Regional Studies

Dealmakers in Place: Social Capital Connections in Regional Entrepreneurial Economies

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Published online: 17 Nov 2011.

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Dealmakers in Place: Social Capital Connections in Regional Entrepreneurial Economies

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FELDMAN M. and ZOLLER T. D. Dealmakers in place: social capital connections in regional entrepreneurial economies, *Regional Studies*. This paper examines the internal anatomy of regional social capital and develops a role for dealmakers – individuals who provide active regional stewardship. An empirical analysis of twelve US regions finds great variation in the presence of dealmakers. The strong local presence of dealmakers is correlated with high start-up rates. The empirical results suggest that the local presence of dealmakers is more important for successful entrepreneurship than aggregate measures of regional entrepreneurial and investors network. Moreover, it is found that the presence of dealmakers is a better predictor of the status of the regional entrepreneurial economy.

Regional economic development   Entrepreneurship   Social capital

FELDMAN M. and ZOLLER T. D. 交易商：区域公司经济的社会资本关联，区域研究。本文考察了区域社会资本的内在自主性,同时探讨了进行积极区域管理的个体作为交易商的作用。对美国12个区域进行的实证分析发现， 交易商存在较大的地域性差异。本地交易商的强弱与高启动率相关。经验性研究结果表明，相比区域公司以及投资网络的集聚效应而言，交易商的地方性存在对于公司的成功更具重要性。文章进一步发现，交易商的出现对于预测区域公司经济状态有着积极的意义。

区域经济发展   公司   社会资本

FELDMAN M. et ZOLLER T. D. Des opérateurs sur place: les liens de capital social dans les économies d'entreprise régionales, *Regional Studies*. Cet article cherche à examiner l'anatomie interne du capital social régional et à développer un rôle à jouer pour les opérateurs – des individus qui fournissent une gestion régionale active. Une analyse empirique de douze régions situées aux E-U laisse voir une variation importante de la présence des opérateurs. La forte présence locale des opérateurs est en corrélation étroite avec les taux de création. Les résultats empiriques laissent supposer que la présence locale des opérateurs est plus importante pour réussir l'esprit d'entreprise que ne le sont des mesures globales de l'établissement de réseaux régionaux d'entrepreneurs et d'investisseurs. Qui plus est, il s'avère que la présence des opérateurs est un meilleur indicateur du statut de l'économie d'entreprise régionale.

Aménagement du territoire   Esprit d'entreprise   Capital social

FELDMAN M. und ZOLLER T. D. Dealmaker vor Ort: Verbindungen des Sozialkapitals in regionalen Unternehmerwirtschaften, *Regional Studies*. In diesem Beitrag wird die interne Anatomie des regionalen Sozialkapitals untersucht und eine Rolle für Dealmaker entwickelt – also für Personen, die für eine aktive regionale Steuerung sorgen. Bei einer empirischen Analyse von zwölf Regionen der USA stellen sich starke Schwankungen hinsichtlich der Präsenz von Dealmakern heraus. Eine hohe lokale Präsenz von Dealmakern geht mit einer hohen Anzahl von Firmengründungen einher. Aus den empirischen Ergebnissen geht hervor, dass die lokale Präsenz von Dealmakern für erfolgreiches Unternehmertum wichtiger ist als die gemeinsamen Faktoren des regionalen Unternehmertums und des Investorennetzwerks. Darüber hinaus stellt sich heraus, dass sich die Präsenz von Dealmakern besser zur Prognose der regionalen Unternehmerwirtschaft eignet.

Regionale Wirtschaftsentwicklung   Unternehmertum   Sozialkapital

FELDMAN M. y ZOLLER T. D. Negociadores disponibles: conexiones de capital social en las economías empresariales regionales, *Regional Studies*. En este artículo analizamos la anatomía interna del capital social regional y desarrollamos un papel para los negociadores – personas que ofrecen una administración regional activa. En un análisis empírico de doce regiones de los Estados Unidos observamos una gran variación en la presencia de negociadores. La fuerte presencia local de negociadores está relacionada con altos índices de creación de nuevas empresas. Los resultados empíricos indican que la presencia local de negociadores es más importante

para el éxito empresarial que las medidas combinadas del empresariado regional y la red de inversores. Además, observamos que la presencia de negociadores es una mejor medida para predecir el estado de la economía regional empresarial.

Desarrollo económico regional   Empresariado   Capital social

INTRODUCTION

The vibrancy of regional economies and the degree of entrepreneurial activity is certainly affected by the anatomy of local social capital. Current research has not yet developed an understanding of the nuanced relationship between social capital and the establishment of entrepreneurial economies, or considered the structure of social capital most conducive to the births of new technology based firms (SHANE and CABLE, 2002). LERNER (2009) suggests that public efforts to boost entrepreneurship often fail. Strategies that work in one place are not transferable to other places, often because an appreciation of local context and internal dynamics is lacking. While there are many studies of regional networks in aggregate, there is little examination of the differential roles that individual actors play in creating the information flows that increase the vibrancy of regional entrepreneurial networks. Unless scholars examine the internal dynamics of social capital in regions, policy-makers will be left with little advice about how best to make investments to build successful entrepreneurial economies.

This paper examines the role of dealmakers – individuals with valuable social capital, who have deep fiduciary ties within regional economies and act in the role of mediating relationships, making connections and facilitating new firm formation. It attempts to move the literature beyond an aggregate analysis of social capital that focuses on the characteristics of regional networks towards a consideration of the role of key individuals who form the backbone of the entrepreneurial economy and motivate new firm formation. The literature has analysed entrepreneurs, investors and professional service providers separately, focusing on their separate functional role in the entrepreneurial network. An alternative formulation is to investigate the structural role that individuals actually assume in influencing and connecting the regional network. The term 'dealmakers' is used colloquially in entrepreneurship practice to connote individuals who act as *insiders* in regional networks and actively engage in creating and sustaining new ventures (SENOR and SINGER, 2009, pp. 203–204). These individuals are part of a class of regional champions who are embedded in the social structure of a place and actively undertake building local capacity. Dealmakers, as a category of regional champions, are distinguished not only by the high level of their local embeddedness, but also by their active stewardship as witnessed by their role as a trusted fiduciary with multiple organizations in the region. This association clearly embeds them in the regional entrepreneurial ecosystem, and positions them for a more deliberate role in catalysing new firm births. Admittedly, while dealmakers may likely have influence in multiple regions, this study defines dealmakers as embedded agents in a regional social capital network and it examines their influence through their localized firm ties, interconnecting social capital and intra-regional syndication patterns.

Dealmakers assume roles that make the connections from which knowledge spills over to lower the costs of engaging in innovative activity, thus creating regional vibrancy. This paper reviews the literature to define the role of dealmakers and their characteristics in the second section. Attention then turns to identifying dealmakers using secondary data on entrepreneurial firms and the individuals who are members of the boards of directors or employed in executive positions. Through this approach, described in the third section, the constraint of examining either entrepreneurs or investors exclusively is avoided and the paper focuses on that set of individuals who are actively involved in the stewardship of new firms. These individuals, who both live and invest in a region, serve as the catalyst for new firm formation and play a central role in enhancing firms' growth and performance and thus affect the vitality of the region. The empirical analysis, presented in the fourth section, reveals that there is great variation in the regional representation of dealmakers in regions. As expected, the presence of dealmakers is associated with greater regional start-up activity and serves as a stronger predictor for a more vibrant regional economy than either the size of the entrepreneurial economy or the stock of entrepreneurs or investors, measures that prevail in the current literature. Through this exploratory analysis structural characteristics of the regional social network are uncovered that are associated with successful regional entrepreneurial economies. The analysis is diagnostic rather than causal; however, the presence of dealmakers is an artefact of vibrant regional entrepreneurial economies. The fifth section concludes by considering the implications of the research and offering suggestions for further research.

DEALMAKERS DEFINED

The literature assigns a variety of different social capital structural roles to individuals in networks such as brokers, gatekeepers and network architects who provide the basis for considering dealmakers. The significance of social capital to regional economic development has been recognized since ROGERS and LARSEN (1984). However, the precise definition of social capital has proven to be more elusive. We rely on a definition of social capital defined by WOLFE (2002) that has particular resonance for regional economies:

> Social capital refers to various features of the social organization of a region, such as the presence of shared norms and values that facilitate coordination and cooperation among individuals, firms, and sectors for their mutual advantage. The use of the term capital indicates that it is an asset; while the term social connotes that the particular asset is attained through involvement with a community. The existence of social capital depends upon the ability of people to associate with each other and the extent to which their shared norms and values allow them to subordinate their individual interests to the larger interests of the community.
> (p. 20)

The evidence is that social capital is a component of successful entrepreneurial communities; however, the precise configuration has proven to be elusive (AHUJA, 2000; BRESCHI and LISSONI, 2001; CANTNER and GRAF, 2004; CANTNER *et al.*, 2009; FISCHER, 2006; KENNEY and BURG, 1999; SHANE and CABLE, 2002; SORENSON and STUART, 2008; ZAHEER and BELL, 2005). GLAESER *et al.* (2002) note that a

> lack of consensus exists because economists have by and large adopted social capital frameworks that are based on *aggregate* analyses … who define social capital as networks.
> (p. F438)

The lack of theoretically grounded models of regional social capital has limited current theory to examining social capital in a structural summary. While network analysis is a social science tool, it is most powerful when grounded in a disciplinary context.

BURT (2000) describes the role of information brokers who span structural holes and bring advantages to the groups they tie together. The definition focuses on the ability of actors to link together other entities; however, there is no definition of the attributes of these individuals, what motivates them both to assume the brokers' role and to be substantively invested in the network. In examining regional networks, the literature has tended to focus on either entrepreneurs or venture capitalists. As GLAESER *et al.* (2002) assert

> While venture capitalists have received the most attention, the location of other constituents of the support network, including investment bankers, accountants, or persons who are capable of serving on the start-up's board of directors, has received far less attention.
> (p. F438)

To this point, KENNEY and PATTON (2005) examine the entrepreneurial professional services that support the creation of new firms and find that professional networks are global rather than local. This is not so surprising when it is considered that accountants and attorneys serve an important role in new firm formation; however, their skills may be highly specialized and they may have more allegiance to their profession or guild than to their local economy. There is no reason to expect professionals to be particularly loyal to one region exclusively. Their presence may be a reflection of the success of the region rather than a sufficient underlying condition for the formation of a regional economy. In addition, greater entrepreneurial activity may be possible only if there is sufficient local buzz to leverage global connections (BARTHELT *et al.*, 2004). Otherwise service providers may be affiliated with the branch locations of national or international firms and only be marking time in peripheral locations. This assertion highlights the need to define actors by their degree of attachment to the region rather than simply by their current function as an entrepreneur, investor or business service provider.

The role that an individual assumes and his or her function with the network may be more important than the individual's current occupation. DUBINI and ALDRICH (1991) introduced the concept of brokerage to explain social capital relationships between entrepreneurs and venture capitalists, defining the broker as

> People or firms who link units having complementary interests, transferring information or resources, and otherwise facilitating the interests of those not directly connected to one another. … Brokers allow people to forge contacts that help them leap over otherwise unbridgeable gaps in their marshalling of resources.
> (p. 310)

Thus, the definition of brokers is shifted from a functional role towards that of mediating information and purposefully making connections. This suggests that a hierarchy of social capital exists within a region, with brokers purposefully serving a central role. Moreover, the number of brokers in the local economy may be more important than the total number of individuals involved in the network.

The concept of brokerage has been used by scholars to examine the dynamics of regional entrepreneurial economies. For example, FRANKE (1999) examined the role of net-brokers who initiate and maintain the virtual connections between organizations, implying that certain individuals function to shape networks (KOGUT and SHAN, 1997). Brokers function as intermediaries between typical entrepreneurs and investors in a social capital network, and their mediation facilitates the birth of new firms that support the growth of entrepreneurial economies (MYINT *et al.*, 2005; POLLOCK *et al.*, 2004; WINCH and COURTNEY, 2007). The concept of brokerage is further updated in the literature to include

the notion of the 'gatekeeper', which represents actors who influence the network through largely informal ties and serve to introduce new knowledge into the selective parts of the network (BELL and GIULIANI, 2007; MORRISON, 2008; TUSHMAN and KATZ, 1980). The gatekeeper serves an important intermediary role at the core of an information network, identifying external sources of knowledge and translating it for a smaller network of individuals. The function of the gatekeeper is less deterministic than other forms of brokerage, and serves to explain how information and knowledge is transmitted and absorbed into the social capital network.

FINLAY and COVERDILL (2000), on the other hand, criticize the term 'broker' because it implies a purely structural position rather than a complex and multidimensional function. To deal with this perceived inadequacy, POLLOCK *et al.* (2004) introduce the term 'network architects' to provide more precision to the role of individuals who broker information and manage structural holes in mediated markets, such as real estate transactions or financial securities. The network architect, according to POLLOCK *et al.* (2004, p. 51), develops a brokerage function as a consequence of serial experience in 'the stock of social resources the broker has accumulated from previously successful transactions that can be brought to bear on a current transaction'. This concept has significant application in other mediated markets, including local enterprise creation. However, what is missing is the deterministic role for the broker in the configuration of the current social network. The network architect, according to POLLOCK *et al.* (2004), develops the role due to a

> proactive and network-building … and that it is difficult to separate the characteristics of deal networks from the choices that brokers are making in response to a variety of social and economic forces.
>
> (p. 54)

The present paper extends the concept of brokerage to consider intentional acts to connect disparate actors in a social capital network. Interviews, case study and other qualitative evidence suggests a class of actors whose experience and concurrent firm ties span multiple functional activities, blending the roles of investor and entrepreneur to serve as a broker in shaping and defining entrepreneurial networks. The term 'dealmaker' is used in practice to describe an accomplished actor experienced in establishing new entrepreneurial firms, especially for individuals who have a bias towards making things happen in the local economy. Thus, dealmakers assume a constitutive role demonstrating a degree regional stewardship by making connections in purposeful ways. Dealmakers maintain a primary affiliation with either an entrepreneurial or a finance firm, but their span of control far exceeds either a managerial or an investor relationship with a single firm. Dealmakers influence multiple firms

concurrently in their respective regions in their role as investors and executives. Building on the concepts previously established in the literature, the dealmaker combines three characteristics – seriality, mediation and network-shaping brokerage – that when blended together represent a unique synthesis not previously advanced by existing theory. For the purposes of this paper, a dealmaker is defined as a facile and accomplished actor with serial venture experience in establishing new entrepreneurial firms who possesses fiduciary responsibility for four or more entrepreneurial firms concurrently. Moreover, the dealmaker plays a central role mediating, shaping and configuring regional entrepreneurial networks by sharing expertise, information and resources among entrepreneurs and investors, thereby facilitating new firm creation and supporting entrepreneurship. They play a substantial, if not a central, role in bridging the relationships between individual investors and entrepreneurs who are responsible for the day-to-day execution of the management strategy of firms in the region. Dealmakers leverage their experience to interconnect and syndicate locally embedded actors involved in new firm formation. Thus, dealmakers organize locally embedded social capital to form the backbone of the regional entrepreneurial economy, and thereby motivate new firm formation. Note that there may be other individuals – public officials, non-profit and community leaders, among others – who assume a stewardship role in the regional economy and also play an important role in shaping and activating local networks.

The presence of dealmakers is expected to be associated with the vitality of the local entrepreneurial economy. There is certainly endogeneity as the number of start-ups provides opportunities for key individuals to be involved in multiple firms, but the expectation is that dealmakers serve a pivotal role facilitating new firm formations. Therefore, it is expected that the larger number of dealmakers present in the regional economy will be correlated with greater start-up activity. If the presence of dealmakers is more important than the stock of either entrepreneurs or investors, then the structure of social capital is arguably more important than the aggregate size of the local entrepreneurial network.

DATA AND METHODOLOGY

The data used for the study are drawn from Capital IQ, a private database maintained by Standard & Poor's and licensed to over 4200 clients, primarily in the financial services industry within the United States. Capital IQ has one of the most comprehensive cross-sectional datasets of information on entrepreneurial firms available in the United States. The data capture firms that have received bank, private equity or venture capital financing.

Capital IQ provides detailed records on private companies, including information of the individuals on the boards of directors or serving in executive roles with board privileges. While it is conceded that dealmakers may indeed be present in any industry, this study focuses on firms in the information technology and life sciences sectors because of the notable association of these sectors with private equity investing and high-growth entrepreneurship. Venture capital and private equity are common in these sectors and limit bias due to omitting firms that do not utilize other forms of external finance not associated with individual actor-directed investing. The lack of robust data on regional entrepreneurial firms is a limitation for researchers. The existence of a comprehensive research dataset of entrepreneurial firms in the Research Triangle region was cross-checked with the Capital IQ data and it was confirmed that the firm- and actor-level data were robust, complete and current.

The paper focuses its analysis of dealmakers on twelve US regions listed in Table 1. These regions have been studied previously as places of interest to our community of scholars. The term 'technopole' was used to identify relevant studies that compared US regions. Each of the studies cited discussed the region's efforts to engage in technology-based economic development beginning in the mid-1980s and anticipated the establishment of entrepreneurial networks.

Boston and Silicon Valley, the two largest and most successful entrepreneurial regions, provide a baseline reference. The other regions provide a cross-section of places with varying degrees of entrepreneurial outcomes and regional location. Table 2 presents the choice of appropriate corresponding geographic designation used in the analysis.[1] Regions are ordered by population size, from largest to smallest.

The outcome variable of interest is firm birth in a region. Firm birth rate has been established as a reliable indicator of the success of entrepreneurial economies by myriad studies (ARMINGTON and ACS, 2002;

GREGORIO and SHANE, 2003; HUISMAN and VAN WISSEN, 2004; REYNOLDS, 2007; REYNOLDS et al., 1994; SHANE, 2002). Table 2 also presents data on the annual number of firm births from 2003 to 2007. Firm births are derived from Capital IQ as the founding date of firms reported in the database. Capital IQ captures firms that are still in existence and therefore successful, an orientation that is biased towards firms with the outcomes that the analysis tries to capture. Since the database represents a snapshot of all firms in existence at the time the data are extracted at various stages of development, this social network analysis captures the social capital associated with these firms, serving as a productive proxy to evaluate the networked inter-relationships of actors surrounding regionally embedded firms. These numbers were verified against Thomson Financials Venture Xpert, a series that captures firms with similar success at securing financing. There were no systematic discrepancies between the two similar sources.

The unit of analysis is the individual actor, but relationships are nested within firms and regions. The logic is that there is a constellation of private entrepreneurial firms in each region, each of which has multiple ties to actors as board members and executives. The subject of interest – the dealmaker connected to an entrepreneurial firm – is qualified as a consequence of their direct involvement in entrepreneurial companies through their fiduciary responsibilities as a member of a firm's board of directors or as an officer of the company with a board seat. As a consequence of the Sarbanes-Oxley Act of 2002, members of the board and officers are legally liable for the direction of the firm given their substantial fiduciary obligation and connection to the firm.

Board and firm tie interlocks are used to evaluate the degree to which individuals are connected to multiple firms and therefore involved in social capital of an entrepreneurial economy (BORGATTI and FOSTER, 2003; FICH and SHIVDASANI, 2006; CASTILLA, 2003; GULATI

Table 1. *Literature analysis to identify study regions: twelve regions engaged in developing entrepreneurial economies*

Region	SMILOR et al. (1988)	PREER (1992)	SCOTT (1993)	SIMMIE (1994)	WANG (1998)	CASTELLS and HALL (1994)	HASSINK (1996)
Boston/Route 128	×	×		×	×	×	×
Silicon Valley	×	×		×	×	×	×
Phoenix	×						
Seattle				×			
Minneapolis/St. Paul		×					
Denver/Boulder				×			
Orange County		×					
San Diego	×		×			×	
Portland			×				
Salt Lake City		×					
Raleigh/Durham	×	×		×			×
Austin	×	×		×			

Source: ZOLLER (2010).

Table 2. Twelve regions that signalled an intention to engage in developing entrepreneurial economies

Region	Federal unit definition	Geographical reference	Population (*n*), 2008	Number of firm births (2006–2009)
Boston/Route 128	Combined Statistical Area 148	Boston–Worcester–Manchester, MA–RI–NH	7 514 759	220
Silicon Valley	Combined Statistical Area 488	San Jose–San Francisco–Oakland, CA	7 354 555	590
Phoenix	Metropolitan Statistical Area 6200	Phoenix–Mesa–Scottsdale, AZ	4 281 899	40
Seattle	Combined Statistical Area 500	Seattle–Tacoma–Olympia, WA	4 087 033	120
Minneapolis/St. Paul	Combined Statistical Area 378	Minneapolis–St. Paul–St. Cloud, MN–WI	3 562 284	31
Denver/Boulder	Combined Statistical Area 216	Denver–Aurora–Boulder, CO	3 049 562	78
Orange County	Zip codes within county (special case)	Orange County, CA	3 010 759	54
San Diego	Metropolitan Statistical Area 7320	San Diego–Carlsbad–San Marcos, CA	3 001 072	99
Portland	Metropolitan Statistical Area 6442	Portland–Vancouver–Beaverton, OR–WA	2 207 462	35
Salt Lake City	Combined Statistical Area 482	Salt Lake City–Ogden–Clearfield, UT	1 717 261	29
Raleigh/Durham (RTP)	Combined Statistical Area 450	Raleigh–Durham–Cary, NC	1 690 557	26
Austin	Metropolitan Statistical Area 640	Austin–Round Rock, TX	1 652 602	44

Source: Population data are from the US Census Bureau. The number of firm births are derived from Capital IQ.

and WESTPHAL, 1999; STUART and SORENSON, 2005; WILLIAMSON and CABLE, 2003). Following the literature, this paper differentiates between entrepreneurs and investors. Entrepreneurs are defined as individuals on the board of directors or management team of a company and who do not hold a position with a finance firm. Individuals who are also known to be executives of finance, investment or equity firms are classified as investors. Individuals with one or two connections are either investors or entrepreneurs. Individuals may also have concurrent connections on the board or management of entrepreneurial firms while also being key executives at finance or equity firms. In this case, these individuals are classified as investors, and play an enhanced brokerage function through their equity investing functions. More than half of those individuals with three connections are involved with local companies in multiple roles as investors and as executives. Both individuals with three concurrent ties and dealmakers with four or more concurrent ties are examined. While there are several functions hypothesized for dealmakers and nuanced relationships that cannot be fully captured or adequately identified with any social capital measurement methodology, this approach serves as a proxy to the larger concept of the dealmaker proposed here, and represents a reliable means to identify serial entrepreneurs and investors with dealmaker characteristics consistent with the definition proposed above.

The dataset provides a snapshot of current firm affiliations by individuals in each of the twelve sample

regions. The data are only available as a cross-section and reflect activity on 18 December 2009 when the data were extracted for this analysis. This yields a sample of 85 579 individual actors among 22 201 private entrepreneurial firms. To facilitate data acquisition and identify patterns in social networks at the actor level, an algorithm was created to extract unique datasets from Capital IQ's formatted files. The algorithm identifies individual actors based on their entrepreneurial firm affiliations, their geographic locations and their parallel affiliations as executives or board members of finance firms. By distinguishing clearly the primary employment or board relationships for individual actors (entrepreneurial firms or finance firms), the algorithm allows actors to be classified into mutually exclusive categories according to their primary role as entrepreneurs or investors, upholding the entrepreneur–investor dichotomy framed in the literature. This approach further separates actors into groups based on the number of concurrent firm ties they hold, allowing for comparisons between typical single-firm-tie entrepreneurs and investors and those with dealmaker traits with multiple entrepreneurial firm ties, both within and across the sample regions. Finally, the algorithm uses the affiliation data and geographic screens to build mutually exclusive, consistent sets of data for each identified actor in all twelve sample regions, facilitating uniform comparisons of the data across regions.

Table 3 presents data on the counts of individual actors involved with entrepreneurial companies in

Table 3. Distribution of actor's regional ties to entrepreneurial firms

Region	Total number of actors	Number of connections (%)			
		One	Two	Three	Four or more
Boston	15 897	89.4	7.7	1.7	1.2
San Francisco Bay Area	31 221	86.1	9.4	2.5	2.0
Phoenix	2583	95.9	3.4	0.5	0.2
Seattle	5485	92.2	6.1	1.0	0.7
Minneapolis/St. Paul	3656	93.1	5.6	1.0	0.4
Denver/Boulder	4405	94.8	4.3	0.5	0.4
Orange County	5500	95.9	3.8	0.3	0.0
San Diego	6922	91.4	6.6	1.4	0.6
Portland	2025	95.6	3.8	0.4	0.3
Salt Lake City	2243	93.9	5.1	0.6	0.3
Raleigh/Durham	2520	93.9	5.3	0.6	0.3
Austin	3122	93.0	5.8	0.7	0.5
Mean	85 579	90.1	7.2	1.6	1.1

9.4% in the San Francisco Bay Area. Across all twelve regions, the percentage of individuals with each type of connection decreases as the number of connections increases. It is notable that the regions considered more successful a priori have larger percentages of individuals with larger numbers of connections. For example, the largest percentage of dealmakers among the twelve regions examined is Boston with 1.2% of the individuals in the entrepreneurial economy having four or more ties.

Given that actors with one or two concurrent entrepreneurial firm ties comprise 97.3% of the average regional sample, results in Table 3 reveal a highly skewed distribution that suggests that a hierarchy exists in the structure of social capital in entrepreneurial regions. As an illustrative example, in the Bay Area, only 2% of the actors in the entrepreneurial economy have ties to four or more firms, while Orange County exhibits much less dense social capital with only 0.05% of the actors connected to four or more companies.

The differentiating factor between regions is the percentage of individuals who are associated with multiple serial connections. As noted above, for purposes of this study dealmakers are defined as those individuals with four or more connections to firms in the local economy.

each of the twelve focal regions. For example, Boston has a total of 15 897 individuals who participate in the entrepreneurial economy as either executives or board members. The area defined as Silicon Valley contains almost twice as many individuals (31 221) participating in the entrepreneurial economy. Places are arrayed by population size; however, the aggregate number of individuals connected with entrepreneurial firms does not decline monotonically. Denver, Orange Country and San Diego have approximately the same population of 3 million; however, San Diego stands out with 6922 individuals active in the entrepreneurial economy (the population size is taken from Table 1). Austin, with a population of approximately 1.7 million, has 3122 individuals active in entrepreneurial firms, which is greater than Salt Lake City, Portland, Phoenix and Raleigh/Durham.

Table 3 further explores differences in the number of individuals with various counts of local connections. In every region, it was found that the largest share of individuals is associated with only one firm. On average, the majority (90.1%) of individual actors in the twelve regional entrepreneurial economies have one tie to a firm within his or her respective region, 7.2% of actors are connected to two firms; and 1.6% with ties to three firms. Individuals with four or more regional ties comprise 1.1% of the individuals involved in entrepreneurial firms within a given economic region. The percentage of individuals associated with one firm varies from 95.9% in Orange Country and Phoenix to 86.1% in the San Francisco Bay Area.

Table 3 presents the percentage of individuals who have multiple links to boards and entrepreneurial companies. The percentage of individuals associated with two local firms, indicating that an individual has some degree of connection, varies from 3.4% in Phoenix to

EMPIRICAL RESULTS

Table 4 presents a correlation matrix of all categories of social capital for the twelve study regions and average firm birth for the five-year period from 2003 to 2007. The correlation matrix shows simple correlations among six variables. For aggregate social capital the total network, the number of individuals classified as entrepreneurs and the number of individuals classified as investors are measured. The correlation matrix includes two measures of structured social capital: dealmakers with three and four ties, respectively.

The correlation matrix exhibits a progressively stronger correlation between the various categories of social capital and average firm birth with the progression from the aggregate entrepreneurial network to the structured network of dealmakers. The correlation between the aggregate size of the network and new firm births is weakly positive at 0.1612, while the aggregate number of entrepreneurs is a slightly higher with a positive correlation coefficient of 0.253. The aggregate investors alone are negatively correlated at 0.054. The negative correlation (–0.054) for single-tie investors in the aggregate network suggests that investors with limited ties are not positively associated with new firm establishments. This supports the idea that connections are more important than money alone in the new venture creation process.

For the structured social capital measures, the correlations are progressively stronger. Individuals with three concurrent ties have a correlation of 0.848. For those

Table 4. Correlation matrix of social capital measures and new firm births, 2003–2007

	Total network	Entrepreneurs	Investors	Dealmakers (three ties only)	Dealmakers (four plus ties)
Total network	1.000				
Entrepreneurs	0.992	1.000			
Investors	0.917	0.035	1.000		
Individuals with three ties	0.473	0.958	0.129	1.000	
Dealmakers (four or more ties)	0.374	0.468	0.035	0.958	1.000
New firm births	0.161	0.253	−0.054	0.848	0.935

individuals with four or more concurrent ties the correlation with new firm births is 0.935. These strong and positive correlations indicate that the structure of social capital is associated with more successful entrepreneurial regions. These individuals have a high degree of social capital, with influence over multiple firms. Theory suggests that these actors serve an important role in brokering resources among firms, influencing the business environment and in facilitating communication and information flows between firms in the regional entrepreneurial economy.

Notably, the weakest correlations are among social capital categories that the current literature associates with the aggregate entrepreneurial network (that is, entrepreneurs and investors with one firm tie) and average firm birth. This suggests that dealmakers have a stronger effect on firm birth than measurements of an aggregate entrepreneurial network. In general, dealmakers with four or more ties exhibit higher correlation than both the dealmakers with only three ties, and the general entrepreneurs and investors in the total network with a single tie. This suggests that the concept of dealmakers is perhaps a better measure of successful entrepreneurial economies. While correlation does not imply causality, this suggests that dealmakers are perhaps more closely associated to average firm birth than aggregate social capital measures. Moreover, while the association of new firm births and aggregate social capital may be endogenous, it is more challenging to discount why the correlation improves for the structured social capital measures that include dealmakers. It appears that structured social capital has a stronger association to new firm births than aggregate indicators that now are predominant in the literature.

Results from this analysis suggest that the more successful entrepreneurial economies have a higher frequency of individuals in the dealmaker category. Table 5 provides the numbers of total actors in the entrepreneurial economy (column 1), then considers entrepreneurs with one or two connections (column 2), and the number of dealmakers with four or more connections (column 3). For example, Boston has 186 dealmakers while Silicon Valley has 637. Phoenix, next in terms of population, has only four dealmakers, while San Diego has forty-four and Seattle has thirty-seven. Column 4 presents the ratio of entrepreneurs to dealmakers in each region's economy. For example, the San Francisco Bay Area has forty-two entrepreneurs for each dealmaker compared with 1539 in Orange County. These results suggest that that the chances of an entrepreneur having random contact with an influential dealmaker are thirty-six times more likely in San Francisco than in Orange County.

Table 6 provides a component analysis of the aggregate entrepreneurial network for each of the twelve sample regions. Component analysis compares the effects of aggregate density relative to the degree of interconnectivity and cohesiveness of complex networks (ANGELUSZ and TARDOS, 2006; BOSCHMA and TER WAL, 2007; HUISMAN and VAN WISSEN,

Table 5. Distribution of entrepreneurs and dealmakers by region

	(1) Total number of actors	(2) Entrepreneurs	(3) Dealmakers	(4) Entrepreneurs/dealmakers	(5) Total actors/dealmakers
Boston	15 897	13.362	186	71.84	85.47
San Francisco Bay Area	31 221	26.967	637	42.33	49.01
Phoenix	2583	2.193	4	548.25	645.75
Seattle	5485	4.622	37	124.92	148.24
Minneapolis/St. Paul	3656	3.100	13	238.46	281.23
Denver/Boulder	4405	3.675	18	204.17	244.72
Orange County	5500	4.617	3	1539.00	1833.33
San Diego	6922	5.825	44	132.39	157.32
Portland	2025	1.730	6	288.33	337.50
Salt Lake City	2243	1.891	7	270.14	320.43
Raleigh/Durham	2520	2.041	7	291.57	360.00
Austin	3122	2.566	15	171.07	208.13

Table 6. Component analysis of the aggregate entrepreneurial network, twelve sample regions

	Boston/Route 128	Silicon Valley	Phoenix	Seattle	Minneapolis/ St. Paul	Denver/ Boulder	Orange County	San Diego	Portland	Salt Lake City	Raleigh/Durham (RTP)	Austin
Total nodes (*n*)	18 273	36 111	3067	6373	4314	5145	6509	7983	2381	2631	2867	3616
Nodes in the primary network (*n*)	12 509	28 419	293	3470	1649	1839	663	4505	837	943	1386	1458
Associated nodes (%)	68.46	78.70	9.55	54.45	38.22	35.74	10.19	56.43	35.15	35.84	48.34	40.32
Secondary component size (*n*)	33	41	86	37	74	43	345	45	45	27	27	56
Tertiary component size (*n*)	22	27	49	33	47	35	114	33	39	27	20	44
All other components (*n*)	1039	1624	393	488	436	509	808	570	264	259	207	307

2004; KALISH and ROBINS, 2006). These data allow for an easier comparison of whether new firm births in a region are more closely associated with total networks of entrepreneurs and investors or with the subset of a region's actors exhibiting dealmaker characteristics. Component analysis displays the relative distribution of interconnected and disassociated nodes in the total network, a way to observe the degree of cohesiveness of a regional network. If a node is disassociated, it does not possess a tie to the largest single central network observed in a regional ecosystem of commonly associated nodes and is therefore isolated. In the context of this analysis, this means that the individual actor is not part of a cohesive central network and is isolated from the main entrepreneurial ecosystem.

Table 6 presents the total nodes in each network (as a measure of network density) and the number of nodes associated with the primary network group (the primary interconnected group in the network as a measure of cohesiveness). A simple percentage is calculated as a crude measure of the degree of cohesiveness in the network, with a higher percentage indicating that a number of actor nodes are interconnected with one another. This is a simple way to measure the degree of density and cohesiveness of both the region's aggregate and dealmaker networks and compare it against the region's success in new firm formation.

If dealmakers serve to mediate aggregate networks, then it is expected that regions with substantial dealmaker social capital would have higher ratios of associated networks versus disassociated networks. Dealmakers would possess common ties to the primary entrepreneurial network in the region and therefore be counted among the associated networks. There appears to be a relationship between regions with more firm births and those with a higher degree of cohesiveness measured by associated nodes among the aggregated network – for example, Silicon Valley, with 78.7% of nodes associated; and Boston, with 68.5% associated. Moreover, San Diego and Seattle, the next most successful regions in establishing new firms, show the next highest degree of associated nodes, at 56.4% and 54.5%, respectively. Phoenix, on the other hand, represents the region with the lowest degree of associated nodes at 9.6%.

Table 7 provides a component analysis of the dealmaker network, which exhibits even greater associated node cohesiveness. It is striking that while Silicon Valley has the highest cohesiveness in the aggregated network (78.7%), it has almost a completely cohesive dealmaker network at 99.83% associated nodes. This simply means that dealmakers in Silicon Valley are virtually all connected in a common network, with very few exceptions. This suggests that there is a great deal of interconnectivity and cohesiveness among dealmakers than in the aggregate network. Boston follows a similar pattern with 98.09% associated, as does Seattle, San Diego and Austin – all above 90%.

Perhaps counter-intuitively, the regions with lower comparative cohesiveness in the aggregate networks, namely Minneapolis and Portland, show very high cohesiveness among the dealmaker network. The way perhaps to resolve this paradox is to consider the density of these networks. While these aggregate networks are not cohesive, they are also comparatively small with less dense networks given their population size. Some communities have small aggregate networks, but they appear to overcome this by establishing highly interconnected albeit small dealmaker networks. This intuitively makes sense, as these two communities have anecdotal reputations of being very close-knit and focused.

Two regions stand out for having small primary networks: Phoenix with 9.6% of nodes associated and Orange County with 10.2% associated. As might now be expected, the two regions with the highest percentage of associated nodes also have the largest shares of dealmakers within their total entrepreneurial networks. Conversely, regions with the lowest percentage of associated nodes also have the smallest shares of dealmakers. The large metropolitan areas of Minneapolis, Denver and Orange County have less densely associated networks than the Research Triangle Park (RTP) and Austin regions, which are comparatively smaller. Three regions – Portland, Salt Lake City and Orange County – appear to be in the bottom quartile of the sample in terms of network density and in the degree of interconnectedness and cohesiveness among actors in the entrepreneurial network's primary network.

The regional variation in network density is especially dramatic when viewed through the networks of dealmakers. Most notably, the reference regions of Silicon Valley and Boston display significantly denser, more cohesive and interconnected associated networks than regions with fewer start-ups. The density and interconnectedness of a network do not seem to vary with population either. For example, Phoenix is the third largest metropolitan region in the sample, but its network is the least dense and interconnected in the sample.

Silicon Valley and Boston's dealmaker networks exhibit both high density and extraordinarily high cohesiveness in comparison with their aggregate networks, both exhibiting a large cohesive central network. Seattle and San Diego share characteristics and networking patterns similar (though on a comparatively lesser scale) to Boston, suggesting that these developing regions may be best situated to build a leadership position similar to that of Silicon Valley, given their social capital composition. However, comparatively speaking, Seattle and San Diego's combined dealmaker populations are less than one-quarter the size of Boston's and less than 10% of the size of Silicon Valley's. Indeed, in many of the regions in the sample – most notably Phoenix, Orange County and Portland – one could

Table 7. Component analysis of the dealmaker network, twelve sample regions

	Boston/Route 128	Silicon Valley	Phoenix	Seattle	Minneapolis/ St. Paul	Denver/ Boulder	Orange County	San Diego	Portland	Salt Lake City	Raleigh/Durham (RTP)	Austin
Total nodes (*n*)	2466	6897	126	613	325	307	248	722	98	146	149	333
Nodes in the primary network (*n*)	2419	6885	47	582	312	271	135	650	89	95	111	303
Associated nodes (%)	98.09	99.83	37.30	94.94	96.00	88.27	54.44	90.03	90.82	65.07	74.50	90.99
Secondary component size (*n*)	7	4	12	7	5	6	16	11	5	20	12	5
Tertiary component size (*n*)	4	4	10	6	4	5	13	5	4	10	10	4

convene a sample of combined dealmakers around a conference table.

In advanced entrepreneurial regions such as Silicon Valley and Boston, as well as in San Diego and Seattle, dealmakers appear connected to one another through common firm–actor ties in one primary interconnected network. But in less developed economies, the dealmaker networks are not commonly connected and are often split into many firm–actor sub-networks. Less successful entrepreneurial networks appear to exhibit less cohesiveness and greater fragmentation among their dealmakers. This substantial variation in the dealmaker social capital networks (a great deal more pronounced than in the aggregate networks) and in their degree of interconnectivity and cohesiveness follows the correlation with firm births presented above.

REFLECTIVE CONCLUSIONS

The results presented here suggest that the prevalence of dealmakers is a better indicator of entrepreneurial success than the aggregate number of entrepreneurs and/or investors and offers a refinement to existing theories of regional social capital networks. The frequency data on aggregate entrepreneurial and investor social capital – both as levels and normalized – suggest that strong entrepreneurial and investor networks are associated with successful entrepreneurial economies. However, the proposition that successful entrepreneurial economies, as measured by high rates of firm births, are associated with structured social capital and dealmakers suggests that a new structural dimension be added to update existing theory. The results suggest that the anatomy of social networks matters significantly in determining the vibrancy of local entrepreneurial economies.

There is considerable variation across regions in the number and share of each social capital type. While the ratios do not vary enough to make strong claims, patterns exhibited in all sample regions suggest that successful entrepreneurial regions have more entrepreneurs than investors and more of both than less successful regions. This finding suggests that theories emphasizing the presence of both entrepreneurial and investor social capital are valid in explaining successful entrepreneurial economies. This analysis supports the body of theory that associates successful regional entrepreneurial outcomes with aggregate networks of entrepreneurs and investors. For example, Silicon Valley's social network appears to be about five times denser than San Diego's and two times denser than Boston's, based on the total number of ties among entrepreneurs, investors and firms. Indeed, larger aggregate networks may also serve to promote more dealmakers. However, in comparing aggregate and dealmaker networks, the variation is greater among the latter, suggesting that agglomeration may not be the only factor explaining the presence

of dealmakers. Indeed, the third largest region in terms of population – Phoenix – exhibits the weakest dealmaker network. If agglomeration economies were the determining factor, one would expect to see a proportional representation of dealmakers in this large region. Agglomeration economies may actually serve as a stronger determinant of aggregate networks than dealmaker networks.

However, the findings of dealmaker capital suggest that structured social capital should be incorporated into current views of social capital. For example, the dramatic difference in the prevalence of dealmakers between the two reference regions – Boston and Silicon Valley – and the other subject regions indicates a substantial structural difference between the social capital networks of advanced successful entrepreneurial economies and networks in less developed regional entrepreneurial economies. The frequency and normalized data on dealmakers clearly demonstrate that all four social capital categories are associated with successful entrepreneurial economies.

The correlation analysis reinforces this comparative empirical analysis, showing a higher association between dealmakers and firms births than with aggregate entrepreneur and investor networks. This correlation improves when comparing dealmakers with three ties and average firm births, and it improves even more when comparing classes of social capital among dealmakers with four or more ties. This suggests that firm births may be more associated with a prevalence of dealmakers and especially *better-connected* dealmakers than with the aggregate network of entrepreneurs and investors. This lends support to the proposition that dealmakers may play a role in the success of entrepreneurial network, and may therefore serve as a better indicator of successful entrepreneurial economies than the aggregate social capital indicators prevalent in the literature.

Indeed, some of the least successful and anaemic entrepreneurial economies in this study have so few dealmakers that they could gather in a single room. The dealmakers in Silicon Valley and, to a lesser extent, in Boston would fill a sports arena. The findings in this study validate the base of existing theory while also suggesting a refinement. The dealmakers among a region's social capital network may, in fact, serve as a promising indicator for evaluating the innovative capacity of entrepreneurial economies than the aggregate measures of either entrepreneurs or investors. The local presence of dealmakers is more important for successful entrepreneurship in regions than just the size of the local network and the number of entrepreneurs and investors in a region.

The task of the social network component analysis is to test the proposition that successful entrepreneurial economies are associated with dense, cohesive, and interconnected concentrations of entrepreneurs and investors. Consistent with the social capital analysis,

the regions with the greatest success in producing firm births also possess the densest and most cohesive and interconnected networks. But density and cohesiveness do not vary together in all cases. The cohesiveness of a dealmaker network appears to be a strong indicator of the success of an entrepreneurial economy when combined with a dense network. But the findings also suggest that limited density of social capital can perhaps be overcome with improved cohesiveness among dealmaker social capital. Thus, the social network component analysis supports the assertion that regions whose investors and entrepreneurs are more densely interconnected are more successful in generating firm births, but those with cohesive dealmaker networks are perhaps even more successful.

The component analysis further suggests that the degree to which a region benefits from a common, dense and cohesive entrepreneurial network is related to the number of dealmakers found in the region. The differences in prevalence and interconnections in the sample regions among actors in the aggregate entrepreneurial network and in the dealmaker networks are substantial. The dealmaker analysis is even more strongly correlated, given the degree of difference exhibited between regions. When considering the dealmaker networks, the progression from an RTP to a San Diego to a Boston to a Silicon Valley is likely more of an exponential progression than a linear one, such as that exhibited in the aggregate data. Moreover, large metropolitan areas such as Phoenix, where dealmakers are scarce, will likely have a more limited core of assets and social capital on which to build. The distributions of dealmakers in the sample economies suggest that San Diego and Seattle are developing strong entrepreneurial economies. Boston, which is considered a leading entrepreneurial economy, substantially lags Silicon Valley, which has established both the densest and most cohesive network of dealmakers among the sample regions. While the dealmaker concept borrows heavily from existing theory on serial entrepreneurship (with individuals with deep experience), mediation and brokerage, this notion of the dealmaker and the cohesive milieu the dealmakers established collectively in a regional economy transcends current concepts of seriality and cohesiveness currently articulated in the literature. This concept combines them into a new, researchable phenomenon.

While it is not possible to uncover the causal mechanisms that explain specifically how dealmakers influence firm births, these findings support the proposition that dealmakers are important to the functioning of successful entrepreneurial economies. Dealmakers possess extensive experience in building, advising and operating entrepreneurial firms or in financing them. Their impact, while shown in this analysis to play an important role in supporting successful entrepreneurial regions, may also transcend the given region. The dealmaker may indeed play an important role in connecting and

brokering social capital from outside the region to the regional ecosystem, a topic to be explored in forthcoming research. While these skills are necessary to build an individual high-growth entrepreneurial venture, connections among actors in the entrepreneurial network may facilitate access to these skills among a wider range of firms. Moreover, because a dealmaker's span of control exceeds a single entrepreneurial firm, his or her connections may facilitate diffusion of the information, experience and expertise that are required to develop high-growth entrepreneurial ventures.

Future research should employ and probe more carefully the concepts of structured social capital and the role of dealmakers to explain regional entrepreneurial ecosystems. Future research on the boundary-spanning characteristics of dealmakers, their personal characteristics, affiliations, and specific functions in brokering and mediating entrepreneurial social capital would serve to illuminate further their importance as a catalyst for regional economic transformation. Moreover, careful analysis of the boundary-spanning characteristics of dealmakers would bear fruit, looking specifically at their role in connecting intra-regional and external networks. Future research should also include measures of structured social capital to balance tested aggregate measures that predominate the current literature and to analyse the role of prominence, position and power of the dealmaker as an agent of the entrepreneurial economy, probing carefully their evolution and contributions over their career span. Moreover, important insights can be gained by probing how a regional entrepreneurial ecosystem evolves through time, to show how the aggregate network expands and introduces structural characteristics that influence the form and function of the entrepreneurial ecosystem. This would require panel data to examine causal relations and to understand the development of dealmaker networks suggested by the descriptive analysis.

NOTE

1. An analysis of the regions was performed to identify whether these metropolitan areas represented a single core metropolitan area, designated as a Metropolitan Statistical Area (MSA), or a multi-core metropolitan area, designated as a Consolidated Statistical Area

(CSA). MSAs have at least one urbanized area of 50 000 or more population plus adjacent territory that has a high degree of social and economic integration within the core as measured by commuting ties. CSAs represent larger regional units that reflect broader social and economic interactions characterized by multiple metropolitan cores. Where appropriate, the CSA was the preferred geographic unit (with seven of the twelve regions classified as a CSA) given that entrepreneurial activity and firm location is generally not confined to tight geographic boundaries of a single metropolitan area, that social capital is mobile and, most importantly, that geographic development patterns vary widely among regions.

Orange County was distinctly defined in the literature as a county and was the only unit inconsistent with a Federally defined statistical area. This is defensible as Orange County is a part of a larger metropolitan area (Los Angeles), and the population of the county roughly represents the mean of the regions included in the sample. In addition, Orange Country operates as a relatively distinct economic unit. Geographic boundary definitions are derived from the Standards for Defining Metropolitan and Micropolitan Statistical Areas published by the Office of Management and Budget (OMB) in Federal Register Notice (65 FR 82228 – 82238) on 27 December 2000.

REFERENCES

Ahuja G. (2000) Collaboration networks, structural holes, and innovation: a longitudinal study, *Administrative Science Quarterly* **45(3)**, 425–455.

Angelusz R. and Tardos R. (2006) Change and stability in social network resources: the case of Hungary under transformation, in Nan Lin K. S. C. and Burt R. S. (Eds) *Social Capital: Theory and Research*, pp. 380–420. Transaction, New Brunswick, NJ.

Armington C. and Acs Z. (2002) The determinants of regional variation in new firm formation, *Regional Studies* **36(1)**, 33–45.

Barthelt H., Malmberg A. and Maskell P. (2004) Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation, *Progress in Human Geography* **28(1)**, 31–56.

Bell M. and Giuliani E. (2007) Catching up in the global wine industry: innovation systems, cluster knowledge networks and firm-level capabilities in Italy and Chile, *International Journal of Technology and Globalization* **3(2/3)**, 197–223.

Borgatti S. P. and Foster P. C. (2003) The network paradigm in organizational research: a review and typology, *Journal of Management* **29**, 991–1014.

Boschma R. A. and Ter Wal A. L. J. (2007) Knowledge networks and innovative performance in an industrial district: the case of a footwear district in the South of Italy, *Industry and Innovation* **14(2)**, 177–199.

Breschi S. and Lissoni F. (2001) Localised knowledge spillovers vs. innovative milieux: knowledge 'tacitness' reconsidered, *Papers in Regional Science* **80**, 255–273.

Burt R. S. (2000) The network structure of social capital, *Research in Organizational Behavior* **22**, 10–57.

Cantner U. and Graf H. (2004) The network of innovators in Jena: an application of social network analysis, *Research Policy* **35(4)**, 463–480.

Cantner U., Joel K. and Schmidt T. (2009) The use of knowledge management by German innovators, *Journal of Knowledge Management* **13(4)**, 187–203.

Castells M. and Hall P. (1994) *Technopoles of the World: The Making of Twenty-first-Century Industrial Complexes*. Routledge, New York, NY.

Castilla E. J. (2003) Networks of venture capital firms in Silicon Valley, *International Journal of Technology Management* **25(1/2)**, 113.

Dubini P. and Aldrich H. (1991) Personal and extended networks are central to the entrepreneurial process, *Journal of Business Venturing* **6(5)**, 305–313.

Fich E. M. and Shivdasani A. (2006) Are busy board effective monitors?, *Journal of Finance* **61(2)**, 691–693.

Finlay W. and Coverdill J. E. (2000) Risk, opportunism and structural holes: how headhunters manage clients and earn fees, *Work and Occupations* **27**, 377–405.

Fischer M. M. (2006) *Innovation, Networks, and Knowledge Spillovers*. Springer, New York, NY.

Franke U. J. (1999) The virtual web as a new entrepreneurial approach to network organizations, *Entrepreneurship and Regional Development* **11**, 203–229.

Glaeser E. L., Laibson D. and Sacerdote B. (2002) An economic approach to social capital, *Economic Journal* **112(483)**, F437–F458.

Gregorio D. D. and Shane S. (2003) Why do some universities generate more start-ups than others?, *Research Policy* **32(2)**, 209–227.

Gulati R. and Westphal J. D. (1999) Cooperative or controlling? The effects of CEO–board relations and the content of interlocks on the formation of joint ventures, *Administrative Science Quarterly* **44(3)**, 473–506.

Hassink R. (1996) Regional innovation policies compared, *Urban Studies* **30**, 1009–1024.

Huisman C. and van Wissen L. (2004) Localization effects of firm start-ups and closures in the Netherlands, *Annals of Regional Science* **38(2)**, 291–310.

Kalish Y. and Robins G. (2006) Psychological predispositions and network structure: the relationship between individual predispositions, structural holes and network closure, *Social Networks* **28(1)**, 56–84.

Kenney M. and Burg U. V. (1999) Technology, entrepreneurship and path dependence: industrial clustering in Silicon Valley and Route 128, *Industrial and Corporate Change* **8(1)**, 67–104.

Kenney M. and Patton D. (2005) Entrepreneurial geographies: support networks in three high-technology industries, *Economic Geography* **81(2)**, 201–228.

KOGUT B. and SHAN W. (1997) Social capital, structural holes and the formation of an industry network, *Organization Science* **8**, 109–125.

LERNER J. (2009) *Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed – And What to Do About It.* Princeton University Press, Princeton, NJ.

MORRISON A. (2008) Gatekeepers of knowledge within industrial districts: who they are, how they interact, *Regional Studies* **42(6)**, 817–835.

MYINT Y. M., VYAKARNAM S. and NEW M. J. (2005) The effect of social capital in new venture creation: the Cambridge high technology cluster, *Strategic Change* **14**, 169–171.

POLLOCK T. G., PORAC J. F. and WADE J. B. (2004) Constructing deal networks: brokers as network 'architects' in the U.S. IPO market and other examples, *Academy of Management Review* **29**, 50–72.

PREER R. W. (1992) *The Emergence of Technopolis: Knowledge-Intensive Technologies and Regional Development.* Praeger, New York, NY.

REYNOLDS P. (2007) *New Firm Creation in the U.S. A PSED I Overview.* Now, Hanover, NH.

REYNOLDS P., STOREY D. and WESTHEAD P. (1994) Cross-national comparisons for the variation in new firm formation rates, *Regional Studies* **28**, 443–458.

ROGERS E. M. and LARSEN J. K. (1984) *Silicon Valley Fever: Growth of High-Technology Culture.* Basic Books, New York, NY.

SCOTT A. J. (1993) *Technopolis: High-Technology Industry and Regional Development in Southern California.* University of California Press, Los Angeles, CA.

SENOR D. and SINGER S. (2009) *Start-up Nation, the Story of Israel's Economic Miracle.* Hachette, New York, NY.

SHANE S. and CABLE D. (2002) Network ties, reputation, and the financing of new ventures, *Management Science* **48(3)**, 364–366.

SIMMIE J. (1994) *Technopole Planning in Britain, France, Japan and the USA. Planning Practice and Research.* Routledge, New York, NY.

SMILOR R.W., KOZMETSKY G. and GIBON D. (Eds) (1988) *Creating the Technopolis: Linking Technology Commercialization and Economic Development.* Ballinger, Cambridge.

SORENSON O. and STUART T. E. (2008) Bringing the context back in: settings and the search for syndicate partners in venture capital investment networks, *Administrative Science Quarterly* **53**, 266–294.

STUART T. E. and SORENSON O. (2005) Social networks and entrepreneurship, in CASSON M. (Ed.) *The Oxford Handbook of Entrepreneurship*, pp. 211–228. Oxford University Press, Oxford.

TUSHMAN M. L. and KATZ R. (1980) External communication and project performance: an investigation into the role of gatekeepers, *Academy of Management Proceedings* 261–265.

WANG S, WU Y. and LI Y. (1998) Development of technopoles in China, *Asia Pacific Viewpoint* **39(3)**, 281–301.

WILLIAMSON I. O. and CABLE D. M. (2003) Organizational hiring patterns, interfirm network ties, and interorganizational imitation, *Academy of Management Journal* **46(3)**, 349–358.

WINCH G. M. and COURTNEY R. (2007) The organization of innovation brokers: an international review, *Technology Analysis and Strategic Management* **19**, 747–763.

WOLFE D. A. (2002) Social capital and cluster development in learning regions, in HOLBROOK J. A. and WOLFE D. A. (Eds) *Knowledge, Clusters and Regional Innovation: Economic Development in Canada*, pp. 11–38. McGill-Queen's University Press, Montreal/Kingston, ON.

ZAHEER A. and BELL G. (2005) Benefitting from network position: firm capabilities, structural holes, and performance, *Strategic Management Journal* **26(9)**, 809–825.

ZOLLER T. D. (2010) The dealmaker milieu: the anatomy of social capital in entrepreneurial economies. PhD dissertation, University of North Carolina at Chapel Hill.