diversity in the founding team may lead to the opposite relationship between opportunity type and network diversity documented here. Specifically, in these settings, entrepreneurs in creation settings with diverse founding teams may be able to draw from less diverse networks, while entrepreneurs operating in discovery settings with less diverse founding teams may be able to draw from more diverse networks.

Alternatively, it may be the case that the diversity of the founding team is a manifestation of the diversity of the network within which an entrepreneur is operating. In this sense, entrepreneurs operating in creation settings seek input from diverse networks which, in turn, leads to the creation of diverse founding teams. In the same way, entrepreneurs operating in discovery settings, seek input from less diverse networks which, in turns, leads to the creation of less diverse teams.

Future work will have to examine the interaction between the degree of diversity in the founding team, the degree of diversity in an entrepreneur's preferred network, and the opportunity context within which an entrepreneur is operating.

4.5. Practical implications

This research also has practical implications. Prior work has argued that entrepreneurs do, and should, use their networks to help accomplish their entrepreneurial objectives. This paper supports this general conclusion, but adds an important nuance. The kind of network entrepreneurs do, and should, draw on—in this case, a network dominated by those similar to the entrepreneur or dominated by those that are different than the entrepreneur—depends on the opportunity context within which an entrepreneur is operating. Because opportunity contexts are not all the same, not all networks will be as effective in these different contexts.

In the end, it is not surprising that the resources entrepreneurs should draw on to improve their chances for success depend, in an important way, on the opportunity context within which they are operating. Networks are just one example of these kinds of resources. Future work will need to examine other resource differences between entrepreneurs operating in creation and discovery contexts to continue to provide entrepreneurs more nuanced advice as they seek to improve their odds of successfully engaging in entrepreneurship.

4.6. Limitations and future research

Like most studies, this study is not without its limitations. Several of these, and how they might be addressed in future research, are discussed here.

4.6.1. Network endogeneity

One of the key limitations of the studies in this paper is that they do not resolve the classic endogeneity or reverse causality problem associated with most network studies. Consistent with research in social network theory (Mayhew, 1980; Scott, 2001), it could be argued that entrepreneurs pursue particular types of opportunities as a result of their network positions (Mayhew, 1980). However, it could also be argued that entrepreneurs actively build their strategic networks to pursue certain types of opportunities and not others (Keh, Foo, & Lim, 2002; Vissa, 2011). The studies reported in this paper are silent on these issues.

To explore these issues, future research will need to examine the co-evolution between networks and entrepreneurial opportunities. It is very likely that the causal link between these variables goes both ways, but when networks have a stronger impact on opportunities and when opportunities have a strong impact on networks will have to be unpacked in a careful and systematic way.

4.6.2. Data and measurement limitations

While this is among the first studies to use survey data to characterize the opportunity context of entrepreneurs, these data had some limitations. For example, the same data was not available in both studies, and so the measures that were developed—though theoretically grounded—were different. Moreover, entrepreneurial activity categories used to develop measures of opportunity context and network diversity were also very broad, leading to relatively coarse measures of these concepts.

Future work will need to build on these first efforts, to develop more consistent and fine grained measures of these variables.

4.6.3. Role of modern communication technologies

Also, modern communication technologies enable entrepreneurs to access individuals from all around the world. In the current study, while we expect the networks already reflect this aspect, we did not attempt to parse out how individuals in the networks were accessed. It would be interesting to see whether entrepreneurs use

modern communication technologies to access people similar to themselves or dissimilar to themselves and whether this effect is contingent upon the ‘discovery’ and ‘creation’ opportunity contexts.

4.6.4. Performance implications

Finally, the studies reported in this paper adopted the assumption that entrepreneurs will draw on those kinds of networks that they believe will be most helpful in enabling them to realize their entrepreneurial objectives. However, given the nature of the data in these studies, it was not possible to examine if the match between opportunity type (creation or discovery) and network type (similar or diverse) actually increased the probability of entrepreneurial success. Over the next few years, it may be possible to revisit the samples used in these studies, particularly the second study, to examine whether or not matching opportunity and network type actually has the anticipated performance effects.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.emj.2017.01.001>.

References

- Aldrich, H. E., & Kenworthy, A. L. (1999). The accidental entrepreneur: Campbellian antinomies and organizational foundings. In J. A. C. Baum, & B. McKelvey (Eds.), *Variations in organization science: In honor of Donald T. Campbell* (pp. 19–33). Thousand Oaks, CA: Sage.
- Aldrich, H. E., & Kim, P. H. (2007). Small worlds, infinite possibilities? How social networks affect entrepreneurial team formation and search. *Strategic Entrepreneurship Journal*, 1(1–2), 147–165.
- Aldrich, H. E., & Reuf, M. (2006). *Organizations evolving* (2nd ed.). Thousand Oaks, CA: Sage.
- Aldrich, H., & Zimmer, C. (1986). Entrepreneurship through social networks. In D. Sexton, & R. Smilor (Eds.), *The art and science of entrepreneurship* (pp. 3–23). Cambridge, MA: Ballinger.
- Alvarez, S. A., & Barney, J. B. (2007). Discovery and creation: Alternative theories of entrepreneurial action. *Strategic Entrepreneurship Journal*, 1(1–2), 11–26.
- Alvarez, S. A., Barney, J. B., & Anderson, P. (2013). Forming and exploiting opportunities: The implications of discovery and creation processes for entrepreneurial and organizational research. *Organization Science*, 24(1), 301–317.
- Alvarez, S. A., Barney, J. B., McBride, R., & Wuebker, R. (2017). *On opportunities: Philosophical and empirical implications*. Academy of Management Review. forthcoming.
- Alvarez, S. A., Young, S., & Wooley, J. (2015). Opportunities and institutions: A co-creation story of the king crab industry. *Journal of Business Venturing*, 30(1), 95–112.
- Angus, R. (2016). *Product innovativeness and the discovery-creation distinction*. Unpublished. Department of Entrepreneurship and Strategy, Eccles School of Business, the University of Utah.
- Anokhin, S., Wincent, J., & Autio, E. (2011). Operationalizing opportunities in entrepreneurship research: Use of data envelopment analysis. *Small Business Economics*, 37(1), 39–57.
- Ardichvili, A., Cardozo, R., & Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing*, 18(1), 105–123.
- Athanassiou, N., & Nigh, D. (1999). The impact of U.S. company internationalization on top management team advice networks: A tacit knowledge perspective. *Strategic Management Journal*, 20, 83–92.
- Bagozzi, R. P., & Fornell, C. (1982). Theoretical concepts, measurements, and

- meaning. In C. Fornell (Ed.), *A second generation of multivariate analysis: Vol. 2. Measurement and evaluation* (pp. 24–38). New York: Praeger.
- Baker, T., Miner, A. S., & Easley, D. T. (2003). Improvising firms: Bricolage, account giving and improvisational competencies in the founding process. *Research Policy*, 32(2), 255–276.
- Baker, T., & Nelson, R. E. (2005). Creating something from nothing: Resource construction through entrepreneurial bricolage. *Administrative Science Quarterly*, 50(3), 329–366.
- Baum, J. R., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic Management Journal*, 24(11), 1107–1129.
- Berger, P. L., & Luckmann, T. (1967). *The social construction of reality*. New York: Doubleday.
- Brush, C. G., Greene, P. G., Hart, M. M., & Haller, H. S. (2001). From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. *Academy of Management Perspectives*, 15(1), 64–78.
- Burns, B. L., Barney, J. B., Angus, R. W., & Herrick, H. N. (2016). Enrolling stakeholders under conditions of risk and uncertainty. *Strategic Entrepreneurship Journal*, 10, 97–106.
- Burt, R. S. (1992). *Structural holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.
- Burt, R. S. (1997). The contingent value of social capital. *Administrative Science Quarterly*, 42(2), 339–365.
- Burt, R. S. (2000). The network structure of social capital. In R. T. Sutton, & B. M. Staw (Eds.), *Research in organizational behavior*. Greenwich, CT: JAI Press.
- Burt, R. S. (2007). Secondhand brokerage: Evidence on the importance of local structure for managers, bankers, and analysts. *Academy of Management Journal*, 50(1), 119–148.
- Busenitz, L. W., & Barney, J. B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, 12(1), 9–30.
- Casson, M. (2003). Entrepreneurship, business culture and the theory of the firm. In Z. J. Acs, & D. B. Audretsch (Eds.), *Handbook of entrepreneurship research: An interdisciplinary survey and introduction* (pp. 223–246). Dordrecht, Netherlands: Kluwer Academic Publishers.
- Cummings, L. (1965). Organizational climates for creativity. *The Academy of Management Journal*, 8(3), 220–227.
- Delmar, F., & Shane, S. (2004). Legitimizing first: Organizing activities and the survival of new ventures. *Journal of Business Venturing*, 19(3), 385–410.
- Dew, N., Sarasvathy, S., Read, S., & Wiltbank, R. (2009). Affordable loss: Behavioral economic aspects of the plunge decision. *Strategic Entrepreneurship Journal*, 3(2), 105–126.
- Dowling, G. R., & Midgley, D. F. (1988). Identifying the coarse and fine structure of market segment. *Decision Sciences*, 19(4), 830–847.
- Dyer, J. H., Gregersen, H. B., & Christensen, C. (2008). Entrepreneur behaviors, opportunity recognitions, and the origins of innovative ventures. *Strategic Entrepreneurship Journal*, 2(4), 317–338.
- Edwards, J. R., & Bagozzi, R. P. (2000). On the nature and direction of relationships between constructs and measures. *Psychological Methods*, 5(2), 155–174.
- Eisenhardt, K. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 32(3), 543–576.
- Epple, D., Argote, L., & Devadas, R. (1991). Organizational learning curves: A method for investigating intra-plant transfer acquired through learning by doing. *Organization Science*, 2(1), 58–70.
- Filatovchev, I., Liu, X., Buck, T., & Wright, M. (2009). The export orientation and export performance of high-technology SMEs in emerging markets: The effects of knowledge transfer by returnee entrepreneurs. *Journal of International Business Studies*, 40(6), 1005–1021.
- Fliaster, & Spiess, A. J. (2008). Knowledge mobilization through social ties: The cost-benefit analysis. *Schmalenbach Business Review*, 60, 99–117.
- Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing Research*, 19, 440–452.
- Fredrickson, J. W., & Mitchell, T. R. (1984). Strategic decision processes: Comprehensiveness and performance in an industry with an unstable environment. *Academy of Management Journal*, 27(2), 399–423.
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360–1380.
- Granovetter, M. S. (1982). The strength of weak ties: A network theory revisited. In P. V. Marsden, & N. Lin (Eds.), *Social structure and network analysis*. Beverly Hills: Sage.
- Hansen, M. T. (1999). The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82–111.
- Hayek, F. A. (1946). *The meaning of competition*. Paper presented at Princeton University, May 20, Princeton, NJ.
- Henriques, I., & Sadorsky, P. (1999). The relationship between environmental commitment and managerial perceptions of stakeholder importance. *Academy of Management Journal*, 42(1), 87–99.
- Herrick, H., Angus, R., Burns, B., Chen, M., & Barney, J. B. (2016). *The efficacy of strong and weak ties for entrepreneurs in creation and discovery settings*. Unpublished, Department of Entrepreneurship and Strategy. Eccles School of Business, the University of Utah.
- Hite, J. M., & Hesterly, W. S. (2001). The evolution of firm networks: From emergence to early growth of the firm. *Strategic Management Journal*, 22(3), 275–286.
- Huovinen, S., & Pasanen, M. (2010). Entrepreneurial and management teams: What makes the difference? *Journal of Management and Organization*, 16(3), 436–453.
- Jarillo, J. C. (1988). On strategic networks. *Strategic Management Journal*, 9(1), 31–41.
- Kabanoff, B., Waldersee, R., & Cohen, M. (1995). Espoused values and organizational change themes. *Academy of Management Journal*, 38(4), 1075–1104.
- Keh, H. T., Foo, M. D., & Lim, B. C. (2002). Opportunity evaluation under risky conditions: The cognitive processes of entrepreneurs. *Entrepreneurship Theory and Practice*, 27(2), 125–148.
- Kirzner, I. (1973). *Competition and entrepreneurship*. Chicago, IL and London: University of Chicago Press.
- Kirzner, I. M. (1989). *Discovery, capitalism, and distributive justice*. Oxford, UK: Basil Blackwell.
- Kirzner, I. M. (1997). Entrepreneurial discovery and the competitive market process: An Austrian approach. *Journal of Economic Literature*, 35(1), 60–85.
- Kontinen, T., & Ojala, A. (2011). Network ties in the international opportunity recognition of family SMEs. *International Business Review*, 20(4), 440–453.
- Larson, A. (1992). Network dyads in entrepreneurial settings: A study of the governance of exchange processes. *Administrative Science Quarterly*, 37(1), 76–104.
- March, J. G. (1991). Exploration and exploitation in organizational learning. *Organization Science*, 2(1), 71–87.
- March, J., & Simon, H. (1958). *Organizations*. New York: Wiley.
- Marsden, P. V. (1983). Restricted access in networks and models of power. *American Journal of Sociology*, 88(4), 686–717.
- Mayhew, B. H. (1980). Structuralism versus individualism: Part 1, shadowboxing in the dark. *Social Forces*, 59, 335–375.
- McDonald, M. L., & Westphal, J. D. (2003). Getting by with the advice of their friends: CEOs' advice networks and firms' strategic responses to poor performance. *Administrative Science Quarterly*, 48(1), 1–32.
- McEvily, B., & Zaheer, A. (1999). Bridging ties: A source of firm heterogeneity in competitive capabilities. *Strategic Management Journal*, 20(12), 1133–1156.
- McGrath, C. A., Vance, C. M., & Gray, E. R. (2003). Advice networks of software entrepreneurs. *Creativity and Innovation Management*, 12(1), 2–10.
- Miller, K. D. (2007). Risk and rationality in entrepreneurial processes. *Strategic Entrepreneurship Journal*, 1(1–2), 57–74.
- Mosakowski, E. (1997). Strategy making under causal ambiguity: Conceptual issues and empirical evidence. *Organization Science*, 8(4), 414–442.
- Reagans, R., & McEvily, B. (2003). Network Structure and Knowledge Transfer: The Effects of Cohesion and Range. *Administrative Science Quarterly*, 48(2), 240–267.
- Reagans, R., & Zuckerman, E. (2001). Networks, diversity and performance: The social capital of R&D units. *Organization Science*, 12(4), 502–517.
- Reynolds, P. D. (2009). Screening item effects in estimating the prevalence of nascent entrepreneurs. *Small Business Economics*, 33(2), 151–163.
- Reynolds, P. D. (2011). Informal and early formal financial support in the business creation process: Exploration with PSED II dataset. *Journal of Small Business Management*, 49(1), 27–54.
- Rodan, S., & Galunic, C. (2004). More than network structure: How knowledge heterogeneity influences managerial performance and innovativeness. *Strategic Management Journal*, 25(6), 541–562.
- Romanelli, E. (1991). The evolution of new organizational forms. *American Review of Sociology*, 17(1), 79–103.
- Romesburg, H. C. (2004). *Cluster analysis for researchers*. Morrisville: Lulu Press.
- Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. *Academy of Management Review*, 26(2), 243–263.
- Sarasvathy, S. D., Dew, N., Velamuri, S. R., & Venkataraman, S. (2003). Three views of entrepreneurial opportunity. In *Handbook of entrepreneurship research* (pp. 141–160). US: Springer.
- Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.
- Scott, J. (2001). *Social network analysis: A handbook*. Thousand Oaks, CA: Sage Publications, Inc.
- Shane, S. (2003). *A general theory of entrepreneurship. The individual-opportunity nexus*. Northampton, MA: Edward Elgar.
- Shepherd, D. A., McMullen, J. S., & Jennings, P. D. (2007). The formation of opportunity beliefs: Overcoming ignorance and reducing doubt. *Strategic Entrepreneurship Journal*, 1(1–2), 75–95.
- Simon, H. A. (1981). *The sciences of the artificial* (2nd ed.). Cambridge, MA: MIT Press.
- Slater, S. F., & Olson, E. M. (2001). Marketing's contribution to the implementation of business strategy: An empirical analysis. *Strategic Management Journal*, 22(11), 1055–1067.
- Stuart, T. E., & Podolny, J. M. (1996). Local search and the evolution of technological capabilities. *Strategic Management Journal*, 17(S1), 21–38.
- Stuart, T. E., & Sorenson, O. (2007). Strategic networks and entrepreneurial ventures. *Strategic Entrepreneurship Journal*, 1(3–4), 211–227.
- Surowiecki, J. (2005). *The wisdom of crowds*. New York: Anchor Books.
- Uzzi, B., & Gillespie, J. (1999). Corporate social capital and the cost of financial capital: An embeddedness approach. In R. Leenders, & S. Gabbay (Eds.), *Corporate social capital and liability*. Boston, MA: Kluwer Academic Publishers.
- Uzzi, B., & Spiro, J. (2005). Collaboration and creativity: The small world problem. *American Journal of Sociology*, 111(2), 447–504.
- Venkataraman, S. (1997). The distinctive domain of entrepreneurship research: An editor's perspective. In J. Kantz, & R. Brockhaus (Eds.), *Advances in entrepreneurship, firm and growth* (vol. 3, pp. 119–138). Greenwich, CT: JAI Press.
- Venkataraman, S. (2003). Foreword. In S. SHANE (Ed.), *A general theory of*

- entrepreneurship. The individual-opportunity nexus* (pp. xi–xii). Northampton, MA: Edward Elgar.
- Venkatraman, N., Henderson, J. C., & Oldach, S. (1993). Continuous strategic alignment: Exploiting information technology capabilities for competitive success. *European Management Journal*, 11(2), 139–149.
- Vissa, B. (2011). A matching theory of entrepreneurs' tie formation intentions and initiation of economic exchange. *Academy of Management Journal*, 54(1), 137–158.
- Vissa, B., & Chacar, A. S. (2009). Leveraging ties: The contingent value of entrepreneurial teams' external advice networks on Indian software performance. *Strategic Management Journal*, 30(11), 1179–1191.
- Weick, K. (1979). *The social psychology of organizing*. Reading MA: Addison-Wesley.
- Welter, C., & Alvarez, S. (2011). *Opportunity types and competitive advantage*. Working paper. Fisher College of Business, The Ohio State University.
- Zaheer, A., & Soda, G. (2009). Network evolution: The origins of structural holes. *Administrative Science Quarterly*, 54(1), 1–31.