Howard E. Aldrich's Prize Lecture: New Directions in Research on Entrepreneurial Teams
*2000 Award Winner**

ABSTRACT

Most new ventures are founded by entrepreneurial teams, particularly those that are highly capitalized and growth oriented. Teams confer many instrumental and social-psychological benefits on new ventures and studies uniformly find that teams do better than solo founders. Potential entrepreneurs clearly have a stake in putting together an effective team, but so do the organizations, institutions, and public agencies that benefit from the consequences of entrepreneurship. Two models dominate the literature on entrepreneurial teams: a rational process model of team formation emphasizing selecting members based on pragmatic instrumental criteria, such as complementary skills or work experiences, versus a social psychological model emphasizing the interpersonal fit between team members and the need for smoothly functioning group processes. In this paper, I argue that certain kinds of social network structures are more likely than others to generate strong entrepreneurial teams formed via a rational process model, and I examine the contributions that institutions and public authorities might make to the conditions facilitating such structures.

Introduction

I have been studying the life and death of small firms for about four decades and I am still fascinated by them. When Magnus Henrekson asked me to speculate about possible new directions for entrepreneurship research, my thoughts first turned to how my own work has changed over the years and where I plan to go next. As one of a handful of sociologists who've won the FSF award, I decided that I should frame my remarks in terms of the contributions of my fellow sociologists, as well as my own work. I believe sociologists have made major contributions toward understanding the conditions under which new organizations are created. Beginning with Weber's

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analysis of ascetic Protestantism's contributions to the entrepreneurial spirit, sociologists have offered cultural and societal level interpretations of entrepreneurial phenomena. Over the past several decades, with the emergence of entrepreneurship as an academic field, sociological analyses of entrepreneurship have become multifaceted. Today, sociologists conduct multi-level investigations, ranging from the personal networks of individual entrepreneurs to an entire society's transition from socialism to capitalism.

Sociological concern for entrepreneurship can be linked with two themes in recent theory and research. First, entrepreneurs can both reproduce and challenge the existing social order. Stinchcombe (1965) argued that people construct organizations that are culturally embedded and historically specific, reflecting societal conditions at a particular historical conjuncture. Thus, in societies characterized by tendencies toward social inequality in the distribution of income, wealth, political power, and other valued resources, we might expect to see such inequality reproduced within the founding process of new economic organizations. In addition to the potentially reproductive effects of entrepreneur's efforts, linking entrepreneurship to inequality in previous generations, entrepreneurs also affect levels of stratification and inequality in a society by shaping the life chances of founders and their employees. New firms can offer employees jobs tailored to their idiosyncratic skills, rather than requiring them to fit into the pre-existing role structures that characterize large established firms.

Second, entrepreneurship ensures the reproduction of existing organizational populations and lays the foundation for the creation of new populations. Organizational ecologists have mainly focused on dynamics within existing populations, noting that most founding attempts reproduce existing organizational forms and comprise incremental rather than novel additions to the organizational landscape. By contrast, evolutionary theorists have focused on the generation of new populations, analyzing the conditions under which

new forms of organizations carve out niches for themselves. Whether a new business simply copies an existing form or strikes off into novel territory depends upon the extent to which its founding members possesses diverse outlooks and skills, as well as on the sociopolitical context in which it is created. Creating entirely new populations requires founding teams that assemble resources in novel ways. Founding teams must also be able to act strategically with other firms to overcome challenges from rival populations and legitimate their own.

These two themes – the relationship between entrepreneurship and the social order, and the role of entrepreneurs in generating novelty at many levels – frame the context within I want to briefly mention an area where wonderful opportunities exist and where I plan to concentrate my own research: the study of entrepreneurial teams. In choosing examples to illustrate my points, I draw on research conducted with my co-authors on a number of papers: Phil Anderson, Diane Burton, Nancy Carter, Amy Davis, Phillip Kim, Kyle Longest, and Martin Ruef.

Entrepreneurial Teams: Overview

Early writing on entrepreneurial founding teams was either heavily prescriptive – telling founders what they ought to do – or based on analyses of high technology and highly-capitalized firms. Those writings emphasized team construction as a pragmatic, instrumental process, with team members recruited on the basis of skills and competencies. Little mention was made of the social embeddedness of entrepreneurial teams. Now, based on research from the PSED on start-up team formation, it appears that homophily – the attraction between individuals with shared characteristics – drives the process of matching and forming these teams (Ruef, Aldrich, and Carter 2003). In particular, teams are quite homogeneous with regard to sex, race, and previous occupation. Our research calls into question the claim that entrepreneurial teams comprise collections of members with diverse and complementary skills.

My colleagues and I have also observed that teams are quite stable over time, and that when they do change, it is in the direction of greater homophily. The strong tendency toward homophily in teams suggests that fundamental social forces within naturally occurring groups may be over-riding founders' instrumental consideration of their teams' compositions. A promising line of investigation concerns the impact of homophily and stability on the tempo of the founding process. If teams form on the basis of homophily, rather than diversity, then what consequences does lack of diversity have for a new venture's survival and growth?

Surprisingly, we have almost no systematic information on the dynamics of team formation and change in startups. In contrast to the planned turnover common in large corporations' top management teams, turnover in new ventures can have immediate and potentially catastrophic consequences. In their early days, new ventures face liabilities of newness that turnover might exacerbate. Moreover, founding team members typically have few employees supporting their actions and thus must rely on their own abilities in the short-term. Thus, the early startup period provides an ideal context for studying the contribution that founders make toward firm performance.

With my colleagues, I have studied how team stability affects the speed at which a founding team achieves various operating milesto-

nes. A key milestone during the initial start-up phase is the development and institutionalization of core organizational competencies. Following one line of thought, stable teams give nascent firms an advantage because they support efficient and effective coordination among members. Strong working relationships can lead to established core routines if team members remain and a nascent firm builds the necessary combination of relevant skills and experiences. Assuming that the stable team contains members with sufficient internal skills to build a new organization, any turnover represents a loss of momentum. Another line of thought, however, argues that teams repeatedly encounter unforeseen circumstances that might require skills and competencies not possessed by current members. From this viewpoint, turnover enables teams to learn from their experiences, and stable teams thus might signify a team's inability to make strategic changes in its membership. Nascent entrepreneurial team that recruit new or drop existing team members may thus enhance their organizing chances. We hope to discover the conditions under which these scenarios are most likely in a typical startup.

Entrepreneurial teams found most new ventures, particularly those that are highly capitalized and growth oriented. Teams confer many instrumental and social-psychological benefits on new ventures and studies uniformly find that teams do better than solo founders, regardless of the measured outcomes. Potential entrepreneurs clearly have a stake in putting together an effective team, but so do the organizations, institutions, and public agencies that benefit from the consequences of entrepreneurship. In this paper, I argue that certain kinds of social network structures are more likely than others to generate strong entrepreneurial teams, and I examine the contributions that institutions and public authorities might make to the conditions facilitating such structures.

Team Formation

Two models dominate the literature on entrepreneurial teams. First, a rational process model of team formation emphasizes selecting members based on pragmatic instrumental criteria, such as complementary skills or work experiences. From this viewpoint, competency should shape team formation so that new ventures possess the capabilities needed to manage complexity and growth. Second, a social psychological model emphasizes the interpersonal fit between team members and the need for smoothly functioning group processes. Many scholars have pointed to the important role that social and emotional support play in affecting human behavior. For example, positive social relations within a team can create a supportive context within which people are encouraged to undertake innovative actions.

The two sets of principles are not mutually exclusive. Within the constraints of interpersonal attraction, teams can still search instrumentally for members. Similarly, within the constraints of resource-based needs, teams can still choose people who are "attractive." Nonetheless, as a normative principle, strategists prefer the rational process model over the social psychological model, noting that new members ought to be chosen based on knowledge demands and resource connections. By contrast, a great deal of evidence indicates that team formation is better explained by social-psychological theories, given the kinds of social networks within which most teams form.

Under what conditions might team formation follow a more ra-

tional process, and can those conditions be affected by public policy? I believe the rational process model works best in social network environments characterized by norms of universalism and competence, shared standards regarding what constitutes effective performance, and search processes facilitated by the free flow of information. Scale-free networks support these conditions, to a large extent, although they may also be found in some small-world networks. In this paper, I outline how this process might work.

Models of Social Networks

In a recent paper, my coauthor and I (Aldrich and Kim 2007) introduced various network models with which to understand entrepreneurial team formation. For each model, we focused on two issues: (1) the extent to which the social world is organized into local clusters of densely connected individuals who interact primarily with one another, and (2) the average path length between individuals in the network, conceptualized as the average number of intermediaries it takes to connect any two randomly chosen individuals. The first issue speaks to the issue of recruitment into entrepreneurial teams across social locations and the second sheds light on the dilemmas involved in long-distance searches for team members.

First, a *random network model* presumes a highly individualized world in which everyone has nearly unlimited access to everyone else, constrained only by limits on the resources that can be devoted to the search for new social ties. Paths between distant people are short because they are not constrained regarding who they can interact with and so everyone is available as an intermediary or broker. Second, a *fragmented network model* presumes a highly clustered world in which people's searches for new ties are highly circumscribed by their environments, with people's ties connecting them mainly to others in their same social context. Third, a *small world network model* posits a world that is fragmented into clusters, but in which the clusters are united by bridging ties. Such ties serve as short cuts connecting many local clusters to other clusters, potentially reducing average path lengths to those found in random worlds.

Fourth, a *scale free network model* presumes that social networks arise through a process that results in a robust and highly structured hierarchical system that is highly resistant to disruptive events. Path lengths are short because a small number of highly connected nodes dominate the distribution, with many nodes having a small number of ties. These networks may also have local clusters, making them also small worlds. Empirical observation of social networks has found that few resemble pure scale free networks. Instead, the distribution of ties follows a power law distribution with a "fat tail", and thus some analysts call them "truncated scale free" networks. (In truncated scale free networks, the degree distribution of ties is scale free over a significant portion of its range but it is not strictly scale free in the tails. In particular, at the "high" end of the degree distribution, there are fewer extremely well-connected nodes that would be expected. Instead, the distribution bunches up short of the high values; hence the term, "fat tail"). In this paper I will focus on scale free networks, but to put them in context, I briefly discuss the other types.

Fragmented and Small World Networks

Models of fragmented networks differ from models of random networks in that rather than connections being formed randomly, relationships are clustered together in local networks, such as neighborhoods, friendship circles, or workplaces. Such clusters form because socio-cultural constraints substantially limit the extent to which any two persons might encounter one another. Most ties are based on homophily, rather than randomness. These conditions increase the density of connection within clusters and reduce the chances that people in one cluster will have contacts with people in other clusters. By making it more difficult to enact ties with dissimilar others, such clusters potentially raise the average path length in social networks.

Small world networks differ from fragmented ones, according to network theorists, to the extent that local clusters of nodes are linked to other local clusters through bridging ties. These bridging ties link clusters together to form a global network. Small world theorists have shown that a surprisingly *small* number of long-distance bridging ties have to be added to otherwise fragmented social networks to create a small world (Watts 1999). These bridging ties jump over otherwise wide gaps in a network, thus lowering the average path between any two points. Note that small world theorists do not make claims about the *frequency* with which small world networks occur in the real world, but only that networks meeting these conditions will be small world networks.

Homophily and Clustering

Social science research strongly supports the proposition that social structural conditions generate densely linked local clusters. Researchers have extensively documented the generalization that "birds of a feather flock together," in studies ranging from research on friendships and teams to studies of cultural and voluntary associations and business organizations. *Homophily* constitutes the central principle behind these consistent findings: "Homophily is the principle that a contact between similar people occurs at a higher rate than among dissimilar people"(McPherson, Smith-Lovin and Cook 2001, p. 416). In the language of social networks, the "friends of our friends" are already our friends, rather than strangers unknown to us.

Local clusters form in ways that sustain and amplify homophily. Strong boundaries deflect social relationships back upon themselves, thus fostering highly concentrated social networks. For example, instead of extending an open public invitation to join, existing clusters recruit new members either by specifically recruiting them (e.g., LinkedIn users send an invitation via email to other potential users) or through drawing on their current ties in other domains (e.g., through kinship ties). Because individuals who share similar characteristics are more likely to know each other, these individuals tend to form dense clusters in which everyone knows everyone else.

Truncated Scale Free Networks

Truncated scale free networks differ in several ways from random and small world networks. Small world networks can also be scale free, whereas by definition, random networks are not. Thus, I begin by highlighting the differences between random and scale free networks and then discus their relation to small world networks. Scale free networks follow a power law in the distribution of their nodes and ties, unlike random networks, which follow a Poisson distribution. In scale free networks, some nodes have a very large number of

ties (in and out) and most of the rest have very few. By contrast, random networks have a peaked distribution in the number of ties per node, and the distribution is very homogeneous, centered on the mean and mode. Small world networks can also have a scale free distribution of ties. Unlike the small world networks described in the previous section, the connectivity of a scale free network does not depend on shortcuts closing long-distance gaps between clusters. In scale free networks, reductions in path length between nodes are achieved through a small number of highly connected nodes, rather than through a few links serving as short cuts between clusters.

How Might Scale Free Networks Emerge?

Barabási (2002) and his collaborators proposed two simple principles by which to understand how scale free networks grow: growth takes place one node at a time and new nodes link to existing nodes following a principle of preferential attachment. As each new node is added to the network, it links to a few others. These links are not made randomly, but rather the node "observes" which nodes already have the most links and then link to them.

Following the principle of preferential attachment means, "the rich get richer," thus increasing inequality in a network. However, it is only probabilistic: not every new node links only to the most preferred. For growth to result in a scale free network, it is only necessary that a high proportion follow the preference principle. Some newcomers will not flock to the most highly connected nodes, because they have divergent preferences or because of capacity constraints on the ability of the most highly linked nodes to handle large numbers of ties arriving in a short interval. Nonetheless, if a large enough proportion of newcomers follow the principle of preferential attachment, the resulting network evolves into one with a few highly linked and many sparsely linked nodes.

Application to Entrepreneurial Teams

I noted earlier that the literature on entrepreneurial teams has proposed two principles by which teams might form. The rational process model of team formation emphasizes selecting members based on pragmatic instrumental criteria, whereas the social-psychological model emphasizes the interpersonal fit between team members. I argue that the instrumental model fits best those teams that emerge in well-institutionalized fields characterized by networks whose degree distributions resemble truncated scale free or exponential distributions with fat tails. By contrast, the social-psychological model fits best for the vast majority of team foundings, in part because they are embedded in disconnected and homophilous local clusters that only sporadically coalesce into small worlds containing shortcuts to diverse other clusters.

Teams in Well-Institutionalized Scale Free Networks

We can gain insight into the special social structural conditions under which most entrepreneurial teams form by examining teams emerging within networks characterized by power law distributions with fat tails: creative teams of coauthors in academic disciplines and creative teams in the Broadway music industry (BMI). In their work on team assembly mechanisms in four academic fields and the BMI, Guimerà *et al.* (2005) found that the set of people from whom teams were drawn was embedded in a larger network which acted as

a storehouse of past knowledge created within the field. The large network of participants shared common professional standards, norms of collaboration, and was national in scope. Over time, the fields became increasingly integrated, moving from semi-isolated small clusters to a single large connected cluster. A small number of very prestigious actors acted as brokers and created bridges between clusters, lowering the average path length for the entire network. Founders assembling teams thus had a very large community of practitioners from which to draw, with shared social identities.

Team sizes in all fields increased over time, reflecting the growing complexity of the fields and external performance pressures. Clearly, competence was a very important criterion in assembling teams and we would expect universalistic norms to govern recruitment. These teams exemplified many of the desired characteristics identified by the "rational process" models of entrepreneurial team formation: adequate size, skill diversity, shared prior experiences, and high human capital. Even so, the investigators found a very strong tendency for people to repeat past collaborations, just as in the venture capital industry. At least for the BMI, the shape of the degree distribution could be characterized by a power law with an exponential tail, meaning it was highly skewed with a few people at the top with many ties and many people with only a few ties (Jarrett Spiro, personal communication). In this respect, it resembled the VC industry repeated tie distribution in recent research (Kogut *et al.* 2007), indicating that a process of preferential attachment seemed to be driving the national network for the BMI.

The social structural conditions underlying team emergence in these five fields provide a sharp contrast to the much more locally oriented networks out of which most entrepreneurial teams emerge. Nonetheless, they could well be descriptive of particular subfields of entrepreneurship, such as within regional clusters around Route 128 or Silicon Valley or within particular industries drawing on national talent pools where prestige and status affect the recruiting process. In fields where status and reputation effects strongly govern choices of which ties to form, we would expect scale free networks to form (Pollock 2004; Pollock, Porac and Wade 2004; Stuart, Hoang and Hybels 1999). The venture capital industry represents a particularly promising place to look for scale free networks, based on status and reputation effects, given the high degree of uncertainty facing its participants. In their analysis of U.S. venture capital firms' investments, Sorenson and Stuart (2001) noted that frequent reliance on investment syndication, rather than solo investing, created a dense VC interfirm network that structured the flow of information in the industry.

Mundane Entrepreneurial Teams

In contrast to entrepreneurial teams formed in well-institutionalized fields, teams emerging under typical circumstances are deeply embedded in local clusters of social relations. We cannot assume that most nascent entrepreneurs are operating in a small world context in which ties to other clusters help them recruit diverse members for their founding teams. Whereas Guimerà *et al.* (2005) could take for granted an instrumental basis for team formation as scientists searched for coauthors and Broadway producers sought choreographers and composers, interpersonal relations take priority in mundane foundings. Under such conditions, few teams will recruit out-of-cluster members.

Homophily and Familiarity in Team Formation

Using data from the Panel Study of Entrepreneurial Dynamics, a representative national survey of 830 people who reported they were in the process of trying to start a new business in 1999-2000, Ruef *et al.* (2003) showed that two principles dominated team formation: homophily and familiarity. In the PSED, teams were extremely homogeneous with respect to gender, race, and occupation. For example, racially homogeneous teams appeared in the data at a level 27 times that expected based on random mixing, and gender homogeneous teams – net of spousal pairs – were about 5 times more likely than expected. As we followed the founding efforts over time, we observed that they became more gender and racially homogenous as people left and new members joined the teams.

Familiarity is also a key social mechanism of in-group formation, and can be a result of pre-existing ties, such as through work or family. The principle of familiarity asserts that people who associate with one another, under certain conditions, become more likely to continue the association subsequently in other circumstances. How far outside their immediate circle are founders prepared to go in building a team? Research shows that people rarely establish "relationships" with those they meet by chance (Grossetti 2005). Instead, local clusters of family, friends, work, and neighborhoods will serve as the pool of people available for recruitment into entrepreneurial teams, if nascent entrepreneurs follow the principle of interpersonal relations in team building.

Strangers Need Not Apply

Strangers – people not related by kinship or known to one another prior to the initial interactions around the founding of a new venture – constitute the most interesting potential team members. Rational process theories of entrepreneurial team functioning strongly imply that interpersonal considerations are secondary to instrumental ones. If industry experience and technical or managerial competence are critical to the success of a team, then we would expect lead entrepreneurs to search widely for qualified people, using existing bridges to go beyond local clusters or creating new bridges if none exist. Well-qualified strangers might even be preferred over less-qualified family, friends, and business associates.

Accordingly, perhaps the most striking finding from the PSED concerns the nearly complete absence of any strangers whatsoever among two person teams, and their rarity among three person teams. They were also extremely rare among all spouse/partner based teams, with only 2 percent of such teams reporting any stranger ties. Only among the non spouse/partner based teams with 4 or 5 members, representing 18 percent of all the non spouse/partner teams, did we find a sizeable proportion of strangers. About half of the three and four person teams had at least one pair of strangers, and almost three-quarters of the five person teams did. Nonetheless, even in these large teams, most team members still knew each other prior to team formation. Clearly, these strangers carry the possibility of serving as bridging ties to other clusters. We suspect that these large teams, somewhat dependent upon people who were unknown to one another before forming the team, represent the kinds of more capital-intensive and growth-oriented teams that figure so prominently in the strategic literature on entrepreneurial teams.

The great majority of entrepreneurial teams emerge out of the local clusters described by small world networks but *without* the bridging ties necessary to reduce the social distance to strangers qua-

lified for team membership. As such, we would expect them to be very stable, and follow-up studies over the subsequent three waves of the PSED bore out that expectation. Indeed, only 12 percent of the new ventures identified in the first wave experienced any changes in team composition over the four waves.

Unlike the creative teams assembled in increasingly institutionalized fields in the United States, as documented by Guimerà *et al.* (2005), most attempts at founding new ventures in the United States do not draw their members from a nationally-integrated pool of experts whose competence has been judged against agreed-upon standards. Strangers are rare, except for the largest teams, possibly hinting at a "competency discount" that founders extend to potential members whom they know and trust. Instead, almost all start-ups assemble teams based on embedded ties from pre-existing relations within local clusters. Perhaps founding team members use instrumental criteria mainly *within* networks of embedded ties. Apparently, bridging ties usually fail to bring in non-homophilous members. Most new ventures do not inhabit a "small world".

How to Promote the Rational Process Model

Although research on entrepreneurial team formation shows that most apparently are the product of close ties within fragmented homophilous clusters, research on creative teams in the Broadway musical industry and in various academic disciplines, demonstrates that under the right conditions, the rational process model works. The conditions promoting a universalistic and competence-driven formation process apparently take years if not decades to emerge, suggesting that only organizations, agencies, and institutions taking a long view have the capability to facilitate such a process. The social psychological model is firmly grounded in socio-cultural norms and practices whose force might be reduced but never eliminated. Thus, I will focus my suggestions on a few modest proposals.

First, norms of universalism and competence can be promoted by the educational system and by professional associations. Professional associations and trade associations within industries can generate and reinforce shared standards regarding how performance is evaluated. Second, strong laws regarding antidiscrimination measures and regulatory policies promoting freedom of association and competition in labor markets might blunt, to some extent, the tendency for homophilous groups to engage in boundary – reinforcing tactics. Third, new developments in information technology that have been facilitated by the Internet have created the possibility for universalistic searches unfettered by socio-cultural barriers. For example, social networking sites such as LinkedIn carry the promise of enabling individuals to look beyond their immediate networks into the second and third level ties of people in their immediate network. Indeed, the multiplicative effect of working through indirect ties exemplified by such networks is staggering: within a path distance of only three steps, such sites provide access to tens of thousands of potential team members.

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