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10. Social Networks and Entrepreneurship

INTRODUCTION

A central tenet in sociology holds that positions in social structure influence the attitudes, behaviors, and outcomes of the actors occupying those positions. Though this proposition underlies much sociological thinking, perhaps the clearest instantiation of it appears in the literature collectively referred to as 'social network theory'. Research in this area investigates both the structure of the relations between social actors and how patterns in those relations influence a variety of outcomes. To the extent that network theory has a central idea, it is that locations in social structures determine the opportunities available to, as well as the constraints binding, actors. In other words, actors' positions in webs of relationships determine the level of social and economic benefit they attain.

This chapter reviews some of the mechanisms through which social networks might influence the entrepreneurial process and some of the implications of these processes. Our review of this literature divides the challenges facing the entrepreneur into two basic tasks: the identification of a promising opportunity and the mobilization of resources to exploit it. Social networks influence both of these stages of the entrepreneurial process: they shape information flows and trace the ties through which financial capital flows. If one thinks of ideas, knowledge, and capital as the central ingredients entrepreneurs must assemble in new venture creation, social relations provide the connections required to unite these ingredients to form new organizations.

Though many consider a broader set of activities to fall under the rubric of entrepreneurship, we focus on the act of founding a firm. We do so because delineating the boundaries of entrepreneurship within existing firms strikes us as fraught with difficulty. Moreover, while the most common form of entrepreneurship involves a transition to self-employment, our own research for the most part has considered the formation of technology- and capital-intensive firms. As we lay out the arguments in this chapter, we have in mind the formation of firms with these characteristics. Despite this focus,

in principle the application of social network theory to a broader definition of entrepreneurial activity would draw on roughly the same set of ideas. After all, entrepreneurship within firms (often referred to as "intrapreneurship") involves analogues to the same two critical steps in forming new companies: identifying valuable opportunities and then mobilizing the requisite resources to realize them.

OPPORTUNITY IDENTIFICATION

An early step along a prospective entrepreneur's path to beginning a new business is the identification of an opportunity to pursue. In essence, the would-be entrepreneur must recognize that society currently deploys resources in a sub-optimal manner, so that a benefit exists to mobilizing and then reconfiguring them for use in a different capacity. In many instances, opportunity recognition results from an entrepreneur's creative insight into a new way to fulfill an unmet need. But even in well-established and highly visible industries, much of the information that serves as a necessary input to the creative process is available only to those with extensive industry experience. In part for this reason, considerable evidence reveals that nascent entrepreneurs most likely develop new ventures in domains in which they have broad work experience (for an early statement of this argument, see Brittain & Freeman, 1986).

In a second and less common set of cases, entrepreneurship can involve the discovery of an entirely new means of creating value. One can view the creators of companies of this sort as bringing together previously disparate ideas or pieces of knowledge in such a manner as to exploit complementarities between them (Schumpeter, 1934). Sometimes this involves the creation of an entirely new class of product – for example, the computer workstation brought together a set of existing computer components to create a fundamentally new type of machine. But entrepreneurs can also innovate in terms of processes or business models. Netflix, for instance, has challenged traditional video retailers (e.g., Blockbluster) by recognizing that the DVD, weighing only an ounce and hence inexpensively transportable by post, changes the economics of distribution. The same could be said for internet-based stock brokerages, book retailers, and other types of web businesses that substitute for traditional means of distribution. Recognizing entrepreneurial opportunities of this nature requires detailed information about the potentially complementary domains: nascent entrepreneurs must become aware of these disparate bases of knowledge and connect them before too many others seize the available opportunity.

One reason why social networks shape the entrepreneurial process so importantly is that they provide the conduits through which private information flows. To the extent that individuals occupy heterogeneous positions in networks, they vary in their access to this information. And to the degree that the recognition of entrepreneurial opportunities hinges on access to private information, differences in network positions can thus explain much of the inter-individual variance in access to the knowledge required to discern attractive opportunities for new ventures.

A substantial literature on diffusion and social influence attests to the importance of social networks as pathways for the transmission of private information. One stream of the literature in this area examines the diffusion of innovations. Classic studies include Ryan and Gross's (1946) pioneering investigation of the spread of the usage of hybrid corn and Colman, Katz and Mendel's (1957) examination of the adoption of a new drug. These path-breaking inquiries revealed that the pattern of social connections among individuals strongly predicts the sequence of adoption of an innovation in a focal population (Rogers, 1995, reviews this research stream in detail). In general, this body of work establishes that private communications occurring across the links in a social network provide much of the information that actors use to make sense of new products and processes.

Sociological investigations have evolved beyond the simple observation that networks matter—the preponderance of the work in the area now considers the specific social structures most beneficial to or efficient at providing the resources necessary to perform the task(s) being considered. Studies to date have for the most part examined *egocentric* networks, which consist of the set of relations that surround a chosen set of individuals or firms. One stream of this literature emanates from Granovetter's (1973) classic study, which asserted that *weak ties*–think of an acquaintance, rather than a friend–prove most important for accessing information leading to job (and other) opportunities. The typical individual maintains close ties to only a small number of friends and family. By contrast, some people maintain weak relations with dozens or even hundreds of others. As a matter of sheer quantity, these weak relations may lead to knowledge about more opportunities than do our close friends and family. Moreover, relative to close connections, weak ties more frequently serve as bridges across otherwise disconnected social groups. Granovetter argued that the importance of bridging ties lies in the fact that they expose actors to new information and opportunities—information they would not have encountered in the absence of a relationship with a socially distant actor. In subsequent work, Burt (1992) has extended the notion of bridging ties into a general statement of the advantages available from ties, regardless of strength, that span "structural

holes" (the lacunae between groups of disconnected actors). If access to non-redundant information is the objective, Burt observed that the strength of a tie matters less than the magnitude of the social distance that it spans.

Most of the studies that seek to relate systematically egocentric network structure to entrepreneurial activity examine aggregate data that do not allow the researcher to distinguish whether certain structures affect opportunity identification or resource mobilization. With this important caveat, the most prevalent argument in network-based entrepreneurship studies directly parrots the broader work on the importance of weak or bridging ties: nascent entrepreneurs with structurally diverse networks more likely encounter promising opportunities, and hence more likely engage in entrepreneurship. For instance, studying female graduates from a prestigious MBA program, Burt and Raider (2002) found higher rates of transitioning to self-employment among those with structurally diverse networks. Similarly, Rezulli, Aldrich, and Moody (2000) demonstrated that would-be entrepreneurs with networks that spanned "multiple domains of social life" founded new firms with greater frequency. And in a detailed case study, which *can* disentangle the opportunity recognition from resource mobilization, Elfring and Hulsink (2003) find evidence that weak ties do facilitate opportunity identification.

RESOURCE MOBILIZATION

Following the identification of an attractive opportunity, nascent entrepreneurs must assemble a variety of resources to begin operations. In emerging industries, those hoping to found firms generally require financial capital and skilled labor. As industries develop, selection processes, capital investments, improvements in human capital specific to the business and the accretion of tacit knowledge increase the average production efficiency of firms in the industry. For new entrants to compete in mature markets, founders likely require access to each of these inputs.

Sociologists refer to the process of gaining access to the inputs required to start a viable business as resource mobilization. Because uncertainty regarding the likelihood of profitable exchange typically makes resource holders reluctant to part with them, the poor life chances of most new organizations stand as a primary obstacle to resource mobilization. Social scientists have offered numerous explanations for the high failure rate of new firms: New organizations often lack the commitment of their employees, knowledge of their environments, and working relationships with customers and suppliers necessary to operate successfully (Stinchcombe, 1965).

Similarly, unseasoned enterprises possess little production experience, and so operate under the guidance of immature and unrefined routines (Hannan & Freeman, 1984). Moreover, new organizations start small. In part because they lack the resources to withstand a sustained period of poor performance, small organizations suffer from a high rate of disbandment (Levinthal, 1991). These perils have led organizational sociologists to argue that young (small) organizations are highly vulnerable to environmental selection, a notion succinctly portrayed as a liability of newness (smallness). All of the factors that conspire to reduce the life chances of new firms also impede resource mobilization.

As with opportunity identification, social networks play an important role in facilitating resource mobilization. The backdrop of low survival prospects among new firms makes the role of networks all the more important. The literature has elaborated a few critical tasks that nascent entrepreneurs appear to accomplish with greater success when they have rich social networks: (1) attracting financial capital, (2) recruiting skilled labor, and (3) accessing tacit knowledge. The mechanisms thought to account for the role of social networks in resource acquisition prove to vary somewhat by the type of resource, so we consider each of these in turn. In the following sections, we argue that when entrepreneurs have rich social networks, they enjoy considerably greater success in overcoming some of the obstacles to resource mobilization.

Access to Financial Capital

Since fledgling firms in many fields must either make upfront capital investments and/or incur variable costs for some period before achieving sales, most entrepreneurs must attract financing before starting a firm. Though the exact degree to which capital constraints limit entrepreneurship remains unknown, telling evidence comes from studies of the sensitivity of rates of entrepreneurship to unexpected gains in personal wealth. For example, Evans and Javonovic (1989), analyzing the National Longitudinal Survey, found that gains in personal wealth through inheritance accelerated the transition to self-employment. In fact, they concluded that financial constraints restrict entrepreneurship more than any other single factor. These findings pertain to the transition to self-employment across all types of firms; as one considers capital-intensive businesses such as technology-based companies, capital constraints can loom very large.

Financing for companies originates from many places, but four sources account for the majority of startup capital: (1) personal wealth, (2)

loans and investments from friends and family, (3) bank loans, and (4) venture capital. Two primary factors account for why founders' social networks affect their ability to raise capital. First, much as entrepreneurs recognize opportunities by aggregating information available in their networks, investors identify promising investment candidates in part by searching across their networks. Better-connected founders therefore more likely reach the attention of investors looking for options. Second, investors often prefer to finance companies in which they enjoy a cohesive relation with company principals because, for reasons discussed below, such social structures may safeguard investor interests.

Though an entrepreneur seeking capital can make potential investors aware of the opportunity to invest in his firm, investors tend only to commit funding when they feel confident in their understanding of hard-to-assess qualities of potential opportunities. As researchers in the areas of finance, economic sociology, transaction costs economics, and entrepreneurship have observed, a set of uncertainties and information asymmetries encumber the evaluation of new ventures and complicate the process of contracting between resource holders and fledgling firms. One problem is that entrepreneurs may provide unreliable information. In addition to the fact that entrepreneurs often hold overconfident assessments of the prospects of their endeavors, they also may have an incentive to convey misleading information to potential investors in an attempt to secure funds. Indeed, Amit, Glosten, and Muller (1990) argue that investors in early-stage companies face a variant of the classic 'lemons' problem. At a minimum, an 'information asymmetry' between entrepreneur and investor exists because entrepreneurs have better knowledge of their own capabilities and intentions than do investors. This increases the risk borne by investors in new companies because entrepreneurs may exploit their superior knowledge of their company to gain concessions from investors, for example, by extracting a higher valuation or larger resource commitment than a fully (or more) informed investor would provide. And in many cases, no amount of search of public sources would help the would-be investor to redress the information asymmetry.

When investors and entrepreneurs share overlapping social networks, however, the investor can acquire otherwise difficult-to-discover information about an entrepreneur, including assessments of the entrepreneur's reliability and integrity. Moreover, when an investor's trusted contacts offer assessments of an entrepreneur, these evaluations lack the perception of bias that discredits information provided directly by the entrepreneur. In the venture capital industry at least, one sees strong evidence of these effects. Venture capitalists appear to prefer to invest in fledgling firms that they learn of through referrals by close contacts, including entrepreneurs they have previously sponsored,

fellow venture capitalists, family members, or other professional contacts (Fried & Hisrich, 1994; Shane & Stuart, 2002; Hsu, 2004). These close contacts have an incentive to provide accurate and complete information about entrepreneurs, as well as to bring high quality ventures to the attention of the venture capitalist, because they enjoy an ongoing exchange relation with the VC from which they derive some benefit. Conveyance of inaccurate information or referrals of unreliable individuals will ultimately undermine the credibility of the referrer, and thus the continuance of the relationship (Coleman, 1990).

In addition to exploiting their networks to obtain information about entrepreneurs, investors can also sometimes use them to minimize post-investment problems. Noting that entrepreneurs might shirk or misallocate resources provided by investors, a large body of work in corporate finance discusses the optimal design of contracts between investors and entrepreneurial ventures (for a review, see Kaplan & Strömberg, 2003). Particularly among savvy investors, one sees extensive use of contractual terms aimed at curtailing opportunistic behavior – for instance, early investors typically stage their investments to limit their risk (Amit et al., 1990; Gompers, 1995), retain rights to replace management (Hellman, 1998), and purchase convertible securities that yield control to investors in the event that the company fails to meet pre-specified performance milestones. Despite the prevalent use of formal controls, contracts between investors and entrepreneurs nevertheless remain 'incomplete,' meaning that the contracts do not protect against all possible types of opportunistic behavior that entrepreneurs might undertake.

In the presence of these incomplete contracts, cohesive social ties connecting potential investors and entrepreneurs may increase the chance of an investment by offering an additional defense of investor interests. First, a tighter relation between the investor and the firm increases the ease with which the investor can evaluate the entrepreneur's activities. Knowing more about the business and being in contact with it on a regular basis allows a skilled investor to catch potential problems early. Second, beyond their own observations of the company, cohesive relations also allow the investor to call on others to assist in monitoring the firm. Through mutual contacts investors may learn of problems before they notice them firsthand. In this sense, monitoring need not involve simply the prevention of self-interested action on the part of the entrepreneur; it can also serve to alert investors to when they should assist the entrepreneur to protect their own investments. Coleman (1990) discusses this issue in the context of parents monitoring the activities of their children; if parents also know the parents of their children's friends, they may become aware of a need for their intervention sooner. Third, in

cases where enforcement becomes necessary, cohesive relations augment the ability of the investor to sanction the entrepreneur: Investors can ask mutual contacts to assist them in influencing the entrepreneur (or punishing him should he resist influence).

Recruiting Skilled Labor

New ventures in many areas must recruit highly skilled employees that often belong to established organizations. For example, upstart biotechnology firms frequently compete with universities and established biotechnology and pharmaceutical firms to attract Ph.D.-level scientists and executives with experience in the biopharmaceuticals industry. At least three drawbacks of employment at young companies, however, interfere with early-stage companies' efforts to recruit scarce labor. First, as previously noted, all new enterprises face uncertain life chances. Hence, one might expect potential employees to regard an employment prospect at a new and unknown venture with suspicion when compared to the job they currently hold. Exacerbating this problem, prospective employees face the very same information asymmetry problems that investors do when considering an offer to join a nascent venture. And once again, a potential employee cannot simply accept all of the claims of the entrepreneur, since company principals have a clear incentive to provide incomplete or misleading information to convince a prospective hire to sign on.

Given the uncertain survival prospects of new ventures, entrepreneurs must be very persuasive to succeed in recruiting highly skilled individuals who hold secure positions in well-established organizations. Through a variety of mechanisms, the more extensive the social networks of a young firm's founders, the more success the firm likely enjoys in recruiting highly qualified individuals. For instance, one consequence of an entrepreneur having direct relationships with many of the friends and colleagues of a potential recruit is that the entrepreneur has a disincentive to overstate the prospects of his firm. Relaying inaccurate information to a potential recruit who belongs to the entrepreneur's network risks jeopardizing the entrepreneur's credibility and integrity with friends and/or professional contacts. In addition, though the very nature of a new firm precludes the track record that informs quality assessments, individuals typically do have established reputations among their direct and indirect contacts. And insofar as the entrepreneur's personal and professional contacts respect him highly, individuals socially proximate to the entrepreneur are likely more sanguine

about the future of the new company because of their high regard for the founder.

These network-based arguments apply as well to the investors that finance young firms. As Sorenson and Stuart (2001, p.1554) note, "an oft repeated industry adage [is]: It isn't getting the money, it's who the money comes from." Having the backing of prominent investors benefits new ventures well beyond just the money they bring to the table. As stakeholders in a young firm, investors have a strong interest in the success of the venture. In addition to providing entrepreneurs with advice on operating issues and participating in the governance of the firm, investors typically loan their reputations and their contact networks to the companies they support (Bygrave & Timmons, 1992). Since a large number of investors have themselves been successful entrepreneurs and because many participate regularly in the financing of young companies, investors often have extensive ties in the professional communities from which firms recruit senior technical staff and executives. Beyond their immediate contact networks, the very act of making the investment serves as an endorsement of a young company, thus improving the resource holders' perceived prospects of a young company (Stuart, Hoang & Hybels, 1999). For these reasons, one might expect young companies with prominent investors to recruit more successfully.

In concluding this section, we should note that an abundance of theory and a surfeit of anecdotes exist regarding the influence of networks on recruiting at early-stage companies. The storied venture capital firm Kliener Perkins serves as a frequent example in the popular press: Kliener considers the companies in which it invests members of a "Kieretsu", and it has a reputation for rehiring entrepreneurs from companies it has sponsored in the past to work for recently funded ventures (Kaplan, 1996; Warner, 1998). The prevalent examples and widely held assumption in the academic literature, however, belie an almost complete absence of systematic research on the relative importance of and the mechanisms by which networks shape senior management recruiting at new firms. Additional empirical work in this area is obviously needed.

Access to Tacit Knowledge

Existing social relations also influence resource mobilization through the connections to tacit information they provide. By definition, tacit knowledge eludes codification. Despite (or perhaps as a result of) this, the sustained profitability of firms in a variety of industries depends on access to this valuable knowledge (Rivkin, 2001). Fledging enterprises that can

mobilize this tacit knowledge therefore enjoy a substantial advantage over rivals that cannot (Liles, 1974; Klepper & Sleeper, 2000).

Nascent entrepreneurs can generally only access this valuable knowledge through their existing relations. Though some types of businesses have attempted to package and sell such valuable information – franchising, for example, would fit in this category – tacit information resists efficient market-based exchange. Potential buyers likely question the value of the information, and sellers cannot easily address their concerns without revealing the valuable information. Cohesive social relations – those where two individuals not only know each other but also share a large number of friends – can overcome this market failure by engendering the trust necessary for exchange to take place (Coleman, 1990). Absent the incentives on the part of the knowledge holder to release the information, the transfer of tacit information also typically requires a strong social relation between the holder and the recipient of the knowledge. Ethnographic accounts of science and industrial R&D, for example, frequently note that individuals acquire research capabilities through hands-on experience and apprenticeships with skilled researchers (Latour, 1989). Complex, tacit knowledge resists transfer in the absence of this high bandwidth face-to-face contact because knowledge transmission nearly always occurs with minor errors and gaps. Strong ties to the knowledge source both reduce the magnitude of these transmission errors and allow recipients to confer with the knowledge source in correcting them (Sorenson, Rivkin & Fleming, 2004).

In many cases, nascent entrepreneurs in mature industries may find it difficult to access this knowledge without working for one of the existing firms in the business (Sorenson & Audia, 2000). Through the course of their operations, organizations in many industries build valuable knowledge through learning-by-doing. Though some of this knowledge appears in operational manuals and becomes incorporated in machinery, much of it remains tacitly incorporated in the unwritten routines that workers follow. Though companies might allow outsiders to tour their facilities, absorbing these routines typically requires more intensive observation. Hence, individuals that do not work for one (or more) of the incumbent firms in an industry have little opportunity to acquire this valuable knowledge.

IMPLICATIONS

The arguments we have made to this point have a number of implications for patterns we can expect to observe in analyses of entrepreneurial activity. We develop two ramifications below, one concerning

the career trajectories of high potential entrepreneurs and a second addressing the geography of entrepreneurial activity. Though many have documented the phenomena we discuss below, only recently have researchers sought to link explicitly their occurrence to the influence of network structures on entrepreneurial activity.

Spin Offs

There are a number of reasons to expect that high-level employees at established companies comprise the set of individuals best equipped to launch new ventures in the field of their current employer: they possess the organizing know-how, necessary technical expertise, and – most relevant to the assertions of this chapter – the contact networks necessary to recognize opportunities and mobilize the financial and human resources to create new firms (Freeman, 1983; Romanelli, 1989; Aldrich, 1999; Sorenson & Audia, 2000; Burton, Sørensen & Beckman, 2002; Stuart & Sorenson 2003b). In the course of performing their work roles, senior-level employees at established firms typically build extensive networks relevant to their domains of work. Such individuals naturally build connections inside their workplaces, and they participate in conferences, professional associations, and business transactions that lead to a broadening of their networks within their professional community.

Because of the extensive networks they develop, executives and senior technical staff at existing organizations encompass high potential entrepreneurs, particularly in businesses that entail technically sophisticated products and production processes (Brittain & Freeman, 1986). We can expect that individuals with extensive work histories in an industry have built a commensurately rich set of professional contacts, which facilitate entrepreneurial activity in that industry (Sorenson & Audia, 2000; Stuart & Sorenson, 2003a, 2003b). As a result, we anticipate that established organizations within an industry form the primary source of entrepreneurs that create new firms in that industry. Put differently, one implication of the arguments in this chapter is that spinoffs (founders departing from ongoing firms) will constitute a significant proportion of the entrants in many businesses. Among technology-based industries, empirical evidence consistent with this now exists in automobiles (Klepper, 2002), biotechnology (Mitton, 1990; Stuart & Sorenson, 2003a), microelectronics (Brittain & Freeman, 1986), and telecommunications (Dahl, 2003).

Geography of Entrepreneurial Activity

In a related vein, we believe that one of the most significant implications of the influence of social network structure on opportunity identification and resource mobilization concerns the geography of entrepreneurial activity. Beginning with Bossard (1932), many studies have established the importance of spatial propinquity in marriage and friendship—consistently finding that the likelihood of a relationship declines rapidly with the physical distance separating two parties. Business interactions similarly show evidence of spatial influence: Kono, Palmer, Friedland and Zafonte (1998), for example, find that corporate board interlocks occur most frequently among firms with headquarters in close geographic proximity, and Baker (1984) shows that options traders exchange with those located near to them on a trading floor. Studying the relationships between venture capitalists (VC firms) and the target companies in which they invest, Sorenson and Stuart (2001) demonstrate that VC firms rarely invest in companies located far from them, and only do deviate from this behavior when they can invest together with a trusted partner that does reside near the target.

Because entrepreneurs utilize the contacts in their social networks to found firms, because individuals' contact networks concentrate in the region in which they work and live, and because established firms produce many of the resources consumed in new venture creation (tacit knowledge and skilled labor), new firms in an industry tend to arise in the same locations as existing ones. The concentration of a prospective entrepreneur's network contacts in space, together with the multifaceted influence of networks on the entrepreneurial process, implies that those individuals most able to enter an industry reside in the regions that have concentrations of those businesses already. For example, those most able to recognize an opportunity and mobilize resources to start a new film business most likely live in Los Angeles and work in film or a related industry. Those most likely to found a biotech venture in the United States reside in Boston, San Diego or the San Francisco Bay Area, and so on. As a result of this process, entrepreneurial activity in a field tends to follow the current geographic distribution of industrial activity in that field. Sorenson and Audia (2000) provide strong evidence for this process in the United States shoe industry. Klepper (2002) identifies the same dynamic among U.S. automobile manufacturers. And Stuart and Sorenson (2003a) demonstrate that the same patterns appear in the biotechnology industry.

Interestingly, the geographic constraints on entrepreneurial activity may lead to overcrowding among firms of like kind. The localization of entrepreneurship within an industry happens despite the fact that a high spatial

density of firms can intensify competition, thereby lowering the average performance of the firms within a geographic cluster. Evidence of this dynamic comes from at least two industry studies: footwear and biotechnology. Sorenson and Audia (2000) find that in the U.S. footwear industries new plants continue to enter cities with concentrations of footwear plants at a higher rate than more remote regions, though these same regions exhibit far higher exit rates. Along similar lines, Stuart and Sorenson (2003a) demonstrate that regions with a large number of biotech firms experience higher biotech founding rates. These crowded regions, however, offer firms the lowest odds of going public, an important indicator of success in the biotech industry. Beyond these studies, however, research has yet to document the breadth of this phenomenon.

Though these findings challenge economic interpretations of the existence of regional industrial clusters, which typically assume that clusters must represent some efficient form of industrial organization, the book remains open on whether policy should seek to encourage a greater degree of spatial dispersion within industries. Economic theory on the value of agglomeration refers to the social returns to such a distribution, rather than its benefits to the owners of a firm. Hence, some other stakeholder might benefit from this arrangement—most notably, workers in industrial regions may benefit from higher wages thanks to a combination of productivity gains in these regions as a result of economies of agglomeration (returns to co-location with rivals) coupled with strong labor market competition.

EMERGING STREAMS

Social Influence

Another line of sociological investigation contends that social networks not only provide pathways for information and resource flows, but also act as conduits through which social influence operates (e.g., Friedkin, 1998). This stream brings an extensive literature at the interface of sociology and social psychology to bear on entrepreneurship. Since entrepreneurship necessarily involves doing something different, one might think of it as a form of deviance. In professional work settings, this interpretation appears particularly salient. For example, Stuart and Ding (2003) investigate entrepreneurial activity in a large sample of academic (i.e., university-employed) life scientists. Though the attitudes toward commercializing research produced in universities have significantly changed over time, the

decision to found or join a commercial venture once represented a clear violation of strongly held norms in academia, which prescribe that scientific findings belong in the public domain (rather than for the benefit of the individual responsible for the breakthrough). Stuart and Ding (2003) find that individual academic scientists' propensities to transition to entrepreneurial activity in the early academic life sciences depended to a large degree on the extent to which their networks and work settings included pro-entrepreneurship scientists. Though most settings lack taboos against commercial enterprise (for an exception, consider entrepreneurial activity in the early period of economies in transition), in any situation in which entrepreneurial activity either violates norms or rarely occurs, one might expect that network-based social influence processes will underlie the diffusion of new venture formation in a population.

Interaction with Institutions

Another interesting direction of recent research combines the insights of the importance of social networks with an understanding that institutions may interact in important ways with these processes.

In another recent piece, Stuart and Sorenson (2003b) investigate the importance of labor law to the entrepreneurial process. Labor law matters for at least two reasons. As noted above, entrepreneurs frequently come from the ranks of existing employees. To the extent that labor law binds them to their current employer, these laws may severely restrict entrepreneurship. In addition, restrictive labor laws bind the skilled labor that entrepreneurs require to start their firms to their current employers. Gilson (1999), in fact, argued that one type of labor law in particular plays an important role in limiting entrepreneurship: covenants not to compete. These agreements, typically signed at the time of initial employment, restrict employees from either starting or seeking employment with firms that would compete with their original employer. States vary, however, in the degree to which they will enforce these agreements. Some states, like California, will not enforce them at all, interpreting them as an illegal restraint on trade. Others, such as Massachusetts, enforce even relatively comprehensive agreements that severely limit employees' future options. Stuart and Sorenson (2003b) find strong evidence that these differences in labor law explain a substantial portion of the state-to-state variation in entrepreneurship rates. Though this study provides evidence of the potential importance of one particular type of institution, labor law, much work remains on specifying the ways in which

institutions moderate the role that social relations play in the entrepreneurial process.

Biased Information Flows

On the whole, theoretical accounts of the relationship between social networks and opportunity recognition have focused on the positive aspects of access to private information through interpersonal relations. Social networks, however, may not always provide more accurate information regarding the opportunities in a local area. One problem concerns the transmission of extreme events. For example, in the classic study, *The Search for an Abortionist*, Nancy Lee (1969) found that women managed to locate doctors to perform abortions despite both the rarity of these doctors and their inability to advertise (due to the illegal nature of their services at the time). Perhaps as a result of the unusual nature of this information, it appears to have dispersed more widely than more mundane information. For nascent entrepreneurs, this selective transmission may lead to systematic mistakes in their evaluation of the attractiveness of the market. Information on successful founding attempts may diffuse more widely than that of failures. Sørensen and Sorenson (2003), for example, discovered that nascent entrepreneurs in the television broadcasting industry in deciding whether to attempt entry appear far more sensitive to successful entries than to the failure of existing firms, despite the fact that both provide information on the attractiveness of the market. Moreover, prospective entrants also appear to misinterpret the information provided by entry, perceiving them as signs of a munificent environment rather than as increasing the intensity of competition.

The Shape of Global Social Networks

The substantial majority of prior, sociologically based research on networks and entrepreneurial activity considers how the structure of actors' egocentric networks affects opportunity recognition and resource mobilization. A growing literature – as yet unconnected in any significant way to work on entrepreneurship – examines the shape of very large social networks in entire communities of actors. Rather than evaluate the opportunities and constraints that arise from the relations that embed a focal individual in a social circle, this work addresses the overall structure of relations in a community. Clearly, a link exists between these levels of

analysis: the macro network aggregates the discrete ties that connect all individuals in a population. If our general assertion holds – that the incidence of entrepreneurial activity hinges on the structure of individuals' social networks – it is quite likely that knowledge of the overall shape of social networks could enhance our understanding of the entrepreneurial process at an aggregate level. At a macro level, cross-regional, cross-cultural, cross-ethnic, and inter-temporal variation in the incidence of opportunity recognition (and thus entrepreneurial activity) may depend on differences across these units in the structure of macro networks.

In the sociological literature, the most influential research on global network structures has been Watts' (1999) work on the "small worlds" phenomenon. Watts portrays an image of social structure in large communities in which most individuals do not share direct connections (obviously true in any sufficiently large group); the majority of relationships cluster locally (consistent with a great deal of empirical evidence); and a relatively small number of ties randomly interconnect the many disparate clusters of relations. These ties – akin to the bridges discussed in Burt's work – serve to increase dramatically the distance and speed with which information can travel in a network.

Though we do not know of any systematic attempt to link macro social structures empirically to the incidence of entrepreneurial activity, it stands to reason that many cultural, social, economic, and historical factors produce different patterns of connectivity across groups in different times, places, and regions. For example, Saxenian's (1994) widely influential qualitative analysis of the history of Silicon Valley assumes that a set of cultural and historical factors produced a density of social relations in Silicon Valley that differentiated the region from other parts of the country. Her argument thus concerns the relationship between a macro network structure and the incidence of entrepreneurial activity. Though not directly concerned with entrepreneurship, Fleming, Juda and King (2004) attempt to establish a more systematic link between global network structure and innovation. In a large-scale study of inventors' networks, they find that regions characterized by small world properties (e.g., short average distances between individuals) produce new inventions at a faster rate, The long term value of this approach, however, remains to be seen.

CONCLUSION

Network-based arguments clearly have significant potential to enhance our understanding of two critical tasks comprising the entrepreneurial

process: the discovery of new business opportunities and the mobilization of resources. Though we believe that firm theoretical grounds justify this conclusion, much of the work in the field of entrepreneurship *per se* merely invokes the *metaphor* of a network—very little of this research systematically deploys the theory and methodology that has been developed in sociology. In this regard, we see a tremendous opportunity for research on networks and entrepreneurship more directly grounded in the insights from the sociological literature. The overview in this chapter should also make it apparent that in many areas our theories remain unconfirmed. Thus, we perceive a compelling need for empirical tests of network-based explanations, as well as for the collection of data sets and implementation of research designs that support valid causal inference.

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