



## **Networking and Access to Social Capital:**

### **A Review of Research Literature on Women's Entrepreneurship in the Information Technology Field**

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*"In short, entrepreneurship is inherently a process of building bridges across the structural holes in a network." (Burt, 2000)*

Differential access to "social capital" may affect the gender composition of IT entrepreneurs.<sup>1</sup> Social capital is an essential resource for the efficient conduct of business<sup>2</sup> that gives entrepreneurs "access to opportunities and resources, save[s] time, and tap[s] into advice and moral support that may otherwise be unavailable" (Coleman, 1988, as quoted in Carter et al., 2003). These benefits contribute to the success and survival of an entrepreneur's business, but women may have less or different access to social capital than men have.

Social capital is generated largely by an individual's personal and professional networks,<sup>3</sup> and it can help entrepreneurs in numerous ways. These social networks supply legal advice, financial and accounting advice, assistance with business loans or business financing, and expert advice about the industry of the entrepreneur's firm. Social networks might even "obtain customers, technology, suppliers, physical resources, financial resources, managerial and psychological support, and personnel"<sup>4</sup> (Aldrich, Elam, and Reese, 1997). Networks can also "increase the probability that the entrepreneur knows which of alternative ways to pitch the venture will most appeal to specific potential customers, suppliers, or other sources of revenue" (Burt, 2000). In short, social networks and the social capital they generate can contribute substantially to a firm's success.

The advantages of social networks may be particularly acute in IT and other high-tech fields, where companies are reliant on venture capital. Social networks can make the difference between locating and not locating

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<sup>1</sup> The following general literature reviews on women entrepreneurs demonstrates wide agreement on this point: Brush (1992); Powell and Mainiero (1992); Sullivan (1999); Carter (2000); Buttner (2001); Greene et al. (2001); Menzies et al. (2004); Moore (2004); Still (2005); Widding (2005).

<sup>2</sup> See, for example, Weiler and Bernasek (2001).

<sup>3</sup> There is a vast more general literature on social network theory. Sociological Abstracts listed more than 400 articles published in the year 2000 alone with social networks in the title or abstract. For a review of this literature, see Borgatti and Foster (2003) or Brass et al. (2004).

<sup>4</sup> In a study of 50 professional couples who immigrated from China to Canada, Greve and Salaff (2003) show that networking is important to success, especially in the business planning stage. Davidsson and Honig (2003) found that social capital was much higher in a group of nascent entrepreneurs in Sweden than in a control group, that having strong ties ("bonding social capital") to people who owned businesses was also a strong predictor of entrepreneurial activity, that having "bridging social capital based on weak ties was found to be a strong predictor of rapid and frequent gestation activities, i.e., for carrying the start-up process further," and that bridging social ties also was a predictor of an entrepreneur reporting a first sale or a profit.

funding, with success more likely when the entrepreneur's network intersects with the networks of one or more venture capital firms.<sup>5</sup> These connections to venture capitalists bring financial support, and they often bring access to technical experts and management and financial planning expertise. It is the social networks in Silicon Valley that have supported the high level of job mobility, continuous learning, and technology transfer.<sup>6</sup>

If networks are important to the success of entrepreneurial endeavors, gender differences in networks may help explain both the low participation of women as IT entrepreneurs and, perhaps, the smaller size of their firms. Women's networks may be less useful professionally because of gender differences in two network features related to diversity – *homophily*<sup>7</sup> and strength of ties<sup>8</sup>. Homophily is people's desire to interact with others like themselves with respect to attributes such as sex, race, and education. Strength of ties describes the nature of relationships among network members. *Strong ties* exist when there is a small group of long-term relationships such as the business owner's inner advisor circle, or family members. They are characterized by heavy investments in the relationship, frequent contact with the other person, and an implicit sense of reciprocity. *Weak ties* are of shorter duration, lower frequency of contact, less reliability, and more ambiguity of relationship. *Contacts* are relationships entered into for pragmatic purposes, of fleeting duration, no emotional involvement, and often with people not previously known. In theory, women are disadvantaged both by homophily because women's networks give them less access to necessary resources, and by strength of ties because women and men differ in the way they call upon strong ties, weak ties, and contacts.

Homophilous networks offer the advantages of common interests and worldviews (Ibarra, 1992, citing Lazarsfeld and Merton, 1954; McPherson and Smith-Lovin, 1987; Marsden, 1988); or of trust and reciprocity (Ibarra, 1992, citing Lincoln and Miller, 1979), all of which facilitates exchange of resources. They may be particularly advantageous for men because men are more likely than women to be in positions of establishment from which they can provide well-informed advice and substantial resources.<sup>9</sup>

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<sup>5</sup> Carter et al. (2003) make this point strongly. They point to the fact that venture capital firms are designed to operate in a risk-averse way to make deals that come to them through the recommendation of their tight network of other venture capitalists, people they have previously funded, and a few trusted friends from the technical and business community. They cite Bygrave (1992), Warner (1998), and Alimansky (2000) on this point. They also point to a wide literature on how entrepreneurs use social networks to obtain equity funding from venture capitalists: Tyebjee and Bruno (1984), Bygrave (1988), Fiet (1991), Sargent and Young (1991), Freear et al. (1992), and Fiet (1996). Some other literature on social networks and high-tech entrepreneurship is also worth considering, even though these studies do not discuss issues of gender. They include Myint, Vyarkarnam, and New (2005), which considers the effect of social capital on the creation of high-tech ventures, and in particular serial entrepreneurship, associated with the University of Cambridge in the United Kingdom; Shane and Stuart (2002), which examines new venture creation spinning out of MIT; and Shane and Cable (2002), which discusses the role that social capital plays in forming high-tech geographic clusters.

<sup>6</sup> See, for example, Saxenian (1996).

<sup>7</sup> See, for example, Rogers and Kincaid (1981).

<sup>8</sup> A study by Moog and Backes-Gellner (2006) of over 5,000 university students in Germany found that a student's willingness to become an entrepreneur was correlated to the size of his or her social capital, that women had less social capital than men, and that this explained in part why female students showed less willingness to become self-employed than male students. It should be remembered that individuals often have not made their career decisions by the time of university study and there is no longitudinal study here to correlate an expression of willingness to be self-employed with actual pursuit of an entrepreneurial career. The authors measure the amount of social capital held by an individual in an indirect way that some scholars might question, and their method can only measure the quantity and not the quality of network ties. On the theoretical considerations of how to measure social capital, see Neergaard, Shaw, and Carter (2005).

<sup>9</sup> Renzulli, Aldrich, and Moody (2000) cited literature that showed gendered differences in network characteristics may well effect the likelihood of starting a business, but they found little evidence that it made a difference in survival rates or general economic performance of the businesses. They argue that homogeneity of networks and high presence of kin in the networks are disadvantageous to small business owners, but being female or having a high percentage of females in the business network are not disadvantageous.

Research clearly demonstrates that entrepreneurial networks are homophilous (Ruef, 2003), and that homophily and network constraints are the most powerful factors at play in the formation of founding organizational teams (Ruef, et al., 2003).<sup>10</sup> Homophily may be common because of personal preferences for relations with people who are similar (Ibarra, 1992, citing Lincoln and Miller, 1979; Brass, 1985; Marsden, 1988) or because professional relationships are dependent on contacts, and there are structural constraints based in the sex composition of groups that limit women in the choice of their professional network (Ibarra, 1992, citing Blau, 1977). For example, a study of five industrialized nations showed that only 10% of the people who men relied on for advice were women, but 40% of the people women relied on were women<sup>11</sup> (Aldrich and Sakano, 1995). Whatever the motivation, men's networks tend to include mostly men, and women's networks tend to include more women than do men's networks. The question is whether this difference in the gender composition of networks affects access to important resources and entrepreneurial behavior.

Strength of ties is the other network feature that seems to differ by gender. Ties to people who can provide instrumental support to the business, not just social support and friendship, are particularly valuable to entrepreneurs.<sup>12</sup> A large and diverse set of ties gives "information about new business locations, potential markets for goods and services, sources of capital or potential investors, and innovations ..." (Aldrich 1989). Yet, women commonly create two separate and smaller sets of networks: a set of (mostly) female contacts providing social support, and a set of (mostly) male contacts providing instrumental support; whereas men create a single, larger (mostly male) network for both affective and instrumental support (Lipman-Berman, 1980). As with homophily, the question is whether this possible gender difference affects access to important resources and entrepreneurial behavior.

The literature is relatively long on theory and short on empirical verification of gendered network effects. For example, two methodologically sound empirical studies of entrepreneurship and social capital arrive at opposite conclusions. One study determines that women are disadvantaged due to gender differences in network composition. The other study determines that women experience no disadvantage and are able to obtain the resources they need through their social networks. Our consideration of social capital and networks closes with a closer examination of these two studies and what they contribute to our understanding of women IT entrepreneurs.

An examination of five social networks involving 73 professional staff members in a New England advertising and public relations agency finds that gender differences in network composition and use put women at a disadvantage in this context (Ibarra, 1997). Men showed a great amount of same-sex homophily in their networks for all purposes, but women chose men overwhelmingly for their networks on the basis of advice and influence, chose approximately equal numbers of men and women on the basis of sources of communication and support, and overwhelmingly chose women as friends. Men chose different men for different types of network relationships – but they overwhelmingly chose men. Men had significantly more multiplex ties (ties that served multiple purposes, or multiple "exchange contents in the relationship" to use the social science

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<sup>10</sup> Ruef, Aldrich, and Carter (2003) consider whether there may be too much focus on homophily. In their examination of founding groups of organizations, they consider not only homophily but also four other factors: *functionality*, the extent to which members of the team have complementary skills and knowledge to bring to the collective success of the organization; *status expectations* and how they impact the ability of founding teams to attract others to their venture; *network constraint*, which examines how organizational foundation is shaped by a pre-existing network of strong and weak ties that constrains the choice of members of the founding team; and *ecological constraint*, the shaping role of geography and industry sector in the selection of founding team members. They find that homophily and network constraints are the most powerful factors at play in the formation of founding organizational teams in a large U.S. study using data from the Panel Study of Entrepreneurial Dynamics.

<sup>11</sup> Aldrich and Sakano's study also showed that women were much more likely than men to rely on third-party brokers (outside their network) to introduce them to people (generally men) to provide them with the advice and resources they needed for their business.

<sup>12</sup> Renzulli (1997) showed that women had more family members in their business relationship networks than men, while men had more co-workers in their business relationship network than women.

jargon) to men than women had to women. Men had higher centrality scores (being more central to the network in terms of more friendship and communication choices, more professionally respected and influential, better ties to other people who are influential). On every measure, men achieved greater network rewards than women. This study strongly suggests that women would gain from greater ties to male colleagues, but it does not explain why this did not happen more – whether it was because women were not able to do so (e.g. because the men had a closed network that rejected nominations from women to participate) or chose not to do so (e.g. felt more comfortable with people who were similar).

The context of the other study we consider is closer to home. Potential and active entrepreneurs (157 men, 60 women) in a high-tech region demonstrate that women obtained necessary resources and advice through their social networks in the early 1990s (Aldrich, Elam, and Reese, 1997). The study participants were well educated and professional, with 40% of the men and 29% of the women holding post-graduate degrees of some kind, many of them in knowledge-intensive companies such as Glaxo-Wellcome and IBM. The overall finding from this study explicitly contradicts the findings of the public relations study. In this context, the empirical evidence shows that women's network of obligations and responsibilities did not limit their freedom of action. It also shows that women and men called upon friends and business associates about equally, and neither called upon family members. And of the four aspects of entrepreneurial activity considered – seeking legal advice, financial/accounting advice, advice on obtaining loans, and expert advice within their industry – only seeking legal advice differed by sex. Although there were no obvious gender differences in legal needs, men were more likely to seek legal advice than were women – 66% of the men sought legal advice through their networks while only 44% of the women asked for legal advice. There were no significant gender differences in how often men and women were sued or used legal assistance for incorporation or partnership papers; no significant gender differences in the number of people sought out to provide assistance in any of these four areas; and no significant gender differences in the reasons that entrepreneurs sought out business loans or business financing. The authors conclude that women were as active as men in networking in three (out of four, excepting legal advice) of these business areas. They also suggest that women in this context might benefit more than men from their networks.

“Although men and women drew on the same types of social relations when seeking assistance and turned to the same organizational representatives when required (accountants, bank loan officers), women appeared to seek out other women when it was possible. Same-sex bias was highly resource specific and when women owners relied on prior ties, they were much more likely to ask a woman for advice than otherwise ... [R]ather than being disadvantaged by not being part of an ‘old boys’ network’, women seemed to benefit slightly more from their networks, as measured by their being able to pay less than market rates for legal and loan assistance. However, they apparently received the same quality advice as men. ...” (Aldrich, Elam, and Reese, 1997)

These findings about network benefits might not hold true where venture capital is involved because access to this capital is so dependent on being part of the network; one cannot buy access to the services on the open market.

This brief review of the relevant empirical data demonstrates that evidence remains insufficient for drawing conclusions about the effect of social capital on women's underrepresentation among IT entrepreneurs. Gender differences in networks are clear; it is their impact on entrepreneurial behavior that remains ambiguous. Nevertheless, theoretical considerations suggest that gender differences in networking and social capital contribute to differential access to the resources, such as technical experts, management, and financial planning, that typically come through a relationship with a venture capital firm.

## Bibliography

- Aldrich, Howard (1989). Networking Among Women Entrepreneurs, pp. 103-132 in O. Hagan, C. Rivchun, and D. Sexton, eds. *Women-Owned Businesses* New York: Praeger.
- Aldrich, Howard E., Amanda Brickman Elam, and Pat Ray Reese (1997). Strong Ties, Weak Ties, and Strangers, in Sue Birley and Ian Macmillan, *Entrepreneurship in a Global Context* Routledge.
- Aldrich, Howard E. and T. Sakano (1995). Unbroken Ties: How the Personal Networks of Japanese Business Owners Compare to Those in Other Nations, in Mark Fruin, ed., *Networks and Markets: Pacific Rim Investigations* New York: Oxford University Press.
- Alimansky, B. (2000). Eight Ways to Ruin Your Chances of Raising Equity Capital, *Journal of Private Equity* vol. 3, number 3, pp. 73-83.
- Blau, Peter M. (1977). *Inequality and Heterogeneity: A Primitive Theory of Social Structure* New York: Free Press.
- Borgatti, Stephen P. and Pacey C. Foster (2003). The New Paradigm in Organizational Research: A Review and Typology, *Journal of Management* vol. 29, pp. 991-1013.
- Brass, D.J. (1985). Men's and Women's Networks: A Study of Interaction Patterns and Influence in an Organization, *Academy of Management Journal* vol. 28, pp. 327-343.
- Brass, D.J., Galaskiewicz, J., Greve, H.R., & Tsai, W. (2004). "Taking stock of networks and organizations: A multilevel perspective," *Academy of Management Journal* vol. 47.
- Brush, Candida G. (1992). Research on Women Business Owners: Past Trends, a New Perspective and Future Directions, *Entrepreneurship Theory and Practice* vol. 16, pp. 5-30.
- Burt, Ronald S. (2000). Creating Careers: Women's Paths through Entrepreneurship, Working paper, University of Chicago and Institute European d'Administration d'Affaires (INSEAD), May.
- Buttner, E. Holly (2001). Examining Female Entrepreneurs' Management Style: An Application of a Relational Frame, *Journal of Business Ethics* vol. 29, pp. 253-269.
- Bygrave, W.D. (1988). The Structure of the Investment Networks of Venture Capital Firms, *Journal of Business Venturing* vol. 3, number 2, pp. 137-157.
- Bygrave, W.D. (1992). Venture Capital Returns in the 1980's, pp. 438-462 in D.L. Sexton and J. Kasarda, eds. *The State of the Art of Entrepreneurship* Boston: PWS Kent.
- Carter, Nancy M., Candida G. Brush, Patricia G. Greene, Elizabeth Gatewook, and Myre M. Hart (2003). Women Entrepreneurs Who Break Through to Equity Financing: The Influence of Human, Social and Financial Capital, *Venture Capital* vol. 5, pp. 1-28.
- Carter, Sara (2000). Improving the Numbers and Performance of Women-Owned Businesses: Some Implications for Training and Advisory Services, *Education + Training* vol. 42, pp. 326-333.
- Coleman, J. (1988). Social Capital in the Creation of Human Capital, *American Journal of Sociology* vol. 94, pp. S95-S120.
- Davidsson, Per and Benson Honig (2003). The Role of Social and Human Capital Among Nascent Entrepreneurs, *Journal of Business Venturing* vol. 18, pp. 301-331.
- Fiet, J.O. (1991). Network Reliance By Venture Capital Firms and Business Angels: An Empirical and Theoretical Test, pp. 445-455 in N.C. Churchill, W.D. Bygrave, J.G. Covin, D.L. Sexton, K.H. Vesper, and W.E. Wetzel, Jr., eds. *Frontiers of Entrepreneurship Research* Boston: Babson College.
- Fiet, J.O. (1996). Fragmentation in the Market for Venture Capital, *Entrepreneurship Theory and Practice* vol. 21, pp. 5-20.
- Freear, J., J. Sohl, and W.E. Wetzel, Jr. (1992). The Investment Attitudes, Behaviour, and Characteristics of High Net Worth Individuals, pp. 374-387 in N.C. Churchill, S. Birley, W.D. Bygrave, D.F. Muzyka, C. Washlbin, and W.E. Wetzel, Jr., eds. *Frontiers of Entrepreneurship Research* Wellesley, MA: Babson College.
- Greene, Patricia G., Candida G. Brush, Myra Hart, and Patrick Saporito (2001). Patterns of Venture Capital Funding: Is Gender a Factor? *Venture Capital* vol. 3, pp. 63-83.

- Greve, Arent and Janet Salaff (2003). Gendered Structural Barriers to Job Attainment for Skilled Chinese Immigrants in Canada, *International Journal of Population Geography* vol. 9, pp. 443-456.
- Ibarra, Herminia (1992). Homophily and Differential Returns: Sex Differences in Network Structure and Access in an Advertising Firm, *Administrative Science Quarterly* 37, pp. 422-447.
- Lazarsfeld, Paul F. and Robert K. Merton (1954). Friendship as a Social Process: A Substantive and Methodological Analysis, pp. 18-66 in Morroe Berger, Theodore Abel, and Charles H. Page, eds. *Freedom and Control in Modern Society* New York: Van Nostrand.
- Lincoln, James R. and Jon Miller (1979). Work and Friendship Ties in Organizations: A Comparative Analysis of Relational Networks, *Administrative Science Quarterly* vol. 24, pp. 181-199.
- Lipman-Berman, Jean (1980). Female Leadership in Formal Organizations: Must the Female Leader Go Formal? pp. 341-362 in Harold Leavitt, Louis Pondy, and David Boje eds. *Readings in Managerial Psychology* 3<sup>rd</sup> ed., Chicago: University of Chicago Press.
- Marsden, Peter V. (1988). Homogeneity in Confiding Relations, *Social Networks* vol. 10, pp. 57-76.
- McPherson, J. MillerLynn Smith-Lovin (1987). Homophily in Voluntary Organizations: Status Distance and the Composition of Face-to-Face Groups, *American Sociology Review* vol. 52, pp. 370-379.
- Menzies, Teresa V., Monica Diochon, and Yvon Gasse (2004). Examining Venture-Related Myths Concerning Women Entrepreneurs, *Journal of Developmental Entrepreneurship* vol. 9, August, pp. 89-107.
- Moog, Petra and Uschi Backes-Gellner (2006). Social Capital and the Willingness to Become Self-Employed: Is There a Difference Between Women and Men? Working Paper, Zurich: Institute for Strategy and Business Economics, May.
- Moore, Dorothy Perrin (2004). The Entrepreneurial Woman's Career Model: Current Research and a Typological Framework, *Equal Opportunities International* vol. 23, pp. 78-98.
- Neergaard, Helle, Eleanor Shaw, and Sara Carter (2005). The Impact of Gender, Social Capital and Networks on Business Ownership: A Research Agenda, *International Journal of Entrepreneurial Behavior & Research* vol. 11, pp. 338-357.
- Powell, Gary N. and Lisa A. Mainiero (1992). Cross-Currents in the River of Time: Conceptualizing the Complexities of Women's Careers, *Journal of Management* vol. 18, pp. 215-237.
- Renzulli, L.A., H. Aldrich, and J. Moody (2000). Family Matters: Gender, Networks, and Entrepreneurial Outcomes, *Social Forces* vol. 79, pp. 523-546.
- Rogers, Everett M. and D. Lawrence Kincaid (1981). *Communication Networks: Toward a New Paradigm for Research* New York: Free Press.
- Ruef, Martin, Howard E. Aldrich, and Nancy M. Carter (2003). The Structure of Founding Teams: Homophily, Strong Ties, and Isolation Among U.S. Entrepreneurs, *American Sociological Review* vol. 68, pp. 195-222.
- Sargent, M. and J.E. Young (1991). The Entrepreneurial Search for Capital: A Behavioral Science Perspective, *Entrepreneurship & Regional Development* vol. 3, pp. 237-252.
- Saxenian, A. (1996). Beyond Boundaries: Open Labor Markets and Learning in Silicon Valley, pp. 23-39 in M.B. Arthur and D.M. Rousseau, eds. *The Boundaryless Career* New York: Oxford University Press.
- Shane, S. and D. Cable (2002). Network Ties, Reputation, and the Financing of New Ventures, *Management Science* vol. 48, pp. 364-381.
- Shane, S. and T. Stuart (2002). Organizational Endowments and the Performance of University Start-ups, *Management Science* vol. 48, pp. 154-170.
- Still, Leonie (2005). The Constraints Facing Women Entering Small Business Ownership, pp. 55-65 in Sandra Fielden and Marilyn Davidson, eds. *International Handbook of Women & Small Business Entrepreneurship* Cheltenham, UK: Edward Elgar.
- Sullivan, Sherry E. (1999). The Changing Nature of Careers: A Review and Research Agenda, *Journal of Management* vol. 25, pp. 457-484.
- Tyebjee, T.T. and A.V. Bruno (1984). A Model of Venture Capitalist Investment Activity, *Management Science* vol. 30, pp. 1051-1076.

Warner, M. (1998). Inside the Silicon Valley Money Machine, *Fortune* vol. 28, pp. 128-140.

Weiler, Stephan and Alexandra Bernasek (2001). Dodging the Glass Ceiling? Networks and the New Wave of Women Entrepreneurs, *The Social Science Journal*, pp. 85-103.

Widding, Lars Oystein (2005). Building Entrepreneurial Knowledge Reservoirs, *Journal of Small Business and Enterprise Development* vol. 12, pp. 595-612.

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