

**AN INVESTIGATION OF WOMEN-LED FIRMS AND VENTURE
CAPITAL INVESTMENT**

FINAL REPORT

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Executive Summary

For decades venture capital investment assumed a quiet yet crucial role in the development and expansion of growing ventures. But, the 1990's boom in technology dramatically increased in the pool of equity capital and funding of new ventures with high growth potential. There is a substantial body of venture capital research on equity fund flows, investor criteria, and the nature of the investor-investee relationship, but no consideration of women-led ventures. Studies of women entrepreneurs have focused on psychological dimensions, business characteristics and performance, but their financing strategies remain unexplored. Similarly, limited research on minority entrepreneurs explores issues of community participation, social networks, and loan accessibility but, research on venture capital financing is scarce. Hence, questions about the intersection of gender, race, ethnicity and equity capital financing remain unexamined. There is little data upon which to base public policy recommendations or programs.

This research investigated venture capital funding and women-led businesses. We utilized two data sets. First, we conducted a literature review and analyzed the nature of the venture capital industry. Using Pratt's Guide to Venture Capital we created a proprietary data base reflecting women's involvement in the venture capital industry in 1995 and 2000. This data provides a summary of their participation and roles in venture capital companies.

Second, we analyzed the Venture Economics data set which includes private equity investments by venture capital firms for more than 30 years. Our analyses considered business location, size, industry and business sector which enabled us to a "map" venture capital investment in women-led-firms over time and test for differences based on gender. Although the data set specified gender and minority identification in its collection procedures, there was no minority data available. We therefore collected anecdotal information on minority access to capital through a website search and follow-up phone calls.

Results of this study show a very small percentage of investments are made in women-led ventures for all years, but a slight increase in investments occurred between 1995-1998. Women-led ventures more likely to receive funding are those in early stage financing, located in the West and Northeast, and in computer hardware/software business sectors. Investments in women-led ventures differ from those in men-led ventures by business sector and stage of investment.

Present trends suggest women-led ventures are faring better. However the proportion of funds that women-led ventures receive remains extremely small. This raises the possibility that women could be "left behind" in the wealth creation process. Implications for public policy conclude this report.

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Introduction

Entrepreneurship is recognized as the engine of growth in the U.S. economy and women are playing an important role. Over the past 10 years women-owned businesses grew dramatically in number, revenues and employment. Their participation in all aspects of venture creation and growth has attracted significant attention. From 1987 to 1996, the number of women-owned businesses grew 78 percent, well above the 48 percent growth posted by all US businesses.¹ In 1992 it was estimated that more than 600,000 women-owned firms had sales greater than \$1 million (*Women Owned Businesses: The New Economic Force*, 1992). In 1996, women owned 36 percent of U.S. businesses, employed 26 percent of the total work force and generated \$3.1 trillion in revenues or 16 percent of total US revenues (*Women in Business*, 1998). Employment gains (28%) and revenue growth (34.8%) from 1996 to 1997 represent an even greater impact on the economy than does the sheer growth in the number of such firms. In 1999 it was estimated that there were 9.1 million women-owned businesses employing 27.5 million workers (NFWBO, 1999).

Yet, recently-released figures based on the 1997 U.S. Census indicate a lower number of women-owned businesses, a discrepancy that resulted from the adoption of different qualifying criteria. To be considered “women-owned” under the new definition requires 51% ownership, \$1,000 minimum annual revenues (up from the previous criterion of \$500), and that the business be privately held.² The new criteria exclude many high growth publicly held ventures that are at the upper end of the revenue continuum. The change in definition results in understating the numbers and economic contribution of women-owned businesses. However, this Census report also shows that over the past decade the number of women-owned businesses increased at a faster rate than all firms. Regardless of which criteria is applied, the growth and contribution of women-owned business is indisputable.

Trends for minority-owned businesses were similar to those of women-owned businesses but represented even more striking growth patterns. Between 1987 and 1997 the number of firms reported as minority-owned grew 168 percent, reaching a total of 3.25 million businesses (*Minorities in Business*, 1999). The increase in employment and revenue was equally strong. In 1997 minority-owned businesses employed 3.9 million people, an increase over the decade of 362.1 percent. Revenues reached \$494.7 billion, representing a gain from 1987 to 1997 of 342.8 percent (*Minorities in Business*

¹ U.S. Small Business Administration (1982-1996), *The State of Small Business: A Report of the President*, US Government Printing Office, Washington DC.

² The U.S. Census reported that the new criteria shows women own 26% of all US businesses, or 5.4 million.

Advocacy, 1999). Whereas there was variability among minority groups on all growth measures, the general trend in each of the minority categories was strongly positive.³

The Equity Funding Gap

A history of the U.S. Venture Capital Industry⁴ shows that in 1979 there were approximately 225 venture capital firms managing \$2.9 billion, and by 1989 there were 674 managing \$33.4 billion (Timmons & Sapienza, 1992). Since 1995, the venture capital industry has recorded exceptional and unprecedented growth. In 2000, \$103 billion was invested reflecting a one year increase of 113%. Not only did the total dollars invested reach new highs, but also the number of companies receiving equity funds rose from 3,967 in 1999 to 5,380 in 2000 (nvca.org/VEpress01_29_01). In 2000, firms received an average of \$19 million to fuel growth.

The crash of the dot.coms slowed investment but has not stopped it. Venture capital investments for the first quarter of 2001 were reported at \$11.7 billion, representing 1,072 investments and an average of \$10.94 million per company (nvca.org/VEpress 05/11/01). In addition, fundraising is down 68% from a year ago, with experienced funds having more success in raising money. The second quarter of 2001 shows \$10.6 billion or 13.8% of the total being invested primarily in life sciences/medical/health whereas only 11.2% went to such companies in the second quarter of 2000.

The spectacular increase and sudden slow-down of venture capital investing raises concerns about investor returns, increased sophistication of limited partners, venture capital firm investment specialization, and growing investment size. At the same time, recent trends may raise the standards for entrepreneurs seeking capital and increase the competition among venture capitalist for good deals (Timmons & Bygrave, 1997). While the long-term economic impact of the current venture capital phenomenon remains to be seen, equity investment is still recognized as a priority for fast growth businesses.

Notable changes in the types of investments were evident over the past decades. While the 1980s marked a trend toward investments at the seed stage (approximately 44% of investments) (Timmons & Sapienza, 1992), in the late 1990s the majority of venture capital firms were investing in later stages of venture development (Timmons & Bygrave, 1997; Kelly, 1999). Investments by industrial sector, once focused primarily on computer hardware and energy products, broadened considerably in recent years. During the first half of 1999, investments were divided between computer software and services (38.9%), communications (20.5%), consumer related (11.7%), medical/health (7.8%),

³ The groups mentioned here are those used by the U.S. Government and include Hispanic, Black, and Asian.

⁴ The National Venture Capital Association represents more than 400 venture capital and private equity organizations. Venture Economics is a Thomson Financial company and provides information for private equity professionals through newsletters and research reports (nvca.org/2001)

semiconductor and electrical related (4.7%), biotechnology (4.1%), computer hardware (2.5%), industrial/energy (.21%) and a broad category of other products (9.6%)(Thompson Financial Securities Data, 1999).

In 2000, the vast majority of venture capital investments were made primarily in communications; computer software, hardware and services; and medical, health, and biotechnology. Strong trends in regional concentration of investments were reported. More than 30 percent of the funds were invested in Northern California firms, primarily in the Silicon Valley; approximately 10 percent invested in New York and 9 percent in New England (Pratt, 1998; nvca.org/VEpress01_29_01). Together ventures in these three regions received nearly 56 percent of total dollars invested (\$57 billion), which approaches the total dollars invested in 1999. Compared to 2000, a greater number of companies in the expansion stage received venture capital, which might be a sign that venture capitalists were investing in their own portfolio companies (www.nvca.org/VEpress09_19_01).

Despite the explosive growth in equity investment, indications were that women and minority entrepreneurs were receiving only a miniscule percentage of equity capital. A private study of the venture capital industry conducted by Venture One for Aurora Venture partners in 1996 indicated that of the 6,362 companies that received venture funding from 1991 to 1996, only 31 deals were with women-led ventures (Seegull, 1998). Pratt (1998) estimated that of the 1,900 companies that received \$11.4 billion in venture capital in 1997 less than 2.5% (or 47) were women-led businesses. Similarly, a national study of 14,424 new firms found that when controlling for human capital and firm traits, minority entrepreneurs faced greater barriers in obtaining equity capital (Bates & Bradford, 1992). Another study of Hispanic-American ventures and equity capital noted that Latino businesses were “relegated to a peripheral status on the radar screens of most venture capitalists” (Morales & Saade, 2000, p. 59).

What explains this equity funding gap in women-led ventures? Previous research suggested three reasons that women may receive less equity investment: choice of industry, geographic location, and business size.

Choice of Industry

Researchers found that success in obtaining venture capital often depended on industry sector (Hustedde & Pulver, 1992). The predominant industry choices of female and minority entrepreneurs appeared to be mismatched with the industry preferences of venture capitalists. Scholars speculated that venture capitalists sought to avoid risk, while maximizing returns, and were likely to avoid diseconomies involved in disproportionate monitoring and due diligence associated with certain populations of entrepreneurs (Brophy, 1997).

“The combination of a perceived unacceptable risk/return relationship and investment diseconomies pose special problems for firms of varying types of ownership, many of which carry an extra burden of prejudgment with them as they approach the financial community. These include women-owned and minority-owned firms, and family businesses, franchises, and micro-businesses...” (Brophy, 1997, p.7).

Separate statistics on women-owned businesses seemed to support the speculation that women-led ventures were in sectors less popular for equity investment, and that they were not located in regions receiving high amounts of venture capital. For example, US Small Business Administration statistics showed that female and minority-owned businesses were heavily concentrated in the service (51% and 46%) and retail (18% and 21%) sectors, and most of their firms were small (www.sba.gov/advo/stats/wib.html).

Geographic Location

Another variable discriminating between firms successful and less successful in obtaining venture capital was geographic location. Studies showed that proximity to an urbanized setting was critical in acquisition of capital (Hustedde & Pulver, 1992). Relatedly, it was widely recognized that venture capital firms were geographically concentrated in certain areas (e.g. California, Massachusetts, Chicago, New York) (Timmons & Bygrave, 1997). Statistics on dollars invested in recent years supported this, showing that more than 50 percent of funds were extremely geographically concentrated in three areas (Northern California, New York and New England). For firms located in rural areas or outside of major venture capital concentrations, it was harder to gain access to funds. By contrast, there was strong evidence that the highest growth rate for the numbers of women-owned firms was in Nevada, Georgia, New Mexico, Florida and Idaho (*Women in Business*, 1998), all states outside of the major concentrations of venture capital providers.

Stage of Investment

Research showed that venture capital firms were more likely to invest in firms that had reached the accelerated growth or later growth stage (Mason & Harrison, 1999; Timmons & Bygrave, 1997). Since 1992, there was a trend towards heavier investing and re-investing in ventures reaching later stages as the risk was lower, returns were quicker and less managerial attention was required by the VC firm (Timmons & Sapienza, 1992). At the same time, the number of deals per year was increasing, the average deal size was growing faster. Hence, even though the pool of venture capital was increasing, less capital was available to new entrepreneurs, especially those seeking small amounts of capital necessary for early stage venture growth.

Academic Literature Review

Our academic literature review examined all issues of *Journal of Business Venturing*⁵ published between 1997 and 2002, a search that yielded 34 (of 150) studies about venture capital. We also identified four literature reviews published in the *State of the Art of Entrepreneurship* (Bygrave, 1992; Timmons & Sapienza, 1992) and *Entrepreneurship 2000* (Brophy, 1997; Timmons & Bygrave, 1997). All articles except for the literature reviews were empirical studies and two examined the European Venture Capital Industry (Ooghe, Manigart & Fassian, 1991; and Manigart, 1994). To date, research falls generally into three streams; the relationship between the investor and the venture capital firm; the operations and decision processes of the venture capital firm (1) the relationship between the investor and the venture capital firm; (2) the operations and decision processes of the venture capital firm, particularly pertaining to the search/screen and evaluation activities; and (3) the relationship between the entrepreneurial company and the venture capital firm

Nearly half of the studies (n=15) focused on the venture capital firm, the decision process and evaluation criteria in assessing the new venture (Sapienza, 1992; Sapienza & Korsgaard, 1996; Zacharakis & Shepherd, 2001; Zacharakis & Shepherd, 2002). While earlier studies relied on surveys and self-reports by venture capitalists, more recent studies applied cognitive theory and experimental design methods (Zacharakis & Shepherd, 2001; Zacharakis & Shepherd, 2002).

We identified eight studies that examined the relationship between the investor and venture capital firm, although this topic was examined in the literature reviews (Timmons & Sapienza, 1992; Bygrave, 1992; Brophy, 1997; Timmons & Bygrave, 1997). Strategies of venture capital firms were considered in some empirical works (Gupta, & Sapienza, 1992; Swartz, 1991), while other authors explored the “valued added” to entrepreneurial firms from venture capitalists (Sapienza, 1992), the effects of team processes in the partnership (Watson, Ponthieu, & Critelli, 1995), and venture capitalists’ perceptions of serial entrepreneurs (Wright, Robbie & Ennew, 1997).

Agreeing with Mason and Harrison (1999), we concluded that the majority of research, regardless of research stream or theoretical framework, approached venture capital studies from the perspective of the venture capitalist, or the venture capital industry, which is the supply side of the industry. Less often did research examine the demand side, or the approaches taken by firms *seeking* venture capital. Indeed, industry overviews explicitly pointed out that future research opportunities existed in studying public policy, industry competitiveness and venture capital firm operations and strategies (Timmons & Bygrave, 1997; Sapienza & Timmons, 1992), and called for examination of

⁵ While there are several journals that publish venture capital research, this *Journal of Business Venturing* is widely recognized as a top journal in the Entrepreneurship field, and given its mission, publishes a fairly high number of articles about venture capital. Our purpose was not to be comprehensive, but to conduct a representative literature review.

the factors influencing variations in the ability of some populations of firms to obtain venture capital.

None of the 34 articles and book chapters we reviewed indicated that women or minority-owned businesses were included in the samples of ventures seeking equity funding, and no studies of venture capital decision-making or venture capital firms indicated whether or not women venture capitalists were included in the samples.

When the search of current articles on venture capital yielded no studies that explicitly included women-owned businesses, we expanded our review to current literature on financing and women-owned businesses. Studies about the access and use of debt or credit or financing strategies and relationships to growth and performance were extremely limited. Research examining issues of gender and financing focused exclusively on access to *debt* capital (Riding & Swift, 1990; Buttner & Rosen, 1988). Findings on the relationship between gender and access to debt financing were inconclusive. A study of the role of initial firm resources on start-up success showed that women-owned firms had less access to financial resources than did their male counterparts (Carter, Williams & Reynolds, 1997). A follow up study showed that availability of capital through private and personal banking sources was related to the size of women-owned businesses (Carter & Allen, 1997). Similarly, Buttner and Rosen (1988) found that bankers perceived men to be higher on characteristics associated with successful entrepreneurship than women.

In contrast, a study of access to bank financing in Canada showed few differences where firm age, size, and growth rate were controlled (Riding & Swift, 1990; Fabowale, Orser & Riding, 1995). A study by Coleman (2000) using bank data showed that women-owned businesses were smaller and newer than men-owned, and that they were less likely to use external financing. She concluded there was no apparent discrimination in lending based on gender, but noted that women often paid higher interest rates and higher collateral requirements, supporting results of Fabowale, et al (1995).

We also reviewed articles on minority business access to funding (debt) and found it to be similarly limited. Bates and Bradford's (1992) investigation of venture capital financing of minority businesses found that 2.8% of the 14,424 firms studied received equity capital and that human capital factors (education, age, managerial experience) distinguished those receiving capital from those not receiving equity. Another study pointed out that black-owned businesses had limited access to financial capital in general, in part because they were poorly capitalized at the start, and had less experience and education (Bates, 1996). A third study of ethnic immigrants found that trust, based on shared values played a significant role in capital acquisition (Greene, 1997). Further, Greene and Butler (1997) point out in their extensive literature review that capital formation varies by ethnic group, many ethnic entrepreneurs using non-traditional means to finance new businesses.

In summary, we concluded that current studies in the venture capital investigated the relationship between the investor and the venture capital firm, the search/screen, evaluation and decision processes, and the strategies/characteristics of the venture funded firms. But, to date research has not included or not reported whether women venture capitalists or women-owned businesses were included in the samples. Research on financing strategies and access to debt for women-owned businesses was sparse and inconclusive. Hence, the academic literature showed a significant “gap” in our understanding of the ways women finance their businesses and women’s participation in the venture capital industry, further justifying the need for this study.

Research Objectives and Methodology

The purpose of this study was to map and describe equity financing over the past 30 years and to examine the participation of women.⁶ As the time period extended three decades, we did a separate analysis of the data for the years 1988-1998 in order to detect more recent trends reflecting the growth in women-owned businesses and rise in venture capital funding. While our initial intention was to examine minority access to financing as part of this study, we found that the data sets we utilized did not collect or code for race or ethnicity.⁷ The research questions of interest in this study were:

1. What were patterns of women’s participation in the venture capital industry?
2. What were patterns of venture capital funding in women-led businesses over the past 30 years?
3. What were patterns of venture capital funding in women-led businesses over the past 10 years?

Research Design and Methodology

Phase I

Our study was conducted in two phases. Phase I was designed to explore the history and context of the venture capital industry. We began with a literature review of articles about venture capital from entrepreneurship journals (reported above). Each article was abstracted, and assessed according to theory, research question, sample and major findings.

⁶ This study first proposed to investigate women-owned ventures, however, the data set did not permit identification of “ownership”. Instead, we screened the data set for highest ranking role (Chairman and President/CEO) and re-coded the data set for gender of the “leader”, consistent with previous studies (MacMillan, Zeman & Subba Narasimha, 1987; Hisrich & Jancowicz, 1990). Details of our coding procedures are included in Appendix A.

⁷ The Kauffman Center for Entrepreneurial Leadership recently funded a study to investigate minority access to equity capital. Principle investigators are Dr. Timothy Bates and Dr. William Bradford.

We then examined women's participation in the venture capital industry using *Pratt's Guide to Venture Capital* for 1995 and 2000. *Pratt's Guide* lists venture capital firms that voluntarily report information, such as location of offices, funds under management, age of company, investment preferences and management. We identified women by names and their roles in the decision-making hierarchy through visual examination of the volumes. A website check was used to verify any names that were not identifiable by gender from the printed Guide. Titles were used to determine role, which were categorized (e.g. partner, president, CEO, managing director, chairman, principal, senior vice-president, vice president, associate, other titles). In cases where titles were not listed, phone calls and website checks were used to verify. Statistical analysis included frequencies and descriptive statistics.

Phase II

This research phase used a comprehensive data set,⁸ which included information on companies funded by venture capital since 1957. This data set was made available through an ongoing project by one of the investigators with the Kauffman Center for Entrepreneurial Leadership (KCEL) and that Center's strategic partnership with the National Venture Capital Association and Venture Economics, a subsidiary of Securities Data Corp. The data set included information on 20,000 portfolio companies, 34,000 executives and 120,000 company investments. The information was provided by 4,500 private equity firms that managed 7,000 private equity funds. The data was collected by the National Venture Capital Association (NVCA) and was updated on a quarterly basis.

However, as noted by MacMillan et al, (1995), and as is the case with many publicly available data sets, this data set has some common limitations- i.e. completeness of responses and definitional purity (Phillips & Dennis, 1997). In addition, only businesses receiving funding are included in the data set, therefore comparisons to businesses not receiving funding are not possible from this data set.

In order to analyze the data set, we re-organized, re-formatted, and re-coded the original data set. When we received the data, it was organized in four separate excel files with multiple redundant records. It was necessary to review each line of data to determine redundant company entries to insure that each investment was counted only once. This necessitated re-coding, checking and cleaning. Files were transposed, imported into an SPSS format, and merged into a single data base.

All responses were coded according to the sex of firm owner or management, year of first investment, stage at first investment, and industrial sector. The original data set was not coded for sex of participants, therefore, it was necessary for us to screen all entries and code male or female by first name or title (Mr./Mrs./Ms). Entries for which

⁸ The data was originally collected by Venture Economics, but taken over by the National Venture Capital Association.

sex was not apparent by either criterion were coded "2," used to establish frequencies, and set aside for further investigation and consideration. We screened according to job title, selecting the highest-ranking role for each firm as the representative. In cases where both Chairman and President/CEO were listed, we chose the latter, reasoning that management capabilities was one of the key determinants in the decision to fund a new venture (MacMillan, et al, 1985, Hisrich & Jancowicz, 1990).

Analyzable variables included stage of investment (coded: early, expansion, late, buyout/acquisition), month/year of investment, and amount of investment. Company characteristics included were geographic location (city, state, zip), industry (SIC and industry category –e.g. software), gross sales, and owner demographics. All of these variables were recorded for each investment stage- for instance sales and profits were noted for a company every time it received venture capital.⁹ Although minority status was included in the description of the data set, we have since learned this information was not collected.¹⁰

Data recoding was followed by statistical analysis. We ran frequencies, means, and descriptive statistics for the overall data set, and for subgroups (gender, decade, sector and geographic region). This was followed by running cross-tabs and X2 analyses to determine if gender was related to stage and/or amount of investment for all years and for the past 10 years, 1988-1998, anticipating that patterns might be different given the increased growth of the venture capital industry and new business formations by women in the past decade.

As noted earlier, our data sets did not collect information coded by race or ethnicity. However, in order to gain an understanding of the issues surrounding the funding of minorities, and particularly minority women, we conducted a website search of more than 150 websites to identify (1) venture capital funds focusing on minority and minority women investing, (2) community and trade organizations facilitating or supporting minority women in growth and equity capital acquisition, and (3) minority women-led ventures seeking or receiving equity investment. Websites that were specific to certain groups (e.g. Hispanics, Asians, African-Americans) were examined. Follow-up phone calls were made to clarify information from the websites.

Results

Women's Participation in the Venture Capital Industry

In order to address our first research question: "*What were the patterns of women's participation in the venture capital industry?*", we conducted statistical tests of

⁹ This information was not reported consistently for every company, as there is substantial missing data.

¹⁰ While minority status was a variable listed in the data set, the number was very small. This information was collected only sporadically during the past 6 years, and it is uncertain to what extent the numbers were analyzable.

the compiled and re-coded data from *Pratt's Guide*. Listings were based on individual level data (women's names) and collapsed using company name and information. From this, 462 firms were identified in the combined 1995 and 2000 data sets that had women listed in one or both years.

In 1995, 276 women were listed, while in 2000, 529 women were listed, a rate of increase of 92 %. The number of firms listing one woman increased by 49% from 144 to 237, while the number of firms listing two women rose by 93%, and those listing 3 or more grew by 183%. While the average number of women per firm had increased from 1.37 to 1.48, in 2000 the number of firms having more than 3 women listed remains very small, less than 10% of all firms listing women.(See Table #1)

The total number of people listed in the industry in 1995 was 3,647; the percentage of women was 7.8%. By 2000, the total number of people in the industry was 6,086, and women accounted for 8.8%. Similarly, the average number of women in venture capital firms showed a slight increase from 1.37 to 1.49 over the same time period. However, the percentage of women among the staff listed decreased over the five year period from 35% representation to 32%. (See Table #1).

The number of women listed in top decision positions increased by 109% from 106 in 1995 to 222 in 2000 with nearly 50% of firms in 2000 having women partners. The number of women at mid-decision levels increased by 73%, from 100 to 173. At the lower decision level, the increase was much smaller, 27% over the same time period (See Table #1.). Although women serving as managing directors of venture capital firms also increased, their numbers remained extremely small.

The data showed that even though the percentage of women was overall quite small relative to their male counterparts, the number of women working in the venture capital industry was increasing, many were rising to major decision-roles in their firms and there were significant numbers of women in the pipeline. In just 5 years, the progress women made in penetrating a previously male-dominated industry was notable.

Characteristics of Businesses Funded by Venture Capital- 1957-1998

To address our second research question, "*What were patterns of venture capital funding in women-led businesses over the past 30 years?*", we conducted statistical tests on the National Venture Capital Association data set that we recoded. For the 8311 businesses¹¹ for which the leader's gender could be identified (in the years between 1957-1998), 395 (2.4%) of the investments were made in women-led ventures, while 7916 were made in men-led ventures (See Table #2). Between 1957-1980, there is no year in

¹¹ Of the 16,135 investments in ventures between 1957 and 1998, we were able to identify the gender of the founder in 8,311. For many cases, the name of the management contact for the business receiving the investment was only listed by last name, or initial. In other instances, we could not assume that the first name was male or female. For all cases in which there was any question, the businesses were counted as "unidentifiable" by leader's name.

which there were more than 3 identifiable women-led ventures receiving venture capital, but after 1980, the numbers of investments grew (See Table #3). Between 1981-1987 the greatest number of investments in women-led ventures was 33 in 1987, representing 4.1% of all investments. Investments in women-led ventures between 1988 and 1998 increased to a high of 54 (still representing 4.1%) in 1998. The range was a low of 9 in 1995 to a high of 43 in 1996, to 52 (3.5%) in 1997, and 54 (4.1%) in 1998.

From 1957-1998 service-related ventures received the greatest proportion of venture capital investment for women (53%) and the second highest percentage for men-led ventures (42%). Manufacturing ventures received the greatest investment overall at nearly 50%, and for men-led ventures, this comprised 50% of investments. For women-led ventures, manufacturing companies received 38% of total investments, while wholesale firms received 5.2% similar to men-led ventures (5.5%) (See Table #4). No identifiable women-led ventures in FIRE, construction or public administration received equity financing between 1957-1998, although a small percentage of men-led ventures in these sectors received investments.

The analysis of funding by stage of investment showed that the highest percentage of investments in women-led ventures were made at early stage similar to men-led ventures (See Table #5). However, within gender percent shows that 63% of women-led ventures received equity at seed stage compared to 55% of men-led ventures. The data suggests that proportionately, women are more likely to receive early stage funding, whereas men are more likely to receive funding at early, expansion and buy-out stages.

Ventures funded were most often located in the West (42%) and East (31%). Only about 8% to 11% of businesses receiving funding were located in the South, Midwest and Central regions. Among women-led ventures receiving funding, more than 52% were located in the West, about a fourth (26%) were located in the East, and less than 5% (4.6%) were located in the Midwest. (See Table #6) Notably, women-led businesses located in the Midwest received the smallest percent .2 % of total investments, and 4.6% within gender, compared to 7.9% of the total, and 8.3% within gender for men-led businesses. Not surprisingly, women-led ventures located in the West received 51% of all investments in women-led ventures, compared to 41% of investments in men-led ventures.

An analysis of investments by business sector showed that the most popular sector for investing was computer hardware/software/service which received 39% of total investments (See Table #7). This was followed by medical/health (15%) and communications (15%). In comparing investments by sector for men and women, we saw that women-led software ventures received 2.4% of total investments, and nearly 50% of all investments in women-led businesses. On the other hand, men-led businesses in this area received 36% of the total and 38% of the total for all men-led businesses. The data shows that women-led-businesses in medical/health and biotechnology receive a higher proportion of investments than men-led ventures, while the reverse is true for communications and industrial/energy.

Characteristics of Businesses Funded by Venture Capital- 1988-1998

Our third research question examined patterns in the past 10 years: “*What were patterns of venture capital funding in women-led businesses over the past 10 years?*” As seen in Table #8, the proportion of investments made in women-led ventures was the highest in the most recent decade (3.5%). The cumulative average of investments in such firms between 1957 and 1988 was 2.4%. (See Table #2) The total number of investments in firms identified as women-led ventures between 1988-1998 was 290 (vs. 395 for all years) which represents 73% of all investments (See Table #8).

We began with an analysis of investments by industrial sector. No investments were made in women-led ventures in construction, public administration, finance, insurance, or real estate (FIRE) (See Table #9). Women in service (56%) or manufacturing (36%) were more likely to receive funding than in other industries, while the same was true for men (42%) and (43%), respectively. Men and women-led businesses in wholesale and retail were less likely to receive funds. Hence the pattern of investment by sector is quite similar for men and women-led businesses between 1988-1998.

On the other hand, there were differences in that men-led ventures in manufacturing received a higher percentage of total investments, whereas women-led ventures in services received the highest proportion of funding for all women-led businesses. (See Table #9) This may reflect general trends: women were more likely to start service-based businesses rather than manufacturing-based businesses (www.sba.gov/advo/stats/wib.html). From 1988-1998, there was only one sector for which women’s receipt of venture capital was not significantly different from men: retail and wholesale.

In the years 1988-1998, both men and women led ventures in early stages received more investments. However, women-led companies were more likely to be funded at early stages of business development, with more than 62% of all investments in women-led ventures occurring at this stage, compared to 43% for men-led ventures. Men-led ventures more often received funding at buy out/acquisition. (See Table #10). The buy-out acquisition stage of investment represented 18 percent of all investments made in male-led ventures, but not quite 1 percent of those made in women-led firms. Statistical tests showed significant differences between men and women led ventures in stage of investment, men were significantly more likely to receive buy-out and acquisition investments, while women were more likely to receive seed stage investments.

Patterns of Minority Access to Equity Capital

As indicated earlier, the data sets we analyzed (NVCA and Pratt's Guide) included no breakdown by race or ethnicity. We collected anecdotal information to determine trends in equity funding for minority businesses by using a snowball approach starting with general web searches, follow-up phone calls and e-mail correspondence. We examined 500 web pages (150 websites) and made 70 phone calls. Initial web searches employed key terms and combinations of key terms (e.g. minorities, venture capital, equity financing and specific ethnic group classifications used in prior research by the US Small Business Administration). This yielded more than 13,000 hits (for instance, venture capital and African –Americans, 3,840 hits). Next, organizations and resources targeted at business development of minorities were investigated. Several organizations were contacted by phone (n= 45) to determine if they provided venture capital, education/programs about venture capital, or had information about minority business access to venture capital. Phone interviews, websites and materials mailed to us as a result of our inquiries were analyzed by two researchers. We developed following “stylized” facts from this investigation.

- a. Venture capital funds, angel investment programs, and equity funding organizations targeting minorities focused on businesses specializing in computer and information systems, health care services and communications.
- b. Regional initiatives designed to advance venture capital investment (e.g. an Illinois strategic initiative for investing state resources in education and advanced research and development, health sciences and bio-technology and cutting –edge information and technology programs) did not appear to specifically target women or minority businesses. (www.state.il.us/tech/venture.htm).
- c. Networking behaviors by minorities to locate equity investment began with other minorities in related services (i.e. lawyers, accountants). Quite often, these were local business based groups (e.g. the Atlanta Business League, www.theabl.org), minority groups of local Chambers of Commerce, or targeted ethnic organizations that provided a variety of services (e.g. Asian Inc., www.asianinc.org). These organizations noted consistently that the process of obtaining equity capital varied by ethnic group. For example Vietnamese and Korean families were more likely to engage in “pooling” of funds to seed new ventures.
- d. Recent minority businesses investment conferences were fostering networking and contacts among members. For example, the National Organization of Minority Funds (www.naich.org) sponsored conferences in the past 30 years to increase the number of equity investments in minority-led ventures.
- e. Minority women seeking capital may have greater barriers than white women or minority men. For example, one Hispanic woman entrepreneur, who owns a sizable multi-media production company, suggested that venture capitalists were

less likely to consider minority women than white women. This perception was echoed by an Atlanta-based Hispanic woman, who owns a steel fabrication firm, and a Chinese woman who founded a multi-outlet medicine research institute. All three women had established businesses of over \$ 1,000,000 in sales, and desired to expand their businesses rapidly.

Discussion

This exploratory analysis showed that the proportion of women-led businesses funded by venture capital over the past 30+ years was extremely small. Earlier reports note that about two percent of the deals receiving venture capital were women-led firms, and our data showed overall similar results. Whereas the data in this study showed the overall percentage for the past 30 years was 2.4%, the last few years provided indications of an increasing trend (up to 4.1% in 1998). Nevertheless, the proportion of women-owned businesses receiving venture capital from 1957-1998 remained extremely small (395 compared to 7916), especially considering the overall number of women-owned businesses in the US.

Industry differences were apparent. There were no investments reported for women-owned firms in construction, Finance, Insurance, Real Estate (FIRE), and public administration, and only one in transportation/communications. In part, the explanation for this lack of investment in these sectors may be a result of the small number of women starting businesses in these sectors. In 1982, women's share of all non-farm sole-proprietorships in agricultural services, mining, transportation and utilities, and manufacturing was less than 1%. In construction, women held a 2.3% share (*The State of Small Business*, 1995). By 1992, women's share rose to 1.4% (82,526 businesses) in agricultural services, 2.6% (152,346 businesses) in manufacturing and 3.1% (183,695 businesses) in construction (*The State of Small Business*, 1995). The numbers of women-owned businesses in finance, real estate and insurance had a 9.4% share in 1982 (246,403 businesses) and rose to 10.2% (602,802 businesses) by 1992. One reason for the comparative lack of investment in women-led ventures during the 1980's and early 1990's may be explained by their low level of participation in these areas.

By contrast, in 1992, women owned 53.6% of all service firms (3,158,444 businesses). When examining the percentage of investments in women-led ventures within this sector, we found that women in services received only 6.7% (155) of total VC investments in this sector. Hence the proportion of women receiving equity investments relative to presence in the industry is comparatively small, considering the total number of investments in service businesses (2,306). (See Table #4, #9). On the other hand, the overall high percentage of investments in service businesses for both men and women-led ventures disconfirms the idea that only manufacturing or technology ventures receive equity capital

Extended analysis of investments in industry by gender between 1988 and 1998 shows that women's share of investments in manufacturing businesses rose from 4.2% to 7.2% and in services from 6.7% to 10.9% (See Tables #4, #9). Within-industry analysis of investments in women-owned businesses shows the highest percent of investments is received by services and manufacturing, which parallels the distribution of investments in men-owned businesses. The lack of significant differences between industry sectors supported the strength of the supply side of the industry. Venture capital dollars were attracted to specific industries in a way that benefited risk/reward trade-offs desirable to equity investors.

Furthermore, it has been argued that transportation and communications businesses are more technology focused and innovative, and therefore have the potential to grow faster and bigger (Kirchhoff, 1994). According to the National Women's Business Council, the women in management positions in technology-based businesses grew by 21% between 1998-1999 (NWBC, 1998).

Although the distribution of investments by industry and gender was similar, the major disparity was in the sheer number of investments, which was less than 10% of all investments that could be identified by gender and SIC code. There were more than 600,000 women-owned businesses in FIRE, and over 3 million women-led firms within the service industry. By 1998, 70% of all women-owned businesses were in the service and retail sectors, with 10.2% in finance, real estate, and insurance (SBA, 1998). Consequently, it was surprising that the proportion of women-led firms in these sectors receiving venture capital funding was so small.

A closer examination of investments by business sector showed women in biotechnology and medical/health sectors received proportionately more investments than men-led ventures. This might parallel the increased numbers of women attending medical school. In 1960, approximately 6% of attendees were female, but this grew to 25% in 1982 and 43% in 1995 (AACSB.org). On the other hand, the share of women-led businesses in computer hardware/software and communications receiving financing was comparatively low, even though these areas were the highest for women overall. This suggests that women do indeed start ventures in sectors that are attractive to venture capital funding. A recent survey of applicants to the Springboard Venture Forums shows that 50 percent of the women-led businesses that received investments were in computer hardware/software/services. Further, a review of the National Venture Capital Association statistics from between 1988 and 1998 showed that service-related ventures received the greatest proportion of venture capital investments for both men-led (42 percent) and women-led (53 percent) ventures. It is clear that women are active participants in industrial sectors attractive to venture capitalists (*The Diana Project*, 2001).

The geographical distribution of investments by gender showed that 70% of all investments were made in businesses located on the East and West coasts for both men and women-led ventures. This suggests that businesses located in the Midwest, South

and Central regions of the US were receiving a combined 25% of investments. While the distribution of the venture capital industry matched the investments, it was less clear whether the proportion of fundable businesses were concentrated on the two coasts. For women-led businesses in the South and Midwestern part of the US, a combined 48 businesses or 12% were funded over 30 years. This compared to 1247 for men-led (16%) It raised the question as to whether location was playing a significant role in determining access to equity funding.

Looking at the relationship between stage of development and equity funding from 1957-1998 showed that the bulk of women-led businesses were funded at early stage, while men-owned businesses received buy/out and acquisition funding. The data from the past 10 years did not reflect a change in that relationship: more than 60% of women-led investments were still early stage investments. This suggested that even for women-led growth oriented firms, those likely to be funded by venture capital, growth by acquisition may not be a primary strategy, by choice or because of lack of funding to pursue those strategies. Data showed that the number of women starting new businesses was greater in the past 5-10 years (SBA, 1998). Even with early stage investments, it was expected firms will have received angel and private funding prior to seeking institutional equity funding (Bartlett, 1999). Furthermore, early stage investment might be considered more risky, especially if the market is emerging and products are in the development stage (Mason & Harrison, 1999).

But, it is less clear whether or not there were disparities in the amount of funding or stage of funding based on gender due to perceived risk and/or diseconomies of extra due diligence as suggested by Brophy (1997). Our data did not allow for analysis of amount of investment by stage and gender, but clearly this should be examined in future investigations.

Our assessment of the venture capital industry showed that women are making significant progress participating as venture capitalists and moving into decision-making roles. Ironically, even though the industry itself experienced rapid growth, the increase in women's participation remained comparatively small. The extent to which this influenced the ability of women to access the informal network is yet to be determined. One survey of 145 venture capitalists over 98 different firms showed that more than 67% had an MBA, and than 56% graduated from Stanford and Harvard. A majority had more than 10 years business experience, which for 34% of respondents was in corporate management, while 30% were former entrepreneurs (Smart, Payne & Yuzaki, 2000). By comparison, statistics show that women are less likely to have corporate experience as on average 25% of all managers of Fortune 200 companies are female, some companies reporting only 7%. On the other hand, the pool of women qualified to be venture capitalists by virtue of entrepreneurial experience appears to be increasing. Another study found that of firms that went public in 1988, there were no women on top management teams, but by 1993, 27% of firms going public had women in the management ranks (Welbourne & Cyr, 1999).

It is widely stated that the process of raising capital is a “non-formal process,” that capital seekers should talk to people who have done it before, get guidance from professionals in the business (e.g. investment bankers, attorneys) (Alimansky, 2000). Further, empirical research shows that the industry is highly concentrated with several large firms controlling the bulk of capital and consistently producing superior returns (BenDaniel, Reyes & D’Angelo, 2000). Reasons given for this concentration were the tendency for risk aversion by limited partners (pension funds, endowments, insurance companies) encouraging venture funds to invest in later stage deals, which are less risky. This suggests greater challenges for women and minorities who have earlier stage businesses, fewer role models and less access to professionals or entrepreneurs who have taken companies public.

Implications

Entrepreneurship is the engine of economic growth. Equity investments fuel the growth and development of new ventures that yield innovative solutions to consumers and businesses. Women are contributing to new business development in every sector, yet their ability to acquire equity capital remains limited. The industry choice, stage of investment and geographic location of most women-led ventures are consistent with general practices of entrepreneurs seeking equity to grow their ventures. Moreover, women are gaining presence in the venture capital. However, in spite of recent developments, the disparity between men and women entrepreneurs and their proportional access and receipt of equity funding remains a concern. What are the potential implications of this disparity between men- and women-owned ventures and their access to equity funding?

1. Wealth Creation

Minimal investment in women and minority-led ventures diminishes the opportunity for women to grow their businesses and create wealth. We determined that over a period of 30 years women received less than 5% of all VC investments. The good news is that women’s share increased over recent years, but the large disparity between women owning businesses and those receiving equity are a policy concern. Further, the numbers of women participating as partners in the venture capital industry is equally small. Are women being left out of the wealth creation process? Are women being denied the opportunity to share in the wealth flowing to venture capitalists and entrepreneurs who successfully partner in creating large and valuable enterprises? Will women’s severely limited participation in wealth creation influence their ability to build personal and family assets?

2. US Competitiveness

A lack of equity investment in women and minority-led ventures may limit growth and diffusion of innovations, job creation and economic contributions of these populations to the US economy. Our data showed that women created businesses in industries (e.g. manufacturing and services) and sectors (computer software, telecommunications, biotechnology) that resonate with venture capital investors. Yet the share of women-led ventures in these areas receiving equity remains small. Is the US missing out on multiple opportunities to develop, commercialize and export many of its most unique inventions, best medical solutions, or top technology innovations?

3. Investment Returns

Continued investing in predominantly male-led geographically concentrated businesses may result in less desirable returns to the venture capital community. By pursuing a strategy of identifying investments through informal networks, is the venture capital community missing out on the chance to fund and receive returns from good investments?

Public Policy Suggestions

To encourage and facilitate equity investment in ALL entrepreneurial ventures, not just those led and founded by men, the following steps should be taken:

1. Track investments and performance of investments by gender, race and ethnicity, as well as geographic location in all venture funded companies.
2. Encourage investors to seek out and consider investment in women and minority-led ventures.
3. Create programs to educate and prepare women to lead fast growth businesses—whether high tech or not.
4. Sponsor forums, like Springboard 2000, to link women and minorities with potential investors.
5. Encourage and educate women and minorities to participate in the investment process (angels, corporate venture funds, and venture capital firms).
6. Encourage and sponsor additional research to examine the process by which men, women and minority-led ventures are screened by angels and venture capital firms, to determine if there are any differences.

7. Encourage and sponsor research to examine similarities and differences in funding stages, funding amounts, venture performance and returns to investors by gender and ethnicity.
8. Encourage and sponsor research to examine the extent to which venture capitalists, angels and limited partners (pension funds, endowments, insurance companies) perceive investments in women and minority-led ventures as more risky investments.

The Future

“The equity markets are the last frontier for women entrepreneurs. The stories of the women who tried to build their businesses without a map to the gold in these markets were the motivation for launching the Springboard forum series. Now we have more than stories, we have results. The experiences of these women entrepreneurs have become the gold mine that will be used to guide the next wave of entrepreneurs through these markets.”

-Amy Millman, President, Springboard Enterprises

Within the past two years, several groups around the country have coalesced around the issue of women business owners, growth opportunities and equity investments. Both general networking and focused organizations have created programs to advance the development of female entrepreneurs. In addition, venture capital firms and angel networks began to devote significant attention to what was perceived as a new market – women business owners. Periodically convened by the Kauffman Center for Entrepreneurial Leadership, and in partnership with the National Women’s Business Council and Forum for Women Entrepreneurs, representatives of many of these organizations participated in preparing an agenda for further development

The series of Springboard Forums held in 2000 provided a vivid example of a proactive response to the dearth of women receiving equity investments to grow their ventures. The program, intended to accelerate investments in women-led businesses, was launched in 1999 by a consortium of leading women’s business advocates and organizations. In 2000, forums were held at the Oracle Corporation in Silicon Valley, America Online Headquarters in Washington, DC, and the Harvard Business School in Boston. Forums in 2001 were held at the Oracle Corporation, as well as Chase Manhattan Plaza in New York City, and Northwestern University in Evanston, Illinois. These six events received 1,700 applications from women entrepreneurs in the software, technology, new media, consumer and business products, and life sciences industries. Further, the forums showcased 175 women entrepreneurs, attracted nearly 1,000 investors, and connected almost 2,000 investors, financiers and business development professionals in screening and coaching the companies. The women-led ventures presenting at these forums have raised more than half a billion dollars, and 80 percent of

these companies still have women at the helm and are continuing to grow. The program is continuing as Springboard Enterprises with additional programs and services designed to assist women in growing their ventures.

However, these programs are only a start. The success of the US economy depends on the extent to which the best ideas, managed by qualified entrepreneurs receive growth capital. We cannot afford to leave out populations of women and minorities in either the supply or demand for equity funding.

Table 1- Women in the Venture Capital Industry

	1995 PRATTS		2000 PRATTS		1995 PRATTS	2000 PRATTS	
		Same 96 Companies With Indices taken at both '95 & '00					
	FIRMS LISTED ONLY IN 1995	FIRMS LISTED IN 1995 & 2000	FIRMS LISTED IN 1995 & 2000	FIRMS LISTED ONLY IN 2000	TOTAL NUMBER OF FIRMS 462 (94 overlap)		% Increase across '95-'00
Firms Listing Women Principals	107	94	94	261	201	355	77%
Number of Women in Industry¹	133	143	164	365	276	529	92%
No women listed		1 (1%)	7 (7%)				
1 woman listed	86 (80%)	58 (62%)	48 (51%)	189 (72%)	144(72%)	237(67%)	49%
2 women listed	17 (16%)	26 (28%)	21 (22%)	56 (21%)	43(21%)	77(22%)	93%
3 or more women listed	4 (4%)	9 (10%)	18 (19%)	16 (6%)	13(6%)	34(10%)	183%
Average women in firms	1.2	1.52	1.74	1.38	1.37	1.49	9%
Percentage women in firms	35%	35%	35%	31%	35%	32%	-9%
Women's Position in the Decision-making Hierarchy²							
Number of women at Top Decision Level	49	58	91	142	106	222	109%
Average number of women at Top Decision Level	1.37	1.64	1.95	1.58	1.51	1.69	12%
Percentage of staff that are women at Top Decision Level	37%	38%	36%	34%	38%	35%	-8%
Number of women at Mid Decision Level	48	52	50	122	100	173	73%
Average number of women at Mid Decision Level	1.43	1.76	2.15	1.54	1.59	1.71	7%
Percentage of staff that are women at Mid Decision Level	38%	37%	41%	30%	38%	33%	-13%
Number of women at Low Decision Level	32	24	21	50	56	71	27%
Average number of women at Low Decision Level	1.17	1.95	2.38	1.81	1.49	1.97	32%
Percentage of staff that are women at Low Decision Level	27%	32%	29%	32%	29%	31%	7%

¹ - computation based on listing of woman's name

² - computation of all decision hierarchy measures based on listing of woman's title- number of which is less than indicies based on woman's name because of missing data.

Table 2

**Frequency of Firm Acquisition of Venture Capital, by Gender of Firm Leader
from 1957-1998**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male-led	7916	49.1	49.1	49.1
Female-led	395	2.4	2.4	51.5
Unidentified	7824	48.5	48.5	100.0
Total	16135	100.0	100.0	

Table 4

Frequency of Firm Acquisition of Venture Capital Funding by Gender and Industry from 1957-1998

Industry ^a	Male		Female		Women's % w/in Industry	Industry % of Total	Total Invest- ments
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>			
Construction	3	0.1	0	0.0	0	.05	3
Manufacturing	2556	50.0	111	38.3	4.2	49.4	2667
Trans/Comm	8	0.2	1	0.3	11.1	.2	9
Wholesale	279	5.5	15	5.2	5.1	5.4	294
Retail	102	2.0	8	2.8	7.2	2.0	110
FIRE	8	0.2	0	0.0	0	.1	8
Services	2151	42.1	155	53.4	6.7	42.7	2306
Public Administration	2	0.0	0	0.0	0	.03	2
Total	5109	100.0	290	100.0		100.0	5399

X2 = 18.09

d.f. 7

sig. <.012

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and SIC code is reported. Industry labels are those reported in the NVCA data set. Percents may not add to 100 due to rounding.

Table 5

Frequency of Firm Acquisition of Venture Capital by Gender and Stage of Investment from 1957-1998

Stage	Male		Female		Total	
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>%</u>	<u>Number</u>
Early Stage	4240	52.7	251	3.1	55.9	4,491
Expansion	1449	18.0	80	1.0	19.0	1529
Later Stage	580	7.2	28	.3	7.6	608
Buyout/Acquisition	1097	13.6	31	.4	14.0	1128
Other	277	3.4	5	.1	3.5	282
Total	7643	95.1	395	4.9	100.0	8038

X2 = 22.11

d.f. 4

sig. <.000

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and investment stage is reported. Percents may not add to 100 due to rounding.

Table 6**Chi Square Tests for Gender and Region 1957-1998**

	Male	Female	total
East	2394	102	2496
% in region	95.90%	4.10%	100%
% in gender	31.20%	25.80%	30.90%
% of total	29.60%	1.30%	30.90%
West	3187	204	3391
% in region	94.00%	6.00%	100%
% in gender	41.50%	51.60%	42%
% of total	39.50%	2.50%	42.00%
South	612	30	642
% in region	95.30%	4.70%	100%
% in gender	8.00%	7.60%	7.90%
% of total	7.60%	0.40%	7.90%
Midwest	635	18	653
% in region	97.20%	2.80%	100%
% in gender	8.30%	4.60%	8.10%
% of total	7.90%	0.20%	8.10%
Central	854	41	895
% in region	95.40%	4.60%	100%
% in gender	11.10%	10.40%	11.10%
% of total	10.60%	0.50%	11.10%
Total	7682	395	
% in region	95.10%	4.90%	
% in gender	100%	10%	
% of total	95.10%	4.90%	

X² = 19.346 d.f. 4 sig. <.001

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and investment stage is reported. Percents may not add to 100 due to rounding.

Table 7

Chi Square Tests for Gender and Business Sector 1957-1998

	Male	Female	total
Biotechnology	446	40	486
% in sector	91.80%	8.20%	100%
% in gender	7.10%	12.20%	7.30%
% of total	6.70%	0.60%	7.30%
Communications	955	25	980
% in sector	97.40%	48.2.6%	100%
% in gender	15.10%	7.60%	15%
% of total	14.40%	0.40%	14.80%
Computer hardware			
Software/service	2413	157	2570
% in sector	93.90%	6.10%	100%
% in gender	38.20%	47.90%	38.70%
% of total	36.30%	2.40%	38.70%
Industrial/energy	712	10	722
% in sector	98.60%	1.40%	100%
% in gender	11.30%	3.00%	10.90%
% of total	10.70%	0.20%	10.90%
Medical/health	945	63	1008
% in sector	93.80%	6.30%	100%
% in gender	15.00%	19.20%	15.20%
% of total	14.20%	0.90%	15.20%
Other products	843	33	876
% in sector	96.20%	3.80%	100%
% in gender	13.40%	10.10%	13.20%
% of total	12.70%	0.50%	13.20%
Total	6314	328	
% in sector	95.10%	4.90%	
% in gender	100%	100%	
% of total	95.10%	4.90%	

X² 56.293 d.f. =5 sig. <.000

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and investment stage is reported. Percents may not add to 100 due to rounding.

Table 8

Frequency of Firm Acquisition of Venture Capital from 1988-1998

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	4016	48.4	48.4	48.4
Female	290	3.5	3.5	51.9
Unidentified	3992	48.1	48.1	100.0
Total	8298	100.0	100.0	

Table 9

**Frequency and Chi Square Tests of Firm Acquisition of Venture Capital Funding
by Gender and Industry from 1988-1998**

Industry^a	Male		Female		Women's % w/in Industry	Industry % of Total	Total Invest- ments
	Number	%	Number	%	%	%	
Construction	4	.2	0	0	0	.15	4
Manufacturing	992	42.5	77	35.6	7.2	41.9	1069
Trans/Comm	4	.2	1	.3	20.0	.19	5
Wholesale	191	8.2	10	4.6	4.9	7.9	201
Retail	147	6.3	7	3.2	4.5	6.0	154
FIRE	4	.2	0	0	0	.15	4
Services	988	42.3	121	56.0	10.9	43.5	1109
Public Administration	1	.04	0	0	0	.03	1
Total	2331	100.0	216	100.0		100.0	2547

X² = 18.630

d.f. 7

sig. <.009

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and SIC code is reported. Percents may not add to 100 due to rounding.

Table 10

**Frequency and Chi Square Tests of Firm Acquisition of Venture Capital
by Gender and Stage from 1988-1998**

Stage	Male		Female		Total	
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>%</u>	<u>Number</u>
Early Stage	1700	39.7	182	4.2	43.9	1882
Expansion	1110	25.9	61	1.4	27.3	1171
Later Stage	400	9.3	23	.5	9.9	423
Buyout/Acquisition	770	17.9	23	.5	18.5	793
Other	12	.3	1	.02	.3	13
Total	3992	93.4%	290	6.6%	100%	4282

X² = 49.61

d.f. 4

sig. <.000

Differences in sample size are due to missing data. Data is presented only for firms for which gender of owner is identifiable and SIC code is reported. Percents may not add to 100 due to rounding.

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APPENDIX A

Description of Coding

Responses from companies were coded according to gender of firm owner or top management, year of first investment, stage at first investment, and industrial sector. The original data was not coded for gender. Therefore we screened 21,845 entries and coded male or female by first name or title (Mr./Mrs./Ms). Entries for which gender was not apparent by either criterion were coded "2," used to establish frequencies, and set aside for future investigation and consideration. The file also contains multiple entries for each firm. After we converted the data files from an Excel format to SPSS, we visually reviewed every record and deleted duplicates. In order to determine whether the firm is led by a male or female, we screened according to job title, selecting the highest-ranking role for each firm as the representative. In cases where both Chairman and President/CEO were listed, we chose the latter, reasoning that management capabilities was one of the key determinants in the decision to fund a new venture (MacMillan, et al, 1985, Hisrich & Jancowicz, 1990). Almost half of the investments either were not identifiable by individual characteristics due to either first names that were not gender specific or both first name and title were missing.