CLIMBING THE TECHNICAL LADDER:
OBSTACLES AND SOLUTIONS FOR MID-LEVEL WOMEN IN TECHNOLOGY

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Executive Summary

The mid level is perhaps the most critical juncture for women on the technical career ladder because it is where a complex set of gender barriers converge.

Leading high–tech companies require diversity to maintain globally competitive technical workforces. Research shows that workforce diversity can boost a company's bottom line by providing creative variety of thinking styles and, thus, new business solutions. A recent industry report by Gartner estimates that by the year 2012, teams with greater gender diversity (when compared to all–male teams) will be twice as likely to exceed performance expectations.[1] Gender diversity in the high–tech workforce fuels problem solving and innovation – the driving force of technology.[2]

But when it comes to providing opportunities for technical women, high–tech firms lag sharply behind those in other sectors. As this report shows, men are significantly more likely than women to hold high level management or executive positions. Women at the mid level of their high-tech careers are extremely valuable to companies, but this seems to be the very point at which they face the greatest barriers to advancement — at a cost to both the companies and the individual women.

In order to learn why the mid level is a "glass ceiling" for women on the technical ladder, the Anita Borg Institute for Women and Technology and the Michelle R. Clayman Institute for Gender Research at Stanford University have undertaken a groundbreaking study of female scientists and engineers at seven mid to large, publicly traded Silicon Valley high–tech firms. Drawing from a large-scale survey and in–depth interviews conducted in 2007 and 2008, this report proposes data-driven, systematic solutions for the retention and advancement of technical women.

Key Questions

- Who are mid–level technical women?
- What are the barriers to their retention and advancement?
- How can companies secure their investments by ensuring that female technical talent reaches high-level positions?

Key Findings

The technical workforce

- Technical men are more likely than technical women to hold high-level positions. In our sample, the odds of being in a high-level position are 2.7 times as great for men as for women. Women comprise an increasingly smaller proportion of the workforce at each successive level (from entry to mid to high).
- Mid-level women are predominantly white or Asian. There are few underrepresented minority women at this rank.
- Technical women, like technical men, are highly educated. Among mid-level employees, the majority of men and women have technical degrees in computer science or engineering. However, rates of technical degrees are higher among men than among women (77.1% versus 61.2%).

The workplace experience

- Women are more likely than men to perceive workplace culture as competitive. They do not see their workplaces as true meritocracies; rather, they see cultures that require connections to power and influence in order to advance.
- Consistent with prevailing gender stereotypes about women's abilities, women in management positions are perceived as less technically competent than are their male counterparts. This can create an environment where women are viewed (and can view themselves) as "not fitting in" with the company culture.
- Mid-level women are more likely than men to believe that extended work days are required for success. If the majority of women believe this to be the case, those who cannot work late on a regular basis may perceive barriers to their advancement.
- Mid-level men *and* women agree that mentoring is important to long-term career development, but is not rewarded by high-tech companies. This acts as a further potential barrier to women's advancement.
- Survey results show that mid-level men *and* women strongly value teamwork. Further, men and women perceive that collaboration is key to success in technology. However, mid-level women see a sharp divide between

cooperation and competition at their companies. Mid-level women describe this gap as being especially acute during the promotion-review process, where they find existing promotion and evaluation practices reward competition instead of collaboration.

- Mid-level technical men *and* women value having an impact on their team, their organization, and on technology users.

Work and family

- The majority of mid-level men *and* women describe themselves as family-oriented. However, both men and women believe that being family-oriented is not associated with success in technology. Many mid-level women whom we interviewed described a "family penalty." And many men also experience family responsibilities as a potential roadblock to advancement.

- Employee advancement in today's high-tech workplace culture can come at the cost of family and health.
    - Mid-level women are more likely than mid-level men to suffer poor health as a result of work demands.
    - Mid-level women are almost twice as likely as men to report delaying having children in order to achieve career goals.
    - Mid-level women are more than twice as likely as men to report foregoing having children in order to achieve career goals.
    - Mid-level women are more likely than men to report foregoing having a marriage/partnership in order to achieve career goals.

- While the majority of mid-level men and women who are parents have young children at home, important gender differences remain. Among mid-level technical employees who are married/partnered:
    - Mid-level women are more than twice as likely as men to have a partner who works full time.
    - Mid-level men are almost four times more likely than women to have a partner who assumes the primary responsibility for the household/children.
    - Among those with working partners, the majority of women report that their partners work in high tech.

Recommendations

All recommendations are based on survey and in-depth interview data. Please see the end of each chapter for a complete list of report recommendations.

Professional Development
Investing in professional development is the most profitable step high-tech companies can take to advance technical women and retain all technical talent. Survey results show that technical men and women value opportunities to update their technical skills and technical professional development above and beyond other work benefits. In addition, technical development programs will provide networking benefits to further propel technical women's advancement.

1) **Create company-wide opportunities for all technical employees – at all rank levels – to participate in technical professional development, on company time. Send a signal to employees that company investment in their technical human capital is a priority. Workflow must be adjusted accordingly, as mid-level workers cite a lack of time due to work responsibilities as the number one barrier to updating technical skills. High-tech companies should train managers on this topic and provide appropriate budgets for such development. Managers must ensure that all technical employees have access to appropriate opportunities.**

2) **Create opportunities for technical employees to participate in leadership and management development on company time. Survey results show that technical women value opportunities for professional development of leadership and management skills. In addition to a core investment in their technical professional development, high-tech companies can improve technical women's advancement by investing in their career development.**

Fostering a Positive Work Culture

Survey results indicate that mid-level men and women experience workplace culture differently. For mid-level women, high-tech culture is competitive and unfriendly — one that requires significant personal sacrifice as well as concerted effort to be assertive in order to be heard. High-tech company leaders should carefully consider how their company culture may be hindering diversity at the "micro level" of departments and workgroups.

1) Create company awareness about diversity in communication styles. Technical employees agree that being assertive is essential to success. However, assertiveness can stifle different communication styles, pushing women and men into a single communication mode that further exacerbates gender stereotypes. This may also negatively impact ethnic diversity, as some cultures emphasize listening and humility rather than assertiveness. High-tech companies should ensure that a variety of communication styles are represented in the executive ranks in order to foster company-wide communication diversity.

2) Make mentoring matter in order to give mid-level technical women seamless, internal support for their professional development. Create a mentoring culture by adding mentoring to your company's evaluation and promotion policies. This will encourage women and men – at all rank levels – to participate in mentoring activities. High-tech executives must participate, whether or not your company has a formal mentoring program. No mentoring program will be successful as long as it is perceived as being one of your company's least rewarded behaviors.

Flexibility, Work Pace, and Family

Our study results clearly show that the majority of mid-level technical men and women are "family oriented" and perceive high-tech culture as contradicting their own family values. However, Silicon Valley's mid-level technical women differ from their male peers in important ways. Mid-level technical men are much more likely than women to benefit from partners who do not work full-time and take care of household responsibilities. This fuels inequality regarding work-life pressure at high-tech companies.

1) Mid-level women want flex time. They are more likely than men to rank flexibility as an important benefit. High-tech companies should continue to offer flexibility as a work benefit, expanding this definition to include options for part-time schedules, flexible schedules, and telecommuting. Flexible scheduling is essential for retaining mid-level women, who often face unique work/life challenges. High-tech companies need to foster workplace cultures that encourage women and men to take advantage of flexible schedules.

Managers and Executives

When it comes to retaining and advancing mid-level technical women, high-tech companies must count on their managers to get the job done.

1) Train your mangers to manage. Company evaluation and promotion policies for managers should require their general awareness of gender issues in the workplace. This brief training should highlight the barriers to advancement that technical women most often encounter, as well as the simple gestures that will create family-friendly workgroup environments. Then, reward managers for taking an interest in the long-term career aspirations and professional development of the technical women and men reporting to them. Overwhelmingly, the technical women whom we interviewed attributed their successes to having a manager "who got it."

A Diverse Leadership Team

Technical employees can clearly see a company's commitment to diversity by looking at top technical and executive ranks.

1) Diversify pathways for advancement to the highest ranks on the technical ladder. This will enable any technical women who have accumulated industry and company-specific technical expertise, without the benefit of holding technical degrees, to advance.

2) Increase women's representation on your company's Board of Directors. Diversity breeds diversity. A diverse leadership team is essential to fostering a culture that values diversity. One of the most powerful ways to improve retention and advancement rates for women is to promote women to senior technical positions.[3]

Introduction

Leading high-tech companies rely on diverse technical workforces that span the globe. Recruiting competition is fierce as the number of high-level technical jobs, such as software engineers, has been growing since 2000 and shows few signs of slowing down.[4] In fact, the high-tech industry projects adding 1.6 million new jobs between 2002 and 2012.[5] Employment for computer software engineers alone is projected to increase by 38 percent over the period from 2006 to 2016.[6] Workforce demands are high due to two supply-side factors: 1) decreasing numbers of computer science graduates in the U.S. 2) impending retirements among baby-boomers.

Technology business leaders agree focusing diversity efforts on recruitment alone is not enough. In a recent survey, 300 technology executives identified hiring and retaining skilled technical workers as their top concern.[7] Today's technical employees hail from diverse backgrounds, making retention difficult for companies that cannot meet diverse needs. Poor retention rates, in turn, add an additional costly burden to recruiting efforts. The cost of filling the vacancy left by a single skilled technical employee is estimated to be as high as 120 percent of the yearly salary attached to that position.[8]

A diverse global workforce brings new benefits to high-tech companies. Group diversity leads to better decision outcomes which are borne out in a variety of settings, occupations, and organizations.[9] Diversity also improves group task performance on creativity and innovation.[10] In short, research shows that workforce diversity boosts a company's bottom line because a variety of opinions, backgrounds, and thinking styles stimulate new business solutions.

Gender diversity, in particular, is a benchmark for high-tech success. A recent industry report by Gartner estimates that by the year 2012, teams with gender diversity (when compared to all-male teams) will be twice as likely to exceed performance expectations.[11] Gender diversity in the high-tech workforce fuels problem solving and innovation — the driving force of technology.[12]

As most executives at high-tech companies recognize, they have a vested interest in retaining and promoting technical women after investing valuable resources in their training. Yet gender disparity in the technical workforce remains glaring: few women reach top-level positions, such as Technology Fellow or VP of Engineering. Why this is so plays out at the mid-level. **The mid-career level is perhaps the most critical juncture for women on the technical ladder because it is here that a complex set of gender barriers converge.** And the problems involved go far beyond work and family issues. They are rooted in outmoded workplace practices and cultures that do not take into account the needs of an increasingly diverse workforce.

Why Technical Women?

The computer and information technology industry is seen as a place where innovative thinking generates breakthrough new technologies and lucrative products. Yet when it comes to providing opportunities for women, research suggests that high-tech firms lag sharply behind those in other sectors. Women make up only 25.6 percent of U.S. computer and math occupations. [13] They constitute only 8 percent of engineering managers. [14] In addition, recent statistics show that women make up a modest 13 percent of the boards of directors at high-tech Fortune 500 companies, compared to 14.8 percent among all Fortune 500 companies. [15]

The underrepresentation of women in the science, technology, engineering, and mathematics (STEM) workforce has long been of concern to policy makers, academics, and industry leaders alike. [16] This concern is only intensifying with the looming shortage of U.S. STEM human capital. Many concur that any drop in the U.S.-generated STEM workforce would undermine national competitiveness. [17]

A nation at risk

"The women that I've worked with have been as good as or better than the men. Maybe they had to be. I would like to see that problem solved. I think that our technological leadership as a nation is very much at risk — if we can't expand beyond white males, we're in real trouble."
– mid-level technical man, with 30 years of experience

Despite this national concern, we lack meaningful data on the key factors driving retention rates for technical women. [18] Most studies focus on women at the highest ranks, where research shows that they hold only 3 percent to 5 percent of senior roles in technology. [19] Surprisingly, we know little about how women climb the technical ladder. [20,21]

Why Mid-level?

Mid-level is a critical juncture for both women on the technical ladder and the high-tech firms in which they are employed. Women arguably face the greatest barriers to advancement at mid-level, a point when the loss of their technical talent is most costly to high-tech companies. A recent report identifies the midpoint of women's science and technology careers as the optimal time for high-tech companies to bolster their retention efforts. The authors dub this midpoint the "fight or flight moment," given that 56 percent of women in high-tech companies leave their organizations at this point. [22]

In order to learn why the mid-level is a "glass ceiling" for women on the technical ladder, the Anita Borg Institute for Women and Technology and the Michelle R. Clayman Institute for Gender Research at Stanford University have undertaken a groundbreaking study of women scientists and engineers at seven mid to large, publicly traded Silicon Valley high-tech firms. Drawing from a large-scale survey and in-depth interviews conducted in 2007 and 2008, we analyze new data on women working at the mid-level. In this report, we share the results of our study and propose data-driven, systematic solutions for the retention and advancement of technical women.

"Climbing the Technical Ladder: Obstacles and Solutions for Mid-Level Women in Technology" uncovers important barriers to the advancement of women. Our report hones in on this critical career juncture by answering the following key questions:

- Who are mid-level technical women?
- What are the barriers to their retention and advancement?
- How can companies secure their investments by ensuring that female technical talent reaches high-level positions?

What is mid-level?

Studies of technical careers in various industries have identified four basic career stages, ranging from apprentice to executive.[23] These four stages are corroborated by studies of R&D organizations that define a dual-ladder career structure (technical versus managerial) consisting of four to five steps.[24] In this report, we define mid-level as those positions considered "second career stage" by the high-tech companies in our study. Mid-level personnel are typically technical employees with considerable work experience, but who have not yet reached senior leadership positions.[25]

In this study, we worked with participating companies to define career stages as entry, mid, and high levels. Companies were asked to provide general information about their respective career ladders or structures. Using this information and respondents' self-reported title, level, and/or rank, we developed a level scheme within which respondents were classified as entry, mid, or high, and as an individual contributor or manager, according to their respective company rubric.

We found that mean years of experience among entry-level respondents ranged from a low of 4.4 at one company to 14.1 at one of the oldest companies, mean years of experience among mid-level respondents ranged from 9.4 to 19.5, and mean years of experience among high-level respondents ranged from 15.8 to 22.8. This mid-level range (9.4 to 19.5) is consistent with other "mid-career" definitions as being between 10 and 20 years of experience.[26]

Previous Research on the Barriers to Women's Advancement

Barriers to the advancement of women in the workplace are well documented in social science research. We review four critical barriers for women below.

Stereotyping

Stereotyping most often occurs when there is a clear "out-group" member, such as a single woman on a technical team of men. In this instance, the sole woman will be the subject of more stereotyping than any of the male team members.[27] This type of stereotyping is known as "tokenism" because one person clearly belongs to a minority group.[28] Tokenism means that the majority (male) group members treat their female coworker as someone who represents all the stereotypical characteristics of women in general. This scrutiny is palpable to the technical woman, who sees her performance and communication style judged differently from that of her male peers. For example, cultural attitudes that reward men who act assertively simultaneously punish women who exhibit similar behaviors.[29] This has real career consequences. Moreover, women are stereotyped as "family focused" and "unwilling to travel," and are more likely than men to be passed over for promotions.[30] Women who have "out-group" status are also more likely to be pushed toward tasks that are stereotypically feminine, such as support work.[31] This results in further stereotyping as evidenced by the devaluation of "soft skills" on the technical track.[32] Stereotyping intensifies for women from underrepresented racial or ethnic minority groups. The end result for many "out-group" members is that they are more likely to leave their companies.[33]

Exclusion from social networks, lack of role models and mentors

Network ties build social capital and are key to career opportunities and advancement.[34] This is true in high-tech industry, where research shows that senior managers with more social capital (in the form of network ties that bridge different groups) are more likely to get promoted.[35] Women in lower positions on the technical ladder (from entry- to mid-level) have fewer opportunities to network outside their immediate department.[36] Due to their minority status in the high-tech workplace, women require broader networks for career advancement. This means that many successful women must find alternative network routes to the top.[37] Research on one large IT firm reveals that women have to use networks differently than men in order to achieve the same promotion and overall career benefits. Researchers found that women benefit from having ties to colleagues who have both wide networks and strategic placement within the company hierarchy.[38] Role models and mentors also play a critical role in women's career success. However, research shows that women in technology are likely to suffer from a lack of mentors and role models.[39]

Work-life balance

Technology, as a culture, is often associated with masculine traits. Research shows that technology work culture at its core is masculine, white, and heterosexual, associated with hard programming, obsessive behavior, and extensive working hours.[40] In high-tech companies, "flexibility" often means staying until midnight coupled with the expectation of increased productivity and constant availability. Those with children face the unvarying expectations of a 24/7 workload. The high-tech work pace is so extreme that academic researchers refer to it as a work-family "conflict" rather than work-family balance. Work-family conflict hits women at the mid-level especially hard.[41] When the demands of family life are irreconcilable with work responsibilities, women are often forced to choose between work and family in this "all or nothing" proposition. Career mothers are caught between two competing ideal-types of "mother and family" and "devoted worker."[42] This dilemma is true even in times of economic prosperity.

Organizational structure

Organizational structures — from policies to practices — impact women's ability to attain leadership positions.[43] Many research studies document how workplaces that appear to be "gender-neutral" and meritocratic are, in fact, organized around men's work styles and life cycles.[44] Further, subtle gender bias in hiring, promotion, and evaluation practices (including salary levels) is common across organizations.[45] Companies engage in "homosocial reproduction." Underrepresented minorities and women are evaluated on criteria originally developed for "white upper-middle class men."[46] In fact, many companies rely on established rigid corporate practices for employee evaluation that fail to take diversity into account.[47] Hiring practices also tend to reproduce social inequality. When hiring, new positions and career titles are often created with one individual rather than a pool of individuals in mind. One researcher found that almost half (47%) of open positions at 415 companies had only one candidate.[48] In short, company practices and internal labor markets unwittingly reproduce social inequality within their organizations. This finding holds true for high-tech companies where evaluation practices are entwined with subtle gender bias, making it harder for women to prove their technical expertise.[49] Furthermore, research shows that women and underrepresented minorities find fewer career opportunities even after upgrading their skills.[50]

Interpreting the data in this report: Who are our survey respondents?

Respondents to the "Climbing the Technical Ladder" survey include 1,795 technical men and women at seven high-technology companies in the Silicon Valley region (for a more detailed discussion of company recruitment, company and sample characteristics, and study methodology, see Appendix A). Participating companies identified and surveyed their core Silicon Valley technical workforce across all levels of the technical ladder. Among survey respondents, 55.5 percent were classified as mid-level according to each company's organizational structure. An additional 19.9 percent of respondents were classified as high level, and 24.6 percent of respondents as entry level.

Key indicators suggest that our sample is representative of the Silicon Valley technical population more so than it is of the national or statewide technical populations (see Appendix A). Silicon Valley is one of the most globalized technical regions in the world. Thus, our sample is not simply a snapshot of a technical workforce, but of a highly global, competitive, and mobile technical workforce — a "valley workforce" that will increasingly characterize all parts of the world. Insights on retention and advancement in such a mobile and competitive workforce are especially powerful for today's high-tech companies.

Notably, at 34.2 percent of all survey respondents, women comprise a greater proportion of the sample than national and "valley-workforce" estimates of women in science and engineering occupations would lead us to expect. In this report, we conduct nearly all key analyses for technical men and women separately.

Unless otherwise noted, all between-group differences discussed in this report are statistically significant at the $p<.05$ level.

A Portrait of the Technical Workforce

Understanding today's technical workforce can spur competitive advantage. High-tech companies that seek to improve recruitment and retention of technical talent need to understand workforce demographics in terms of gender, ethnicity, age, and area of specialization.[51] Further they need to understand key decision-making factors shaping technical careers such as career goals and educational background.[52] This chapter provides a portrait of the technical workforce overall, and then zeroes in on the career trajectories of mid-level career women.

Citizenship, Race, and Ethnicity — A Global Workforce

Silicon Valley is known for its ability to operationalize a global workforce by attracting top technical talent from around the world. As one leading scholar makes clear: "[F]oreign-born engineers in Silicon Valley's technology industry make a substantial and growing contribution to regional job and wealth creation…The entrepreneurial contributions of these skilled immigrants are impressive. In 1998, Chinese and Indian engineers, most of whom arrived in the United States after 1970 to pursue graduate studies, were senior executives at one-quarter of Silicon Valley's new technology businesses."[53]

Silicon Valley's global nature is reflected in our survey sample where almost half (48.6%) of respondents were born outside of the U.S. Technical men and women are equally likely to have come to the U.S. from another country. These women and men are not new to Silicon Valley; on average, they have lived in the U.S. for 15.5 years.[54]

The ability to attract and retain global technical talent is critical to the success of high-tech companies. When speaking about technical innovations and positive work environments, our interviews reveal that male and female technical employees share the opinion that global diversity improves the quality of their work.

Views of global diversity

"When we have diversity, we become more open to hearing what the other person is saying. If it is a group of ten white men, the whole atmosphere of that meeting will be very different than when everybody has an accent! When somebody cannot understand what the other person is saying, they must make more effort … and you become more open to accepting and listening to what other people are saying."
– mid-level technical woman

"Gender and ethnic diversity are very important. Ultimately we can only do well if we have the best ideas in place. If everybody thinks the same way, you're not going to get the best ideas — you're going to get the same ideas."
– mid-level technical man

"The more diverse the work environment, the more tolerant. The less diverse, the less tolerant ... people have a tendency to form a group and impose some particular cultural expectations on the rest of the group. Whereas if there's a lot of diversity — and there's no clear majority — I don't think that tends to happen."

– mid-level technical woman

Country of Origin

Technical employees born outside the U.S.:

40.7% are from India
11.4% are from China
5.3% are from Taiwan
3.9% are from the UK
2.7% are from Russia or the former USSR
2.6% are from Vietnam
2.4% are from Canada
2.1% are from Germany
2.0% are from Israel

Racial/Ethnic Diversity

Technical employees in Silicon Valley are decidedly ethnically diverse. In fact, only 53.9 percent of our respondents are White, while a large proportion of technical employees are Asian (39.1%).[55] **Technical women are more ethnically diverse than are technical men.**

African Americans/Blacks and Hispanics/Latinos(as) are underrepresented in the technical workforce. African American technical workers comprise just 1.8 percent of our sample, as compared to 12.7 percent of the U.S. population, 11.4 percent of computer science bachelor's degrees, and 5.2 percent of engineering bachelor's degrees. Hispanic/Latino(a) technical employees make up just 3.5 percent of our sample, versus 12.6 percent of the U.S. population, 6.8 percent of computer science bachelor's degrees, and 7.5 percent of engineering bachelor's degrees.[56][57] There is no difference in the proportion of Hispanic/Latino(a) women and men among our respon-dents; however, technical women are more likely to be

Chart 1a. Race/Ethnicity of Technical Workforce, by Gender

Women
2.0
3.3
3.2
44.1
47.4

Men
1.5
3.7
1.0
36.5
57.3

Legend:
- Other
- African American/Black
- Hispanic/Latino/a
- Asian/Asian American
- White
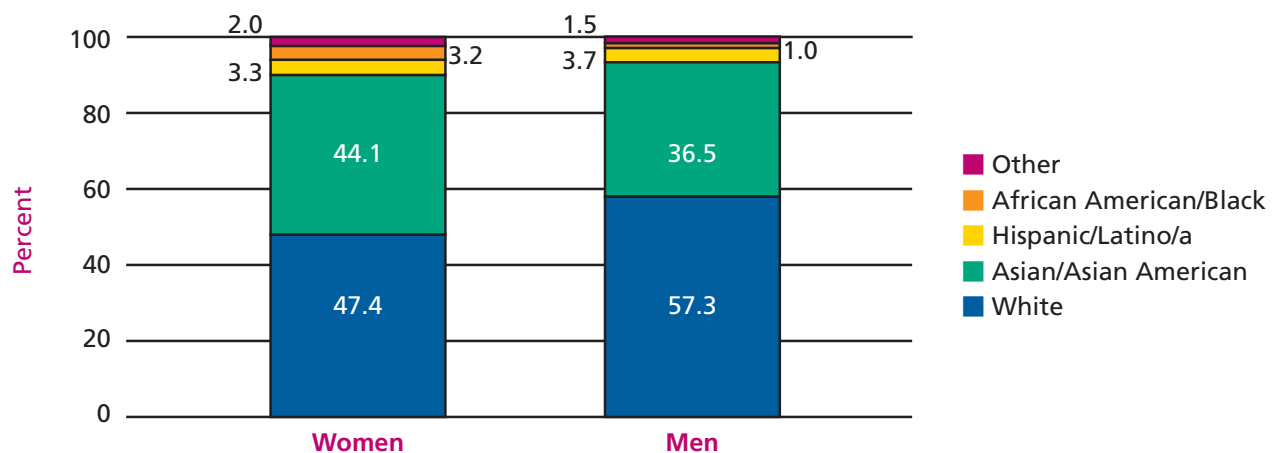
(see method note in Appendix B)

Who are "Asian" technical women?

Among Asian technical women:
- 52.3% are South Asian or South Asian American (Indian subcontinent)
- 33.0% are East Asian/East Asian American (China, Japan, Korea, Mongolia)
- 10.6% are Southeast Asian/Southeast Asian American (Thailand, Philippines, Indonesia, Singapore, Vietnam)

Asian technical women born outside the U.S. are from many countries:
- 58.6% were born in India
- 18.0% were born in China
- 5.4% were born in Taiwan
- 3.6% were born in Vietnam
- 3.6% were born in the Philippines
- 2.3% were born in Korea
- 0.9% were born in Japan

African American/Black than are technical men (3.2% versus 1.0%). **Overall, 5.9 percent of technical men and 7.9 percent of technical women in our sample are from underrepresented racial/ethnic minority back-grounds.[58]**

Asian women represent the second-largest racial/ethnic category in our sample of technical women. This broad Asian category includes many different cultures and countries.

Age and Technical Experience

Our survey results show that, on average, technical women are younger and have fewer years of experience in the industry than do technical men. However, gender differences disappear when looking at the number of years technical men and women have worked at their current high-tech company and the number of years they have been at their current positions.

Chart 1b. Mean Age and Experience of Technical Workforce, by Gender

	Age	Years since degree	Years of technical expertise	Years since hire	Years in position
Women	40.1	13.8	13.3	8.2	4.0
Men	42.0	15.8	17.0	8.1	4.1

(see method note in Appendix B)

Losing technical talent: implications for equality

The gender difference in age and years of experience is consistent with national trends and is partly attributable to greater attrition rates among women with experience.[61] When experienced technical women leave the workforce at a higher rate than technical men, the level of women's technical experience available to high-tech companies also decreases. A recent study shows that high-tech companies experienced an attrition rate of 41 percent of their female employees after 10 years of experience, compared to only 17 percent of their male employees.[20] Improving retention rates for mid-level technical women is imperative for high-tech companies that wish to increase gender equality in their technical workforce.

Education — workforce with high human capital

Silicon Valley high-tech companies profit from a workforce with very high levels of human capital. Over half (53.5%) of the technical workforce holds advanced degrees.[59] **Rates** of advanced degrees run equally high for men and women.

Advanced degrees abound

"I have a Ph.D. in computer science … Subsequent to that, I decided to do an MBA because I wanted to move into a business role. I finished my MBA and then joined [this company]."
– mid-level technical woman

"I did my Ph.D. in cryptography … At my company, I get a real sense of the most important problems, and I can address them in ways that might be meaningful, rather than coming up with theoretical ideas that, in practice, aren't going to be useful."
– high level technical man

While men and women are equally likely to hold advanced degrees, technical women in our sample are less likely to have earned degrees in computer science, and are more likely to have earned degrees in non–

Chart 1c. Highest Degree Earned Among Technical Men and Women

Women:
- 39.2% Master's
- 38.1% Bachelor's
- 7.3% MBA and Other Professional Degree
- 6.3% Ph.D.
- 4.6% High School/Other
- 4.6% Associate's

Men:
- 38.1% Master's
- 38.2% Bachelor's
- 8.2% Ph.D.
- 7.6% MBA and Other Professional Degree
- 4.2% High School/Other
- 3.6% Associate's

Legend:
- Ph.D.
- MBA and Other Professional Degree
- Master's
- Bachelor's
- Associate's
- High School/Other
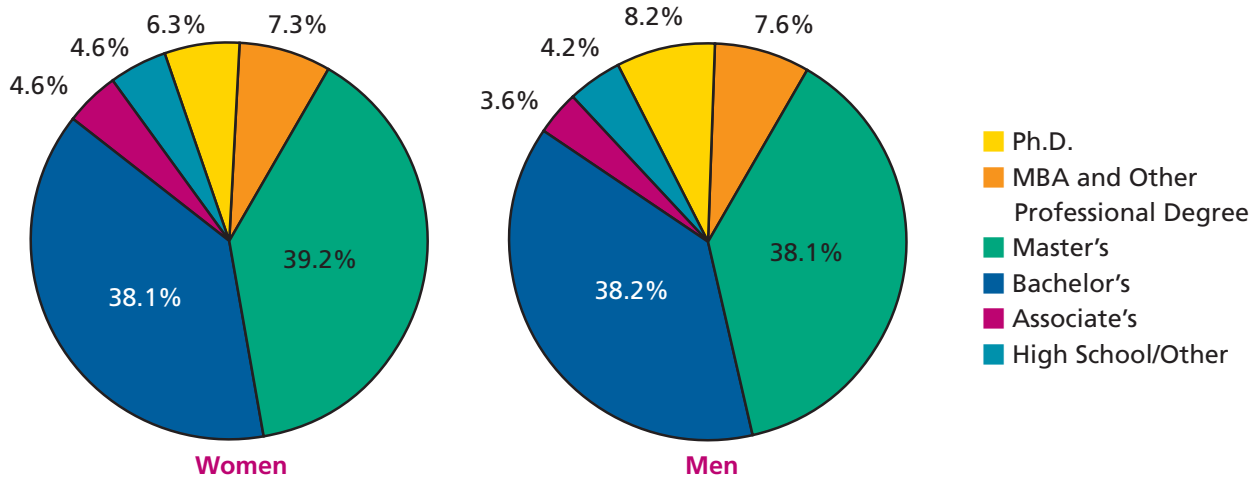
technical fields. Although the majority of women come to a technical career through studies in computer science and engineering (63.2%), a significant proportion of women come to a technical career from other fields of study.

High-tech companies should take note of this finding as they seek to improve promotion rates for technical women. Historically, the proportion of women earning computer science degrees has declined over the last ten years. In 2005, women earned only 22.2 percent of all computer science bachelor's degrees.[60] Similarly, the proportion of women who earn bachelor's degrees in engineering has remained at about 20 percent since 2000.[61] Clearly, women with technical degrees are in shorter supply than men with technical degrees; our survery data suggest that company recruitment efforts may have shifted accordingly. The implications of these patterns are further discussed below.

Understanding women and men at the mid level

It is well known that few women occupy the C-suite (especially CEO and CTO) in high-tech companies.[62] Yet little is understood about the ladder-progression of women rising through the technical ranks. To examine the career trajectories of technical women, we look closely at the relative proportions of men and women at three rank levels: entry level, mid level, and high level (see Appendix 1 for a full discussion of rank levels). Our findings indicate that while technical men and women are equally likely to hold mid-level positions, men are more likely than are women to hold high-level positions. **In our sample, the odds of being in a high-level position are 2.7 times as great for men than for women.** When we look at gender ratios within each rank level, we see that women comprise an increasingly smaller proportion at each successive level. A recent report refers to this phenomenon as the "scissors" in STEM careers and calls for intervention at the mid-level point, where many technical women leave the workplace.[63]

Mid-level demographics

Mid-level personnel reflect a global labor force where just under half (47.6% of men and 46.3% of women) are born outside of the U.S. (though many have spent a considerable portion of their careers living in the U.S.). On average, foreign-born mid-level technical women have lived in the U.S. longer than have men (17.4 years versus 15.4 years, respectively).[64]

Chart 1d. Field of Highest Degree Among Technical Workers, by Gender

	Women	Men
Other	36.7	23.8
Engineering	34.2	37.6
Computer Science	29.0	38.6
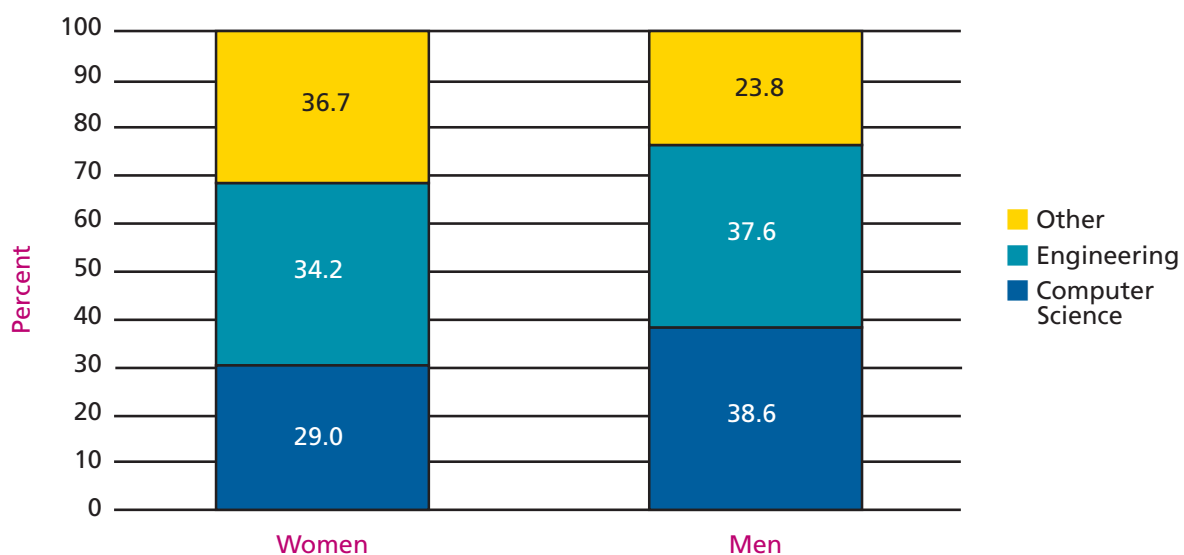
(see method note in Appendix B)

Chart 1e. The Technical Ladder: Distribution of Female and Male Respondents Across Rank Levels

	Women	Men
High	10.9	24.6
Mid	56.0	55.2
Entry	33.1	20.2

Like the technical workforce in general, mid–level women are significantly younger and have fewer years of technical experience than their male colleagues. (The average age of mid–level women is 41.3 years, compared to 42.5 years for men;[65] mid–level women average 14.8 years of technical experience, versus 17.4 years for men.)[66]

Race and ethnicity, by rank level

When looking closely at race and ethnicity at the mid–level, we see that women are predominantly white or Asian. Almost half of mid–level women are white (49.5%), followed by a very high proportion of Asian women (42.6%). Hispanic/Latina women comprise 3 percent of all women at the mid level; African American women comprise 2.7 percent.

When comparing mid–level women to men, we find that **mid–level women are significantly more likely to be Asian and less likely to be white than are mid–level men.** (Similar patterns emerge at the entry and high levels, although differences are not statistically significant.[67]) We do not find significant gender differences among mid–level employees from underrepresented racial/ethnic minority backgrounds.

Race and ethnicity: key gender differences by rank level

- Mid-level technical women are more likely to be Asian and less likely to be White than mid-level technical men.
- Hispanic or Latina technical women are completely absent from the highest level technical jobs.
- The proportion of African American women falls from 4.6 percent at the entry level to 1.6 percent at the high level (though the decline is not statistically significant). Further, entry level women are more likely than men to be African American.

Proportion of Hispanic/Latino(a) technical employees by level and gender:

	Men	Women
Entry	5.3%	4.1%
Mid	3.6%	3.0%
High	2.5%	0.0%

Proportion of African American/Black employees by level and gender:

	Men	Women
Entry	0.4%	4.6%
Mid	1.0%	2.7%
High	1.8%	1.6%

Chart 1f. Race/Ethnicity of Mid-Level Technical Workforce, by Gender

Women (n=335): White 49.5, Asian/Asian American 42.6, 3.0, 2.7, Other 2.1
Men (n=635): White 58.8, Asian/Asian American 34.8, 3.6, 1.0, 1.8

Legend:
- Other
- African American/Black
- Hispanic/Latino/a
- Asian/Asian American
- White
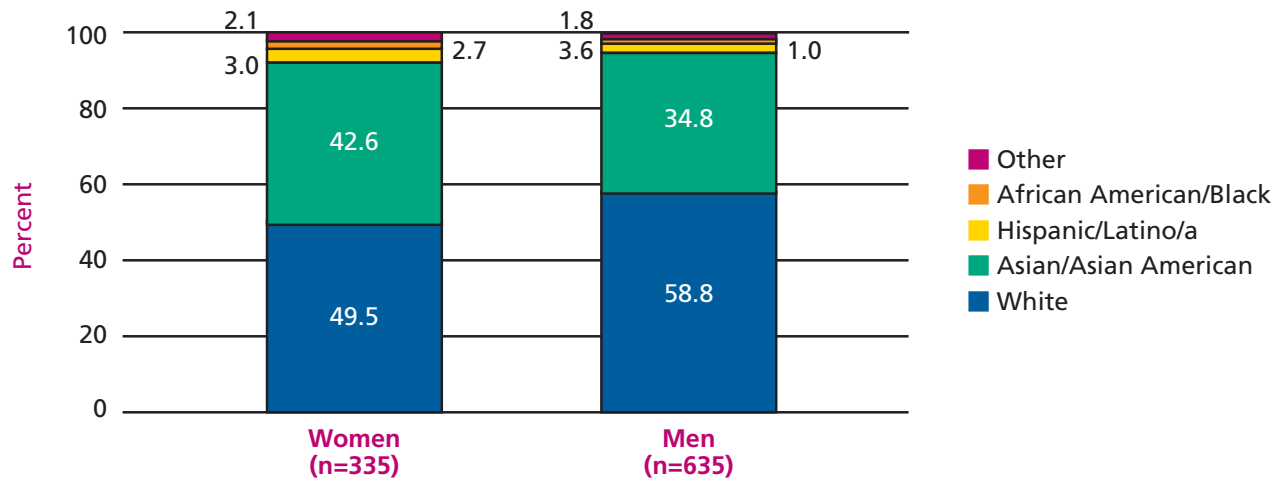
The dearth of technical women from underrepresented minority backgrounds should be of great concern to high-tech companies. The critical absence of underrepresented minority women role models working in high level positions increases the possibility that minority women will experience workplace isolation and, eventually, consider leaving their companies.

"In my organization, there are [almost 180] people and, of that group, only eight are female. It is widely known in my department that our upper management only employs males."
– mid-level technical woman

The only one

"I'm the only Hispanic person in my group … There are very few Hispanics in my technical field. Sometimes I look around and I'm 'both': I'm the only Hispanic and the only woman."
– entry level technical woman

"I'm used to it [being the only woman in my group]. I've been used to it since engineering school in India where I was one among fifty men. So I never questioned it and it never bothered me, partly because I had to accept it."
– mid-level technical woman

Gender and ethnic diversity: workgroups

Gender diversity breeds gender diversity. In other words, women tend to gravitate toward workgroups where other women are present. In our survey sample, mid-level women are less likely than mid-level men to work in groups where men comprise more than 90 percent of the group (we define this as "predominantly male workgroups — extreme").

Chart 1g. Gender Diversity in Workgroups of Mid-Level Men and Women

Percent who report they work in a:

- Women
- Men

28.1 / 40.2 — Predominantly male workgroup – extreme
57.2 / 53.8 — Predominantly male workgroup – moderate
13.5 / 6.0 — Predominantly female workgroup – moderate
1.2 / 0.0 — Predominantly female workgroup – extreme
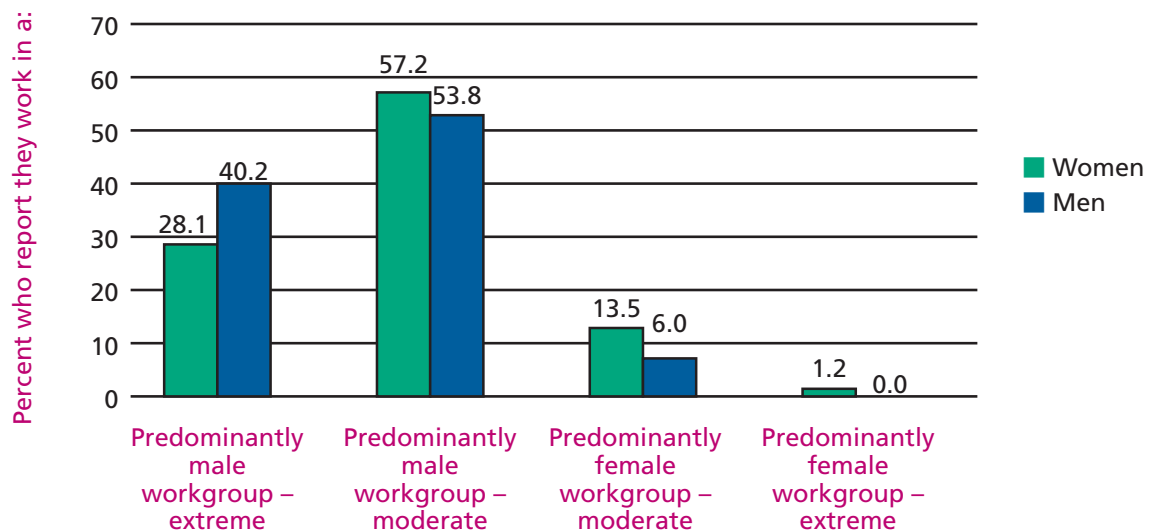
(see method note in Appendix B)

Remembering that "gender diversity breeds gender diversity" can help high-tech companies create gender balance in areas where women are drastically underrepresented. By strategically recruiting women into departments with predominantly male workgroups, high-tech companies will send a clear signal that the department is a welcoming place for technical women. This will, in turn, start to attract more women interested in joining the department and its workgroups.

Ethnic diversity is the norm for the workgroups in our survey sample (keeping in mind that a diverse workforce includes employees who are from both Asian and underrepresented minority backgrounds). Proportionately fewer women and men work in groups where nearly all members are either white or non–white.

Education

At every rank level, technical workers are highly educated. Over half of all men and women technologists hold advanced degrees: 50.5 percent of technical workers at the entry level, 53.2 percent at the mid level, and 58.1 percent at the high level. However, two noteworthy gender differences emerge: **at the high level, men are more likely than women to hold Ph.D.s; and, at the entry level, men are more likely than women to have MBAs (or other professional degrees).**

Overall, men are more likely to have technical degrees than women. However, when we examine each rank level separately, gender differences in field of degree are significant at the mid level only. For mid-level employees, men are significantly more likely than women to have technical degrees in engineering or computer science (77.1% versus 61.2%). These gender differences disappear at the highest level of the ladder, where women and men are equally likely to have a technical degree.

This finding has key implications for companies seeking to support and advance technical women at the mid-level. Women have earned advanced degrees at the same rate as

Chart 1h. Racial/Ethnic Diversity in Workgroups of Mid-Level Men and Women
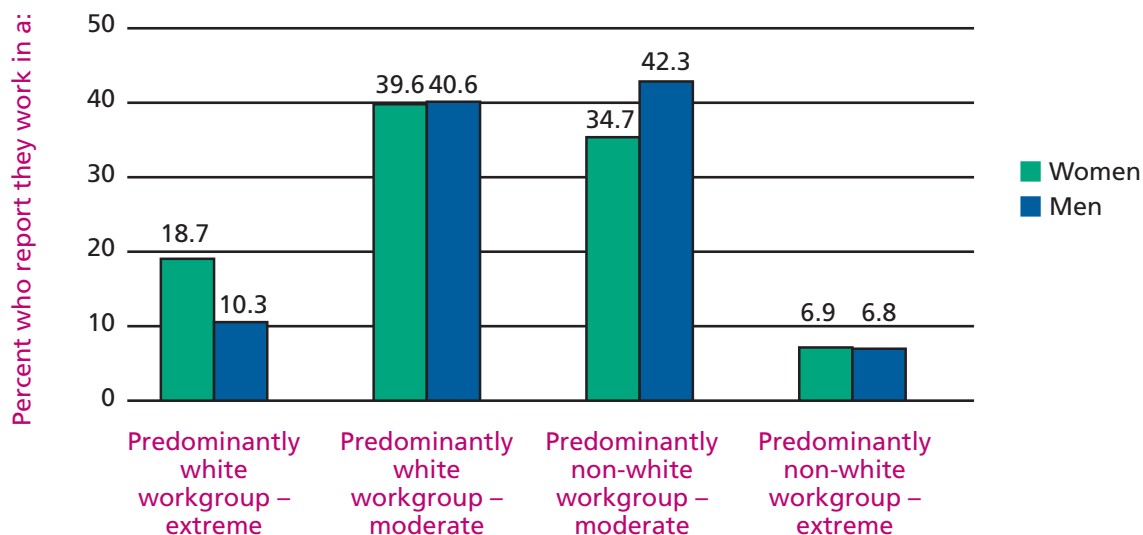
(see method note in Appendix B)

Highest Degree Earned Among Technical Workers, by Gender and Level

	Women (percent)	Men (percent)
Entry Level		
Ph.D.	1.5	4.7
M.B.A/Other Professional Degree	4.1	11.2
Master's	42.6	36.5
Bachelor's	38.6	42.1
Associate's	5.6	2.6
High School/Other	7.6	3.0
Mid Level		
Ph.D.	9.6	8.0
M.B.A./Other Professional Degree	9.3	6.8
Master's	36.2	37.3
Bachelor's	37.4	39.4
Associate's	4.2	3.6
High School/Other	3.3	4.9
High Level		
Ph.D.	3.1	11.3
M.B.A./Other Professional Degree	6.1	7.4
Master's	46.2	40.1
Bachelor's	40.0	33.0
Associate's	1.5	4.6
High School/Other	3.1	3.5

men. Where they tend to differ is the *field* of degree. **If high-tech companies consider computer science and engineering degrees a prerequisite for advancement on the technical career ladder, our data suggest that mid-level technical women, who are more likely to have earned a non-technical degree, are at a clear disadvantage.**

Importantly, however, mid-level women with non-technical degrees may have credentials in other science and mathematics fields:

- Among those with Ph.D.s, 71.9 percent are in computer science and engineering, and 21.8 percent are in other STEM (science, technology, engineering, and mathematics) fields.

- Among those with master's degrees, 80.2 percent are in computer science or engineering, and 6.7 percent are in other STEM fields.

- Among those with bachelor's degrees, 56.8 percent are in computer science and engineering, and 11.2 percent are in other STEM fields.

High-tech companies need to examine their promotion criteria to include more pathways for advancement to the highest ranks. This will enable
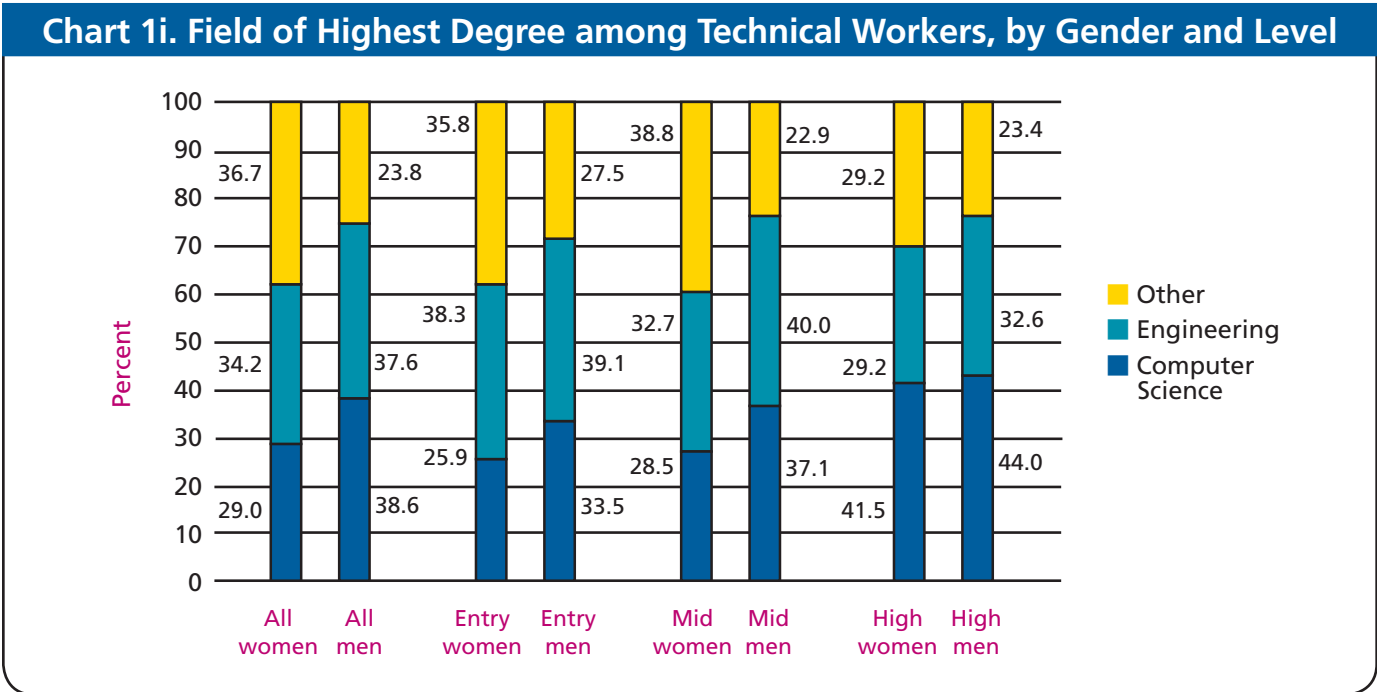
Chart 1i. Field of Highest Degree among Technical Workers, by Gender and Level

technical women who have accumulated industry and company-specific technical expertise, without the benefit of holding technical degrees, to advance. This is particularly important when considering the future predictions of pipeline scarcity in computer science and engineering. **High-tech companies that integrate and on-ramp technical women from diverse disciplinary and professional backgrounds will gain a distinct advantage in our** **competitive global economy. Indeed, women who do not have "normative technical capital" may have been trained in a "technology-adjacent" field (i.e., a STEM field other than engineering and computer science); thus, they bring specialized scientific expertise to the workplace that can diversify and benefit technological research and development.**

Conclusion

1) Our findings confirm that technical men are significantly more likely than women to be in high-level positions. The odds of being in a high level position are 2.7 times as great for men than women.

2) Mid-level women are younger than their male colleagues. Mid-level women also have, on average, 2.6 years fewer technical experience than men. The fact that mid-level women are leaving high-tech companies at a higher rate than men helps to explain these differences in age and expertise.

3) Mid-level women are significantly more likely to be Asian and less likely to be White than mid-level men. Few Hispanic/Latina women (3.0%) and African American women (2.7%) are found at the mid level. The critical absence of underrepresented minority female role models working in high-level positions increases the possibility that minority women will experience workplace isolation and, eventually, consider leaving their companies.

4) Women may gravitate toward workgroups where other women are present. In our survey sample, mid-level women are less likely than mid-level men to be in work groups where men comprise more than 90 percent of the group.

5) Women have equal human capital as men in terms of educational attainment. For mid-level employees, men are significantly more likely than women to have technical degrees in engineering or computer science (77.1% versus 61.2%). (Women who do not have "normative technical capital" may have been trained in a "technology-adjacent" field, i.e., a STEM field other than engineering and computer science.) If high-tech companies consider technical degrees a prerequisite for advancement on the technical career ladder, our data suggest that mid-level technical women, who are more likely to have earned a non-technical degree, are at a clear disadvantage for advancement.

Recommendations

1) Diversify pathways for advancement to the highest rungs on the technical ladder. This will enable women who have accumulated industry and company-specific technical expertise — but who do not hold technical degrees — to advance.

2) Increase women's representation on your company's board of directors and executive ranks. Diversity breeds diversity. Technical employees can clearly see a company's commitment to diversity by looking at the senior technical and executive ranks. A diverse leadership team is essential to fostering a culture that values diversity. One of the most powerful ways to improve retention and advancement rates for women is to promote women to senior technical positions.[68]

3) Update your company's hiring practices. Company leaders and managers should leave advertised positions open until qualified female candidates are in the pool. The groups approving new hires should be diverse in terms of ethnicity and gender. Train managers to be aware that company hiring practices can reproduce gender inequality simply by hiring men with homogeneous backgrounds.

Family

Work-family issues are critical to technical women at the mid-level, many of whom have young children and a partner who is employed full-time. Moreover, a high proportion of technical women in dual-career households have a partner who also works in high tech.[69] The frequency of high tech's dual-career couples, and the unique demands made on them by Silicon Valley's 24/7 culture, have yet to be documented.[70]

high for both men and women at the mid level. Parents, who by definition take on additional responsibilities outside the workplace, are looking to smooth the disjuncture between work and family demands. In many cases, this translates to taking more time off work to be with family. While there are many legitimate factors involved in any parent's career decisions, prioritizing family often threatens career advancement.

Work/life balance

"Even though we continue to talk about work/life balance, it's still difficult to have a work/life balance. This is true in a lot of the companies in the Bay Area. Work is always on and life is always on — you have to make choices."
– high-level technical woman

Taking time off

"I took more time off after our son was born … I certainly work less because as my kid grows up there are things for parents to do: weekend soccer and all the usual activities."
– mid-level technical man

Mid-Level Career, "Entry Level" Families: The Risk of the "Parabolic Career Curve"

Women and men working at the mid level are most often married/partnered (79.3% of women and 86.2% of men), and over half are raising children. Just over one-third of these parents are caring for pre-school or grade school aged children. This means that family concerns rank

For many women, building a career, partnering, and raising a family are not simultaneous life events. Although we find that the majority of mid-level men and women are partnered, mid-level women are more likely than are their male co-workers to be single — a difference that is seen all along the career ladder. Women at the mid level are also younger and less likely than are mid-level men to have children (65.1% of women versus 73.5% of men). Notably, this difference is statistically significant at the mid level only and disappears among women and men in senior positions.

Chart 2a. Percentage of Mid-Level Technical Women and Men with Children in Each Age Group

Percent

- 50
- 40
- 30
- 20
- 10
- 0

Under age 5: 32.9 (Women), 35.9 (Men)
5-10 years old: 36.2 (Women), 36.7 (Men)
11-17 years old: 37.1 (Women), 38.7 (Men)
18 years or older: 23.9 (Women), 18.7 (Men)
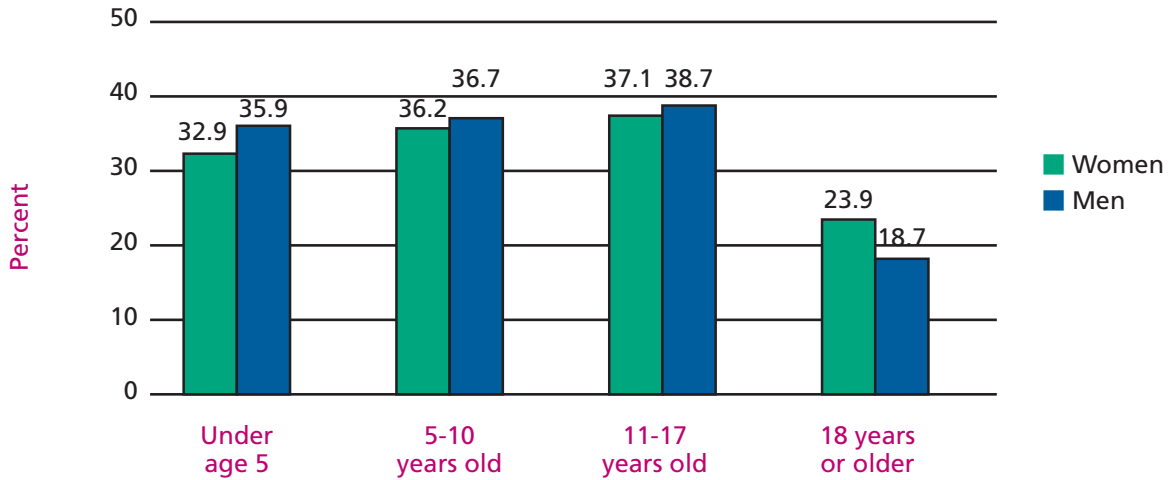
■ Women
■ Men

(see method note in Appendix B)

Chart 2b. Partner Status of Technical Workers, by Gender and Level

Percent

- 100
- 90
- 80
- 70
- 60
- 50
- 40
- 30
- 20
- 10
- 0

Entry women: 30.8 (Single), 69.2 (Partnered)
Entry men: 21.5 (Single), 78.5 (Partnered)
Mid women: 20.7 (Single), 79.3 (Partnered)
Mid men: 13.8 (Single), 86.2 (Partnered)
High women: 20.3 (Single), 79.7 (Partnered)
High men: 11.7 (Single), 88.3 (Partnered)

■ Single
■ Partnered
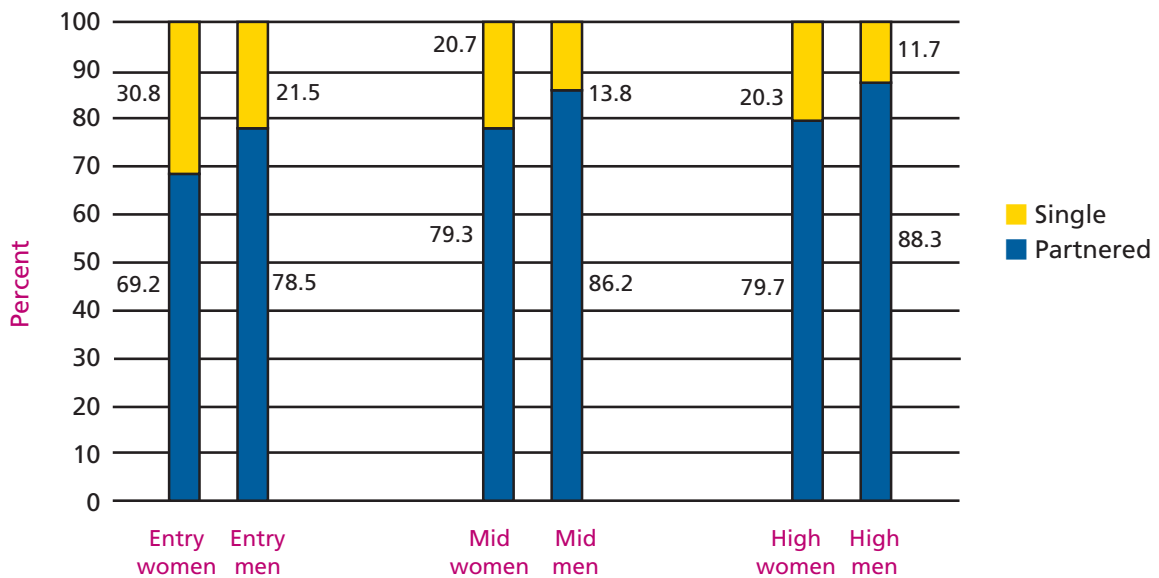
Chart 2c. Percentage of Technical Workers Who Have Children, by Gender and Level

Percent

51.5		34.9	26.5	23.1	24.6
42.7					
48.5			73.5	76.9	75.4
	57.3	65.1			

■ Do not have children
■ Have children

Entry women | Entry men | Mid women | Mid men | High women | High men
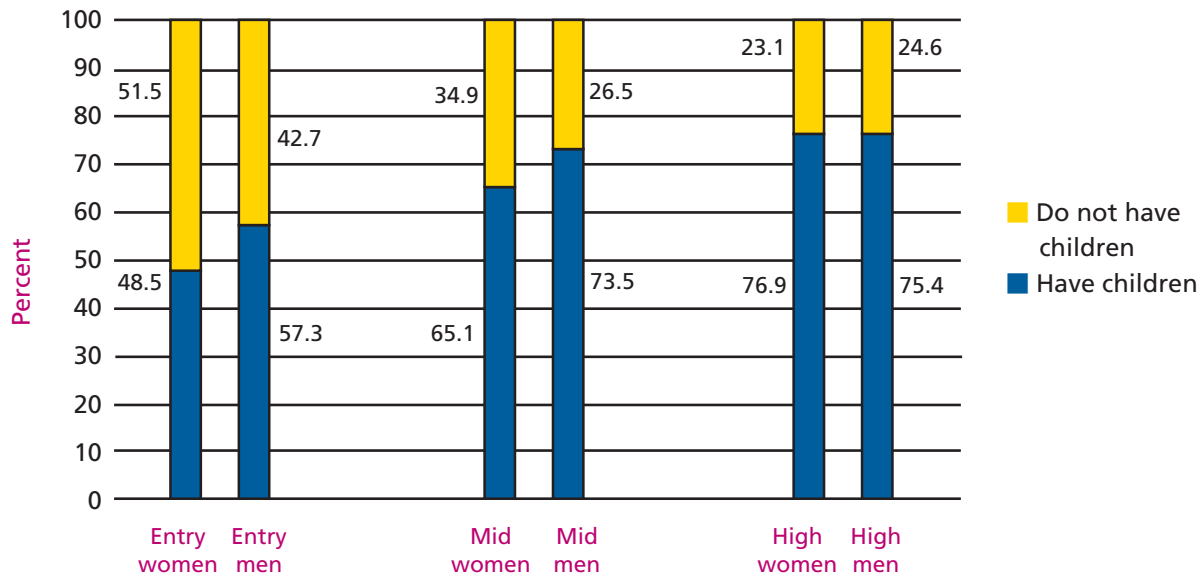
Delaying motherhood to achieve career goals

That women delay starting families in order to establish their careers is well documented.[71] One-third of the mid-level women in our survey report that they have delayed having children in order to achieve their career goals (33.7% of women versus 18.0% of mid-level men). We interviewed a high-ranking woman who explained that she postponed having a family to secure her career advancement. She continues to believe that having children earlier in her career "would have been a challenge."

Some women at the mid-level plan to start families in the near future. In our survey, 13.0 percent of women at the mid-level report that they plan on starting a family in the next twelve months (the same is true among men). Technical women experience a difficult set of choices when starting their families. We interviewed many technical women who spoke of feeling forced to choose between career and family.

Family versus career advancement

"I didn't have kids until later and it was better for my career because I was able to work longer hours. There was none of this 'I got to get home, the kid has a baseball game' type of thing.'"
– high level technical woman

"If I really wanted to be ambitious about my career, it would be a disadvantage to have a family."
– mid-level technical woman

Prime-time conflict

"By the time you get up to the senior engineer level, you're approaching your 30s. You're approaching your prime time to have a family. You see a lot of conflict."
– mid-level technical woman

"[After the birth of my child] I became a process engineer. That demotion was the hard part. I had been the boss of a million people and now I was at an entry level job. I called it the 'Parabolic Career Curve.' I grieved for two years, it just broke my heart."
– mid-level technical woman

"My career took a hit when I went out on maternity leave. Every one of us [women coworkers] found our ranking had dropped the year that we were out on maternity leave."
– mid-level technical woman

Many of the women whom we interviewed temporarily moved to a part-time work schedule to meet the demands of their young families. While they feel more satisfied with their work-life situation, they believe that their careers are languishing because part-time work is not culturally acceptable at their high-tech companies. We explore this phenomenon and offer solutions in Chapter 5.

Tips to make flexibility work

• Make flexibility practices culturally acceptable by modeling them at the executive and managerial levels.

• Adjust evaluations and promotion practices to acknowledge a part-time load or telecommuting schedule such that these practices do not come with a career penalty.

• Experiment with promising new practices such as on-ramps and off-ramps and career customization.

At some point, "delaying" having children can turn into foregoing having children altogether. Nine percent of women at the mid level report that they have foregone having children in order to achieve career goals, compared to only 3.5 percent of men at the mid level. (Similarly, 7.7% of women at the high level report forgoing having children for career priorities.) The fact that women are more likely to forego having children in order to achieve career goals speaks volumes about the work cultures that shape their daily lives.

In the next chapter, we show that both men and women technical workers perceive that "being family oriented" is not a principal characteristic of successful people in technology. Nonetheless, the majority of men and women at the mid level see themselves as family oriented. This disconnect — between workplace ideal and reality — often has negative consequences for women.

Chart 2d. Partnership and Family Compromises to Achieve Career Goals among Mid-Level Technical Workers, by Gender
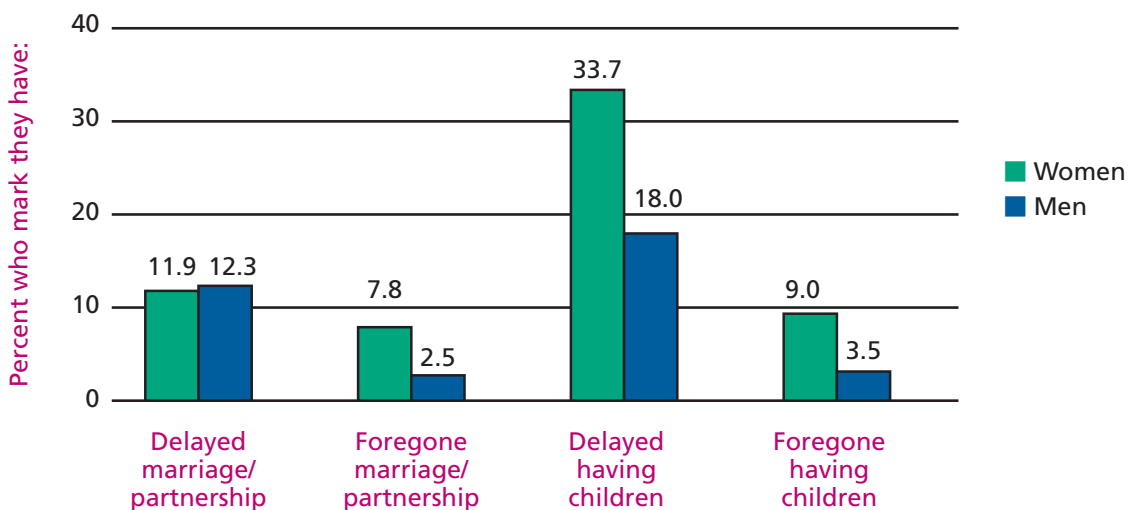
Percent who mark they have:

	Women	Men
Delayed marriage/partnership	11.9	12.3
Foregone marriage/partnership	7.8	2.5
Delayed having children	33.7	18.0
Foregone having children	9.0	3.5

on the division of household labor, **men are almost four times more likely than women to report that their partner has primary responsibility for the household and children.**[72] These patterns have serious consequences for mid-level technical women in terms of successfully meeting the expectations of work and family.

That men are more likely to have a partner who assumes the role of primary caregiver in the home infiltrates workplace culture. Many mid-level women commented that the "motherhood assumption" was a barrier to their career success, while some male interviewees perceived motherhood as a barrier to women as well.

Partner Characteristics

Important differences also emerge when comparing partner characteristics of women and men at the mid-level. **Partnered mid-level women are over twice as likely as partnered mid-level men to have a partner who works full-time (79.3% versus 37.9%).**

Mid-level men, by contrast, are more likely than women to have a partner who either works part time or who is not employed. Consistent with national data

Chart 2e. Household Characteristics of Partnered Mid-Level Technical Workers, by Gender

Category	Women	Men
Partner works full-time	79.3	37.9
Partner works part-time	6.1	19.0
Partner is not employed	8.8	33.5
Partner has primary responsibility for household/children	13.0	50.8
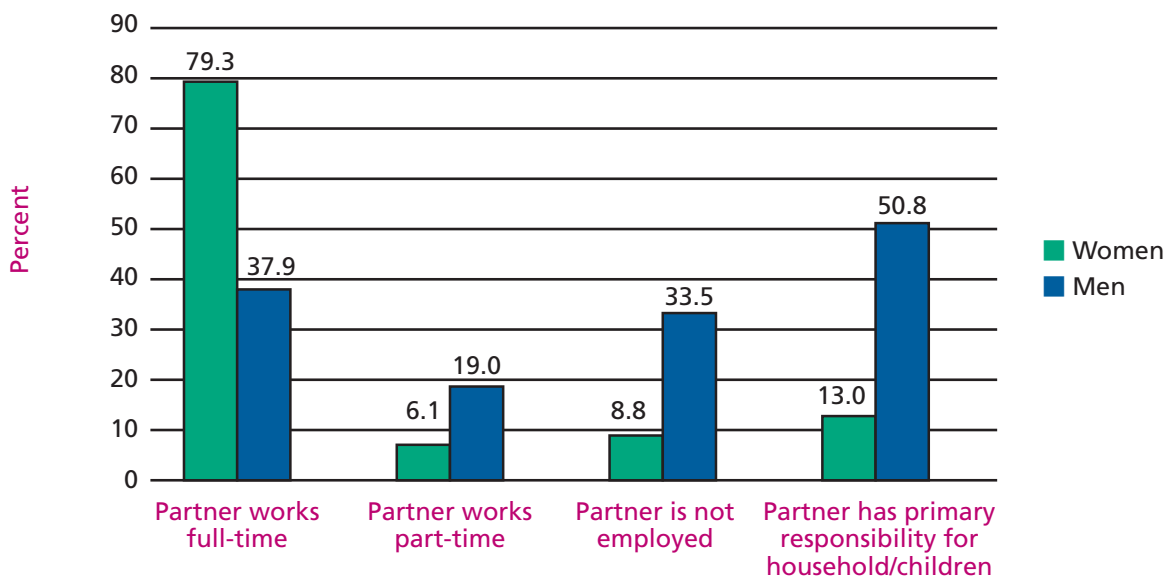
Chart 2f. Percentage of Partnered Respondents Who Report that their Partner Has Primary Responsibility for Household and Children, by Gender and Level

Percent

	Entry	Mid	High
Women	14.1	13.0	23.5
Men	45.3	50.8	50.8

Legend: ■ Women ■ Men
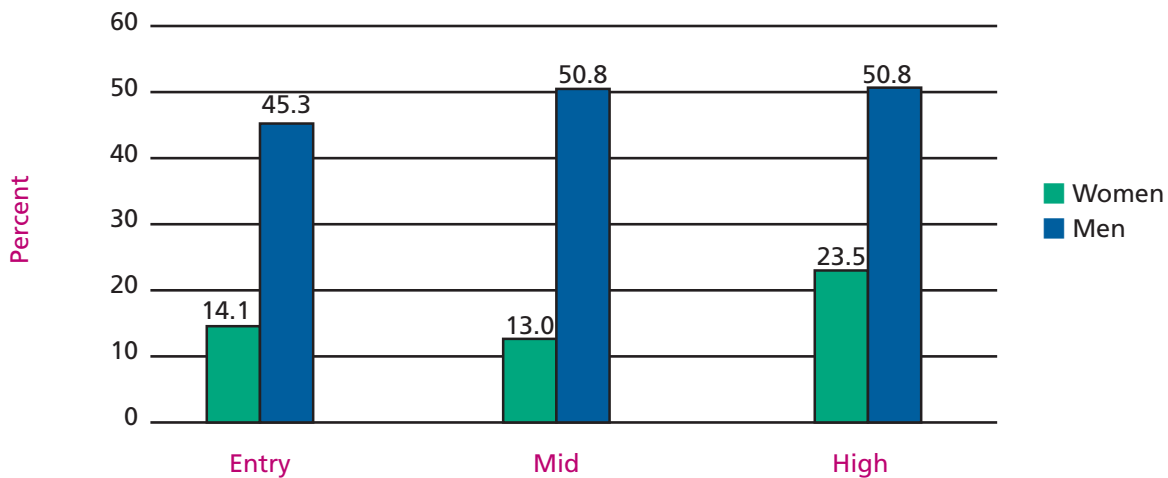
> "The only barrier that I see [for women] is the urge for motherhood. You just can't get past that one."
> – mid-level technical man

Despite the prevalence of this gendered perception, it is important to remember that this viewpoint is not shared by all technical men. We heard from many mid-level men who are also frustrated by the "disconnect" between work expectations and family life.

Work/family disconnect

> "Once kids are into their school years, it is extremely important that we spend lots of time making sure that they have a great life. What about the parents? The parents are squeezed with this work/life thing."
> – mid-level technical man

Notably, nearly seventy percent (68.6%) of mid-level technical women who have full- or part-time working partners are, in fact, partnered with someone who also works in high-tech (this is true for only one third of mid-level technical men). Women in dual-career households are also more likely to work at the same company as their partners (17.0% versus 7.8% of men).

Dual-career technical couples

> "We have conflicts where we have to choose which meeting has less meaning — and that person takes our son, or we let him play at home for an hour while we call in. There is definitely some give and take. My husband juggles it, too."
> – mid-level technical woman

> "He's very good about leaving work at five o'clock and coming home. He coaches all of his son's sports events... and there is Cub Scouts, too. My husband prioritizes that time with his son very highly. He is able to do that with his job. Every once in awhile I have to travel (day trips or an overnight trip) for work and we're able to manage that, too."
> – high-level technical woman

While many of the women in dual-career technical relationships work hard with their partners to create work-life balance, not all believe that they can do so given the context of their working lives. For example, we spoke with a mid-level woman who is considering *"getting out of the high intense environment"* of high-tech after experiencing unreasonable pressure to resume full-time work soon after the birth of her first child. After this experience, she insists that she will *"take advantage of working part time and slowly ramping back up"* after her second

Chart 2g. Percentage of Partnered Respondents in Dual Technical Career Households, by Gender and Level

Percent

- 80
- 70 — Entry: Women **68.0**
- Mid: Women **68.6**
- High: Women **75.0**
- 60
- 50
- Entry: Men **41.2**
- 40
- Mid: Men **32.4**
- High: Men **35.8**
- 30
- 20
- 10
- 0

Legend:
- ■ Women
- ■ Men

Entry | Mid | High
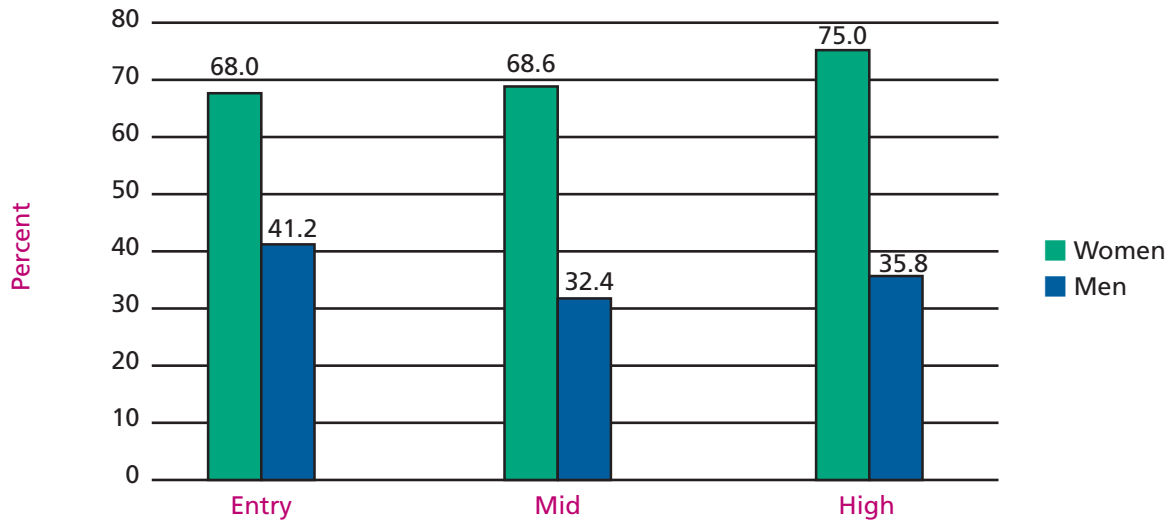
(see method note in Appendix B)

child. Unfortunately, her negative work experience lingers and she finds herself thinking about a new career: *"I have definitely thought, especially after having a child, that it would be nice to have a job that's not so stressful."*

Conclusion

1) The majority of mid-level women and men are married/partnered (79.3% of women and 86.2% of men). Men are almost four times more likely than women to report that their partner has primary responsibility for the household and childcare. These patterns have serious consequences for mid-level technical women in terms of successfully meeting the expectations of work and family.

2) One third of the mid-level women in our survey report that they have delayed having children in order to achieve their career goals (33.7% of women versus 18.0% of mid-level men). Thirteen percent of mid-level women report that they plan on starting a family in the next twelve months (the same percentage is true for men). Technical women experience a difficult set of choices when starting their families. We interviewed many technical women who spoke of feeling forced to choose between career and family.

3) Mid-level women are more likely than are their male co-workers to be single (20.7% of women versus 13.8% of men), a difference that is seen throughout the career ladder.

4) Partnered mid-level women are more than twice as likely as partnered mid-level men to have partners who work full-time (79.3% of women versus 37.9% of men). Mid-level men are more likely than women to have a partner who either works part-time or who is not employed.

5) Nearly 70 percent (68.6%) of mid-level technical women who have full- or part-time working partners are, in fact, partnered with someone who also works in high tech (this is true for only one-third of mid-level technical men). Thus, not only do women at the mid level work and live in dual-career households, but both partners often work within the constraints of high-tech careers.

Recommendations

1) Mid-level women face significant work family challenges. Company practices such as flex time, parental leave, and vacation time are crucial. We discuss these practices and their importance to technical women in Chapter 5.

2) Create awareness among managers and executives about the prevalence of women in dual-career technical couples and the work life challenges they face.

Perceptions of Success and Core Work Values at the Mid Level

The popular image of the successful technical worker is the "hacker" who puts his compulsive, non-collaborative behavior on display by holing up in his cubicle for hours on end.[73] Research clearly shows that the classic hacker stereotype curbs the desire of both women and underrepresented minorities to enter and remain in the technology profession.[74] In fact, practitioners have identified this stereotype as one of high-tech's greatest challenges to recruiting women and underrepresented minorities.[75]

Our study questions whether or not the popular hacker image is relevant to the men and women who work for leading high-tech companies. Our survey captured a new, "professional" image of success that is shared by today's technical workforce. We asked respondents to rate the importance of nineteen key attributes, which included many stereotypical traits (e.g., "obsessive," "geeky," "isolated at the keyboard") as well as other attributes associated with workplace innovation (e.g., "analytical," "risk-taking," "collaborative"). The results are surprising and suggest that the popular image of the technical worker is simply out of date. We also discuss the core values that today's technical employees bring to the workplace. Importantly, we find that both men and women share the same views concerning the qualities critical for success. However, there are noteworthy differences between women and men in terms of technical identities. High-tech companies must understand these key differences in order to promote the retention and advancement of mid-level technical women.

Perceptions of Success

What does it take to be successful in technology? We find that **mid-level employees believe that classic hacker behaviors are not associated with success in today's high-tech companies.** In fact, hacker characteristics rank among the lowest of all 19 attributes of success.

If not the hacker, what image resonates with mid-level employees? Here we examine the attributes (seven in total) that were rated as "very" or "extremely" true of successful people in technology by the majority of mid-level women and men. These qualities are important for professional success in today's technical workforce.

As "Top Seven" attributes of success indicate, mid-level employees describe successful technologists as those who are careful and critical, and yet who take initiative by thinking outside the box. Chief among attributes for success is analytical thinking, followed closely by innovative, risk-taking, and questioning behaviors. Mid-level men and women also believe that collaboration is key to professional success in the high-tech workforce. **As the linchpin of today's global technical workforce, Silicon Valley mid-level employees envision successful people in technology as engaged thinkers who work closely with others.** The popular image of the anti-social hacker working in the isolated glow of his computer screen is a relic of a time when technology was new.

Chart 3a. Attributes of Successful People in Technology According to Mid-Level Technical Workers: the "Top 7" versus "Hacker" Characteristics

Percent who report that each attribute is "very" or "exremely" true of successful people in tech:

Attribute	Percent
Analytical	79.7
Innovator	77.2
Questioning	74.8
Risk-taking	74.2
Collaborative	66.7
Entrepreneurial	63.1
Assertive	59.6
Masculine	16.6
Geeky	15.3
Isolated at keyboard	6.0
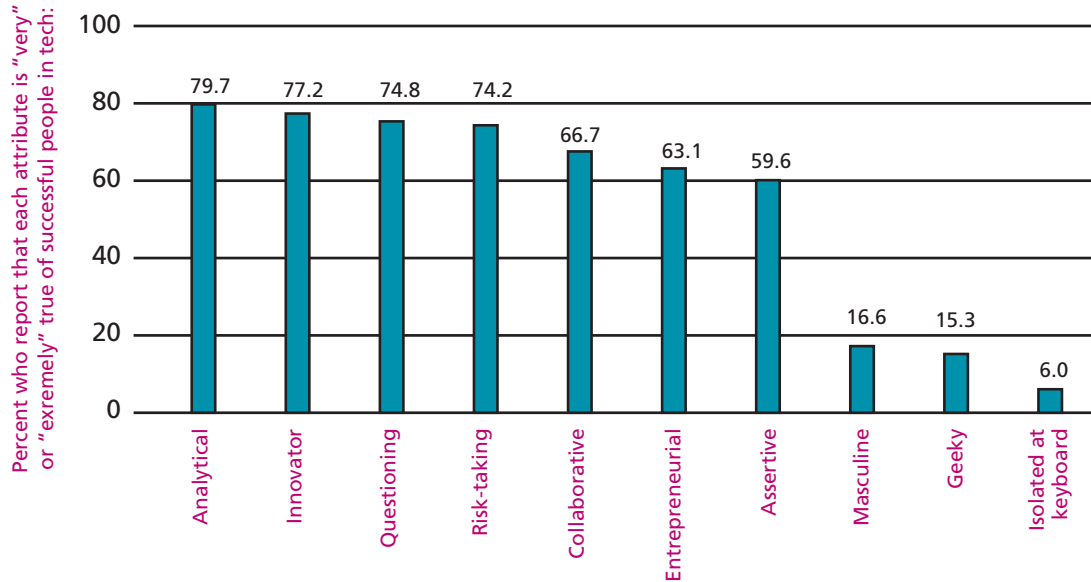
Chart 3b. Self-Perceptions of Mid-Level Technical Women and Men on Select "Top 7" Attributes: Analytical, Risk-Taking, and Assertive

Percent

Attribute	Very or Extremely True of Successful People in Tech (All)	Very or Extremely True of Themselves (Women)	Very or Extremely True of Themselves (Men)
Analytical	79.7	76.1	78.7
Risk-taking	74.2	45.8	52.2
Assertive	59.6	42.7	40.4
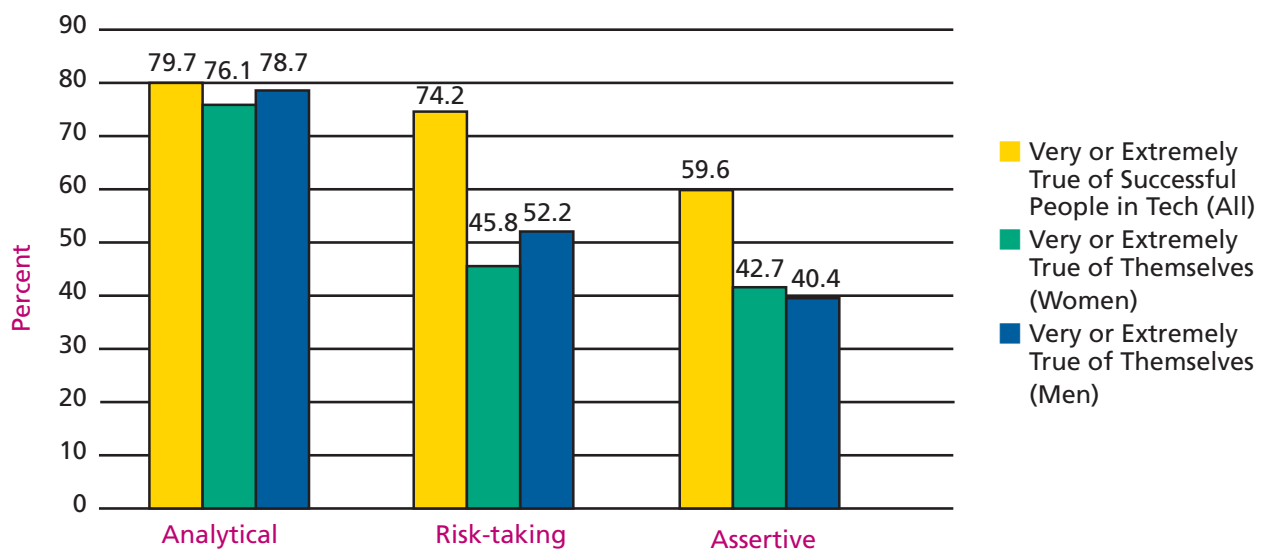
Self-perceptions of technical workers:

While mid-level men and women may share a common vision of professional success, their views tend to differ when it comes to how they see themselves. Here we investigate the extent to which mid-level men and women see themselves as "meeting" professional standards of success in technology.

Survey results show that men and women are equally likely to see themselves as being analytical, risk-taking, and assertive. These findings contradict commonly held beliefs about workplace gender differences, where many assume that women are neither assertive nor risk-taking. We heard from mid-level women who explained that they had "learned to play the game" by developing more assertive communication styles. Learning these skills may well have helped many women advance to the mid-level. But because of stereotypical assumptions that are exacerbated when women are in a minority, assertiveness and risk-taking remain attributes that are positively associated with men more so than with women.[76] This means that women who have these "success" qualities may face additional barriers when putting them into play. We elaborate on these points in Chapter 4.

Tooting your own horn

"You have to be able to blow your own horn. You have to be convinced that you're smarter than everybody else and everybody should listen to you. This is a certain ego trait that I don't think is rewarded in women. It is certainly not seen as feminine ... Whereas those same personality traits in men are somewhat admired."
– mid-level technical woman

"People get evaluated on how others perceive them rather than on results."
– mid-level technical woman

Mid-level men and women have different self-perceptions on other key success attributes. **Men are significantly more likely than women to see themselves as innovative, entrepreneurial, and questioning. Women, on the other**

hand, **are more likely than are men to see themselves as collaborative.** The common thread running through these different views is that they follow contemporary gender norms, where women are frequently depicted as gifted collaborators who are more likely to share and agree with others than to raise difficult questions. Thus, men and women themselves may unwittingly reinforce stereotypical gender norms.

Undervaluing women

"Women are absolutely undervalued in the technical world. When both men and women have equal skill set/education, women are consistently assigned to program/project responsibilities while men are assigned the 'pure engineering' responsibilities."
– mid-level technical woman

Despite these gender differences in self-concept, many women *and* men may perceive a disconnect between "what it takes" to be successful and "who they are" as individuals. For example, over three quarters (77.2%) of mid-level men and women report that innovation is a key attribute of success, but only 52.1 percent of men and 31.3 percent of women report that this is true of themselves. Similarly, while 63.1 percent of men and women report that successful people in technology are entrepreneurial, only 33.3 percent of men and 24.3 percent of women consider themselves to be entrepreneurial. In other words, perceptions of success and self-concept do not necessarily go hand-in-hand.

Men's and women's self-concepts do not align with their perceptions of success. While nearly 60 percent of mid-level workers see being assertive as an attribute of successful people in technology, less than half of men and women see this as a personal attribute (40.4% and 42.7%, respectively). The same is true for risk-taking behaviors. Here 74.2 percent consider risk-taking an attribute of success, but only about half of men (52.2%) and women (45.8%) count risk-taking as a personal trait.

Chart 3c. Self-Perceptions of Mid-Level Technical Women and Men on Select "Top 7" Attributes: Innovator, Questioning, Entrepreneurial, and Collaborative

Innovator: Very or Extremely True of Successful People in Tech (All) 77.2; Very or Extremely True of Themselves (Women) 31.3; Very or Extremely True of Themselves (Men) 52.1

Questioning: Very or Extremely True of Successful People in Tech (All) 74.8; Very or Extremely True of Themselves (Women) 67.2; Very or Extremely True of Themselves (Men) 74.6

Entrepreneurial: Very or Extremely True of Successful People in Tech (All) 63.1; Very or Extremely True of Themselves (Women) 24.3; Very or Extremely True of Themselves (Men) 33.3

Collaborative: Very or Extremely True of Successful People in Tech (All) 66.7; Very or Extremely True of Themselves (Women) 79.7; Very or Extremely True of Themselves (Men) 71.7

Legend:
- Very or Extremely True of Successful People in Tech (All)
- Very or Extremely True of Themselves (Women)
- Very or Extremely True of Themselves (Men)

Chart 3d. "Long Working Hours": Attribute of Success Versus Self-Perception Among Mid-Level Technical Men and Women

Very or extremely true of successful people in tech: Women 58.3; Men 46.7

Very or extremely true of themselves: Women 36.1; Men 40.7
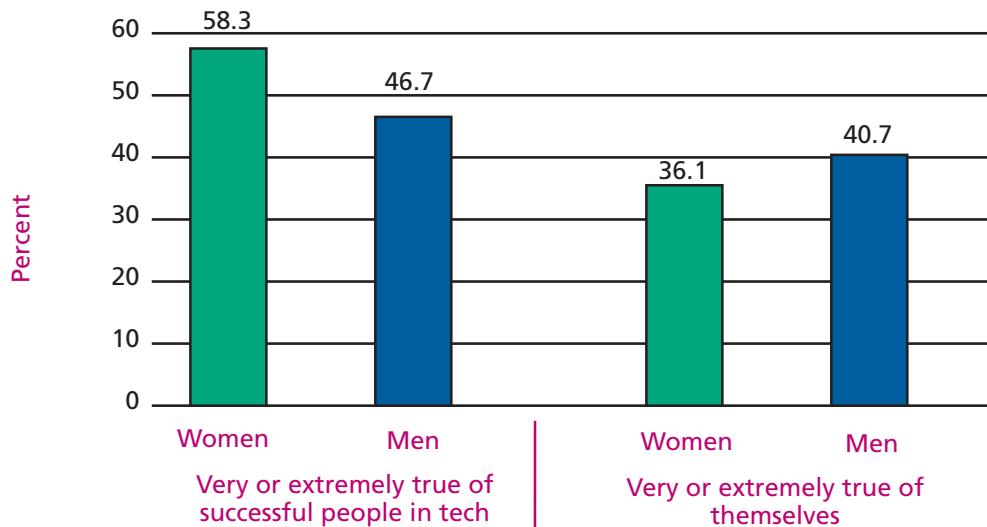
Respondents were also asked to rate the extent to which "long working hours" described successful people in technology and themselves. Here, gender differences in perceptions and self-concept are notable. Women at the mid level are significantly more likely than men to believe that extended work days are a requirement for success. While less than half of mid-level men (46.7%) consider long working hours to be "very" or "extremely" true of successful people in technology, nearly 60 percent (58.3%) of mid-level women believe this to be true. However, 36.1 percent of mid-level women (and 40.7% of mid-level men) report that they work long hours. **If the majority of mid-level women believe that success requires working excessive hours, women who cannot regularly stay late at work may perceive barriers to their advancement.** We discuss this issue and how it acts as a barrier to retention further in Chapter 4.

Family and Career Success

According to mid-level men and women, successful people in technology are not family-oriented. In fact, only 7.3 percent of our respondents agreed that successful technologists are family-oriented.

However, over 60 percent of men and women describe themselves as family-oriented. The shared belief that being family oriented is not an attribute of success may have very real consequences for both men and women. Many of the mid-level women whom we interviewed described a "family penalty." Many men also experience family responsibilities as a potential roadblock to success.

Working weekends to advance

"When I first moved here I went home and told my wife, 'In order to fit in at the company I need to work on Saturdays. I don't particularly want to do this, but I can see that if I'm going to advance here that's what's going to have to happen.'"
– high level technical man

As survey results in Chapter 2 show, many men can buffer work demands with additional household support from their partners. The majority of women do not. They live in households where partners are working full-time and childcare is a major responsibility to be shared by dual-career partners.

Chart 3e. "Family-Oriented": Attribute of Success Versus Self-Perception among Mid-Level Technical Men and Women
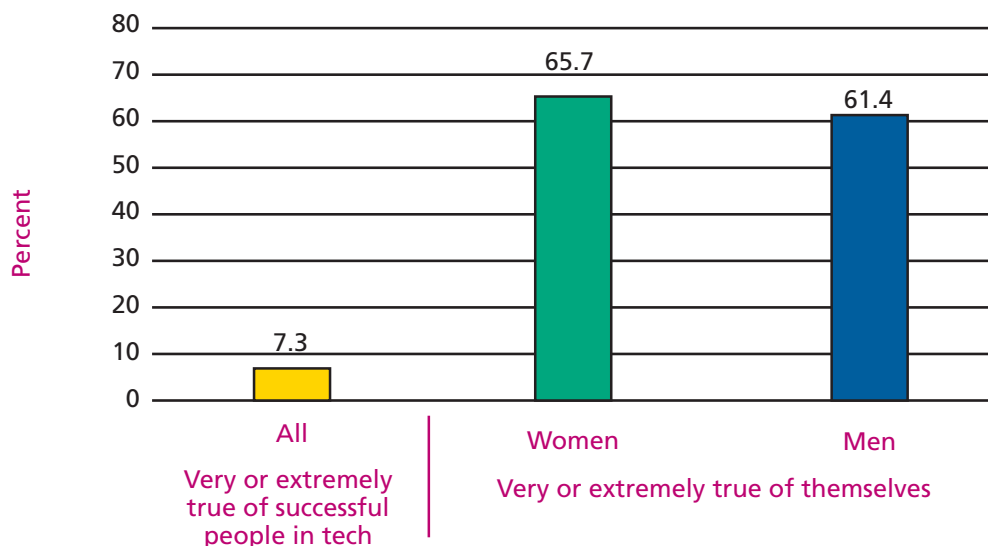
Core Work Values

While perceptions of success give a sense of how tech workers evaluate their own fit in the workplace, core work values describe what mid-level employees want from their daily work experiences. Understanding employees' core work values can help high-tech companies tap into and better address the priorities of their mid-level technical workers. To date, little research attention has been paid to this subject, despite the fact that understanding the values of technical women is crucial to any high-tech company's ability to recruit and retain them.

We asked mid-level men and women to evaluate twelve statements about their work values and interests. We found that both men and women place a great deal of emphasis on **seven "core values:" teamwork, updating their technical skills, innovative work, working on cutting-edge technology, recognition as a technical expert, understanding how their work contributes to the team or organizational goals, and their professional identity as technologists.**

Teamwork

Teamwork is one of the most important values of technical workers in our survey. Mid-level technical men and women clearly value teamwork more than working independently. In fact, teamwork is the highest rated work value for mid-level women.

This finding corroborates the shared perception that collaboration is a key attribute of successful people in technology. Teamwork also stands out in its opposition to the popular "hacker" image of the technical worker. Findings on core values and perceptions of success show that the true nature of technical work is based on teamwork and solid communication skills.

Teamwork is key

"Teamwork is a key component of being an engineer. It's not only writing code, but being able to do that in the context of working with other personalities."
– mid-level technical woman

Chart 3f. Work Values of Mid-Level Technical Women and Men

Statement	Women	Men
I am considered a star in my company	27.7	34.2
My technical skills are underutilized	33.7	43.0
I strongly identify with my company	43.2	45.5
I do not like routine tasks	46.2	51.3
I like to work independently	46.2	45.0
I strongly identify with my technical profession	59.3	66.7
I value working on cutting edge technology	70.4	78.5
I need to understand how my work contributes to the team/organization	74.2	72.3
I value being seen as expert in my technical area	75.5	83.6
I value doing innovative work	78.1	88.9
I value opportunities to update my technical skills	82.3	86.5
I like teamwork	85.5	80.9

Percent who report that each statement is "very" or "extremely" descriptive of themselves:

"I look for a technical job to be challenging both technically and for creating consensus. I shine with the combination of soft and hard skills."
– mid-level technical woman, with 30 years of experience

"I've seen engineers who were brilliant engineers, but they couldn't communicate their ideas and they couldn't influence others. There's no way for them to advance further than a certain level."
– mid-level technical woman

"I've been in the position where I started my own company and there were only a few of us. I had a lot of control, but not a lot of collaboration. I get a lot more job satisfaction out of collaborating with good engineers. To me that's really important."
– mid-level technical woman

Opportunity to Update Technical Skills

Over 80 percent of men and women value opportunities to update their technical skills. Technical workers know that they must keep abreast of new technologies in order to remain both employable and promotable in a constantly changing technological landscape. Though men and women update their skills in different ways, they face similar barriers to technical skill development. High-tech companies that want to retain and promote their technical talent need to invest significantly in company-sponsored opportunities to update technical skills, and adjust employees' workflow accordingly.

Peer interaction is a critical means by which both men and women develop their technical skills. However, men are more likely than are women to update their technical skills on their own, "informally," while women tend to rely on conferences, professional meetings, and mentors more so than men. Despite gender differences in venues for skill development, technical men and women face similar challenges in keeping their skills up to date. Top challenges for both men and women are work and family commitments.

Technical workers place a premium on skill development; when companies are responsive to these values they may strengthen their employees' "commitment to stay." **Creating opportunities to update technical skills is particularly important for mid-level women.** As we noted in Chapter 1, women at the mid-level are more likely to hold non–

Chart 3g. Strategies to Update Technical Skills among Mid-Level Technical Workers, by Gender

Strategy	Women	Men
Interaction with a mentor	31.6	24.3
Course/workshop/certification programs on my own time	43.6	49.0
Professional association meetings/conferences	48.1	40.3
On my own, informally	62.1	81.7
Course/workshop/certification programs on work time	69.6	72.9
Interaction with peers	81.8	82.2

Percent who mark:
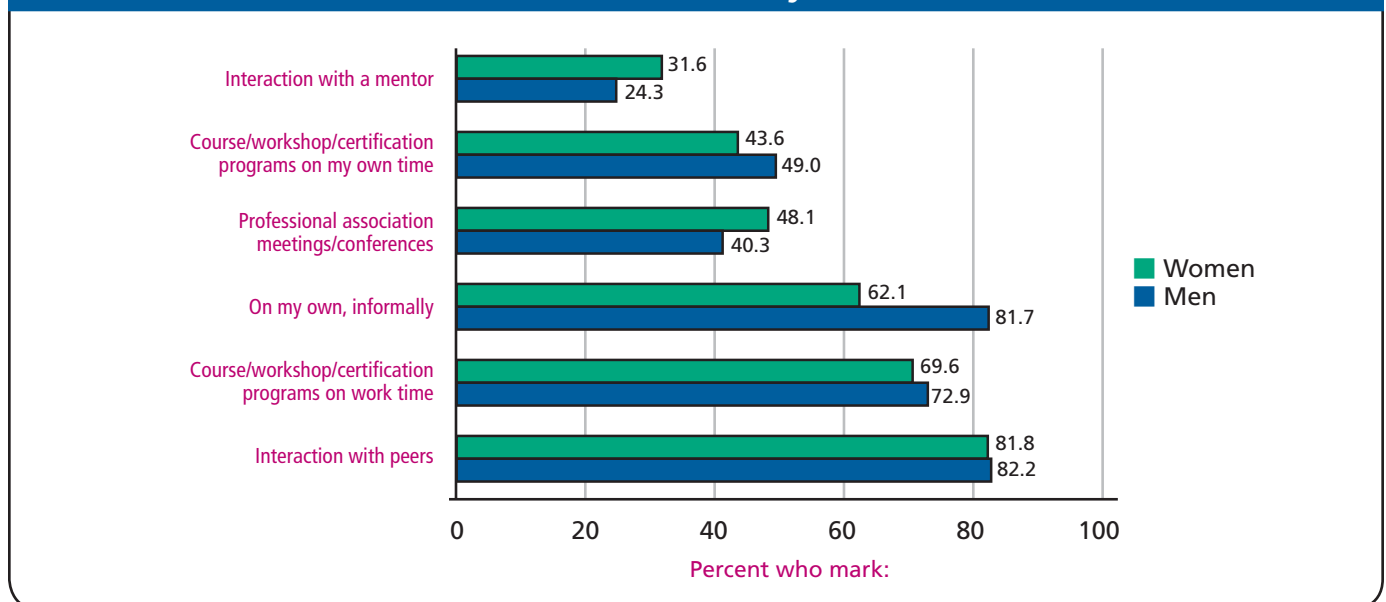
Chart 3h. Challenges to Updating Technical Skills Among Mid-Level Technical Workers, by Gender

Challenge	Women	Men
Lack of personal funds for professional development	19.4	19.4
Difficulty in choosing which technical skill to develop next	30.1	32.8
Fast paced change of technology	32.5	31.5
Lack of company funds for professional development	33.1	36.7
Lack of time due to family/personal commitments	57.6	57.6
Lack of time due to work commitments	79.4	81.4

Percent who mark:
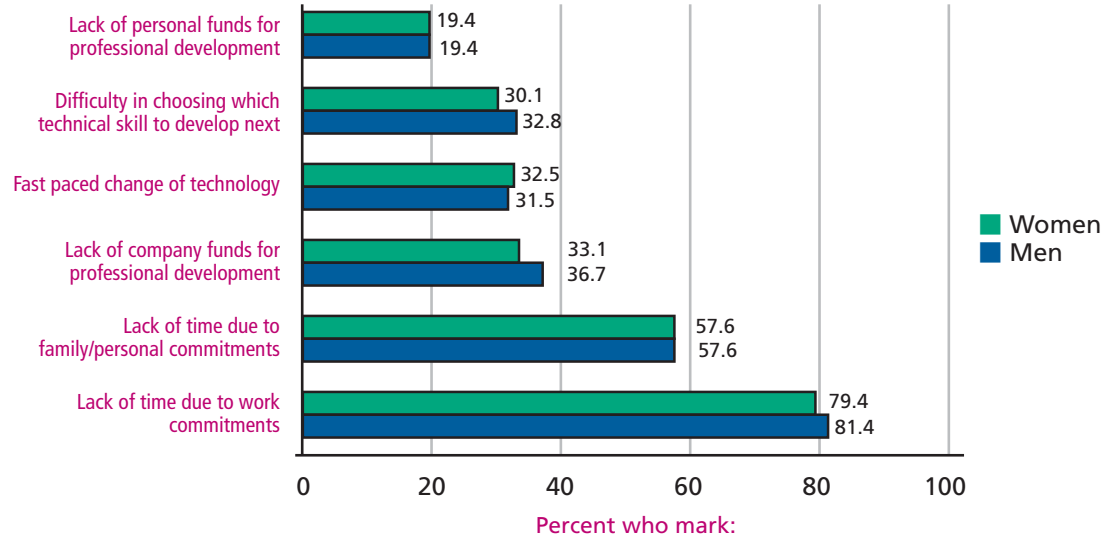
technical degrees than are men. For these women, company–based technical development opportunities are crucial to advancement.

Doing Innovative Work

Men and women want to be doing innovative work. Many women commented that they *"value the chance to do things that allow me to employ some kind of creativity"* and *"value having something new to learn."* However, just as men are more likely than are women to see themselves as innovative, men are more likely than are women to value proximity to innovation.

We learned more about the nature of such innovative work through our interviews. Both women and men defined innovation in terms of creativity, problem–solving, continuous learning, and strategic thinking.

The desire for continuous learning

"[In a technical job] I have to see something I can contribute. I have to be surrounded by people I can learn from."
– high-level technical man

"[What I look for in a technical job] is that it is fun, exciting, and gives me a chance to learn. I want something new, where I can continue to learn. I don't want it to be stagnant. I'm willing to try a bunch of different things."
– high-level technical woman

"I value having something new to learn. I still learn something new every day even though I've been in this job for four years. Having responsibility and ownership, where you know what you're delivering and who you're delivering it to, [gives] that sense of pride when you get it done."
– mid-level technical woman

Being Recognized as an Expert

Both mid-level men and women value being recognized as an expert in their technical area. This is particularly true for technical men, who are more likely than are women to report that this is "very" or "extremely" descriptive of themselves (83.6% of men versus 75.5% of women). Men and women interviewees discussed their passion for technology and their desire to be in an environment where learning is ongoing and where they can make a significant contribution based on their technical expertise.

Having Impact

Mid-level technical men and women value having an impact on their team, their organization, and on technology users. They strive to understand how their work contributes to the team or organization. Interviewees in particular refer to a feeling of accomplishment when their technical contributions achieve organizational goals.

Interviewees noted a feeling of pride and satisfaction knowing that "real people" were using their technological creations. Importantly, interviewees frequently commented that not understanding their role on their team or in their company is a driving force behind any decision to leave a technical position or a company.

Understanding technical impact drives retention

"If a company provides a clear vision of how the work of their technical staff will impact the world, then I think retaining employees would be less of a problem."
– mid-level technical man

"The thing I value more than anything else is 'getting things done.' That has made me want to leave [this company] more than three times … I want my contribution to be used every year … I want to write features that people will use."
– mid-level technical man

"If I had ever gotten to the point where I wasn't interested in what I was working on and I didn't feel that my work was being appreciated by the company … I would have left."
– mid-level technical woman

"I went into engineering because I have a love of building things … What has kept me in this field is the belief that the projects I work on have the potential to make thing better for people — and not in just some small way."
– mid-level technical man

Professional Identity

To complete our portrait of today's mid-level men and women, we now turn to the issue of professional identity. We asked survey respondents to indicate the extent to which they identified with their current high-tech company and with the technical profession generally. These are crude measures that can be applied to professional versus company loyalty. **We found that both technical men and women tend to have stronger ties to their technical profession than to their current company. Company retention efforts hinge on this issue. To improve retention rates, high-tech companies should provide professional opportunities for technical workers to connect to one another as members of a technical community in general.** This addresses the heart of technical personnel who believe in their professional work identity. These opportunities, in turn, may strengthen company loyalty because their employees will experience engagement with their peers and profession at their place of work.

Importantly, men and women differ in the degree to which they identify with the technical profession. Men at the mid-level are more likely to identify strongly with their technical profession (66.7% of men versus 59.3% of women).

Why do mid-level technical women identify less with their technical profession than do men—and what are the implications of this gender difference? First, research shows that when women enter a profession that defies stereotypes (and when they are consistently exposed to the notion that they are somehow not as good as men in that profession) they are likely to believe they do not belong to the profession, a phenomenon known as stereotype threat.[77] Further, research shows that women differ from men in their motivations for entering a technical field. In general, women are drawn to computer science and other technical fields because of an interest in pure technology and the application of computer science and technology to both non-technical fields and broader problems.[78]

(This may be partially connected to women's interdisciplinary backgrounds. As we found in Chapter 1, women who do not have normative technical capital may have been trained in a technology–adjacent STEM field other than engineering and computer science.) **Thus, the degree to which women identify with their technical profession is complicated by the fact that many women do not become tech–nologists solely for technology's sake, but to apply technology to address broader social issues. Indeed, when asked about professional and personal priorities, proportionately more women than men report that working for a socially responsible company is "very" or "extremely" important (66.0% of women versus 51.1% of men).**

Differing views of the technical profession

"We were evaluating three projects to work on … and one was proposed by two women and the others were by men... I heard a lot of good things about the project by the two women, but it didn't go through … It was slightly different from the typical project proposed. We [women] have different ways of seeing things — and it was not appreciated."
– mid-level technical woman

"Men and women are different in how they relate and what they value. I can't say that they're evaluated fairly, just that they're evaluated differently."
– high level technical woman

Conclusion

1) **The popular image of the successful technical worker as an isolated "hacker" does not reflect today's mid-level technical employees. Survey results show that the core values and perceptions of success of mid-level women and men involve teamwork and collaboration.**

2) **According to mid-level men and women, being family-oriented is not a factor for success in their profession. However, the majority of men and women describe themselves as "family-oriented." This disconnect may have very real consequences for both men and women. Many of the mid-level women whom we interviewed described a family penalty. Many men also experi-ence family responsibilities as a potential roadblock to success.**

3) **Technical workers place a premium on skill develop-ment; when companies are responsive to these values, they may strengthen their employees' "commitment to stay."**

4) **Mid-level technical men and women value having an impact on their team, their organization, and on tech-nology users.**

5) **Both technical men and women identify more strongly with their technical profession than with their current company. Company retention efforts hinge on this issue. To improve retention rates, high-tech companies should provide professional opportunities for technical workers to connect to one another as members of a technical community in general. These opportunities, in turn, may strengthen company loyalty because their employees will experience engagement with their peers and profession at their place of work.**

Recommendations

1) Create company-wide opportunity for *all* technical employees — at all rank levels — to participate in technical professional development, on company time. Send the signal to employees that company investment in their technical human capital is a priority. Workflow must be adjusted accordingly, as mid-level workers cite a lack of time due to work responsibilities as the number one barrier to updating technical skills. High-tech companies should train managers on this topic and provide appropriate budgets for such development. Managers must ensure that all technical employees have access to appropriate opportunities.

2) Ensure that your workplace culture addresses the core values of technical workers. Mid-level technical women, in particular, value work that has a positive social impact. Further, they strive to work for high-tech companies that are socially aware and responsible. High-tech companies should clearly articulate how technical employees' work/projects meet broader company goals. The explanation of company goals should include how your technology impacts users and society at large.

3) Reward teamwork values regularly, including in the promotion and evaluation processes. Mid-level women and men value teamwork and see being collaborative as an attribute of successful people in technology. It is important to remember that effective collaboration blends different skills and levels of contribution. High-tech companies (and managers) can reward productive teams rather than single out individual workers who stay past business hours.

Workplace Culture and Climate

"Competitive," "work-obsessed," "cut-throat," "24/7" — the media uses these terms to describe both high-tech and Silicon Valley work cultures. This daunting portrayal of Silicon Valley's work culture can, in and of itself, be detrimental to building diversity. Workplace culture and climate — from the tangible experience of working in an office cubicle to the general atmosphere of high-tech culture — can create additional barriers to the retention of technical women.[79]

Survey results show that mid-level men and women work within an "achievement culture" that expects a high level of commitment from individuals.[80] Achievement cultures emphasize individual expertise and self-motivation, as well as teamwork and urgency (often requiring long working hours) to achieve a common mission. Leading high-tech companies are frequently described as meritocratic environments — where expert skills, knowledge, competence, and achievement trump formal authority. However, achievement cultures can lead to employee burnout and undermine the private lives of its members.[81]

In this chapter, we examine how mid-level technical women experience company culture by identifying rewarded work behaviors and looking closely at gender differences in perceptions of culture. We then explore employee-manager relationships and the interaction between workgroups and departments. We conclude with a discussion of culture clashes that brings into focus how mid-level technical women negotiate work/life balance, part-time work, and vacation time.

Rewarded behaviors

Although mid-level women and men do not buy into many characterizations of technical work (see Chapter 3), many agree with the media's depiction of high-tech as a fast-paced and outspoken culture. **Men and women who responded to our survey believe that high-tech companies reward employees for ambition, self-promotion, speaking up, and quick decision making. Consistent with new images of success, they report that creativity and collaborative work are rewarded as well.** All of these behaviors describe a synaptic, achievement-oriented workplace that focuses on efficiency, excellence, innovation, and the successful completion of collective goals. By contrast, "friendliness" and "mentoring" are seen as the least-rewarded behaviors at high-tech companies.

Rewards and dominant forms of communication

Within this achievement culture, and despite similarities in the overall ranking of rewarded behaviors, mid-level men and women perceive this reward structure differently. Specifically, women are more likely than men to report that self-promotion, ambition, and working late are rewarded by their companies (whereas men are more likely than women to report that friendliness is a rewarded behavior). **Women, in other words, tend to feel that behaviors associated with a "masculine" working style are valued by their companies, more so than do men.** Indeed, while being masculine is not ranked high overall as an attribute of success (see Chapter 3), women rank it higher than do men as a

success factor (31.6% of women versus 8.6% of men). Women's perceptions of a masculine-typed workplace are likely shaped by their relative isolation in a predominantly male technical workforce. They are, in effect, describing a reward structure that aligns better with "typical" characteristics of the dominant group; thus, their "fit" as a minority, comes into question.

Technical women vividly described barriers stemming from a workplace culture that rewards self-promotion, speaking up, and ambition. Interviewees often reported how they had to "learn the hard way" to become as assertive as their male colleagues. In our interviews, Asian women clarified that a "culture of assertiveness" was initially difficult for them to navigate because their cultural background favors listening and humility. Women described an assertive communication style as typically "masculine" or "Type A," where it sometimes appeared that shouting and swearing were acceptable forms of communication. **Interviewees unanimously agreed that women must be assertive in order to be heard in high-tech culture.** As one mid-level technical woman described herself: *"Men like to work with me, because I am very type A, very*

assertive." In another interview, a high-level technical man described his company culture as "*reasonably*" welcoming, *"but I think it's more welcoming for women who act like men."* Female interviewees provided countless examples of fighting to overcome their own cultural background and/or preferred communication styles in order to "fit in" with the high-tech culture. As one mid-level technical woman warned, *"People with only soft skills don't survive here. They don't get any respect."*

Surviving in a masculine culture

"Being a woman is harder in a group that has mostly males. Especially if you are not of the personality where you're outspoken and you're willing to stand up in a room of 30 other men and speak your mind. It takes a certain amount of training (and goading yourself) to be able to do it. That is a barrier — just being in a really male-dominated [culture]."
– mid-level technical woman

Chart 4a. Perceptions of Rewarded Behaviors at Current Company among Mid-Level Technical Women and Men

Percent who report that each behavior is "very" or "extremely" rewarded:

Behavior	Women	Men
Speaking up	49.5	42.6
Self-promotion	49.5	36.8
Ambition	47.7	34.9
Creativity	41.2	39.6
Collaborative work	38.0	42.9
Working late	37.3	26.4
Careful planning to avoid potential problems	35.9	35.2
Quick decision-making	35.5	32.2
Mentoring	17.7	19.0
Friendliness	15.8	27.1
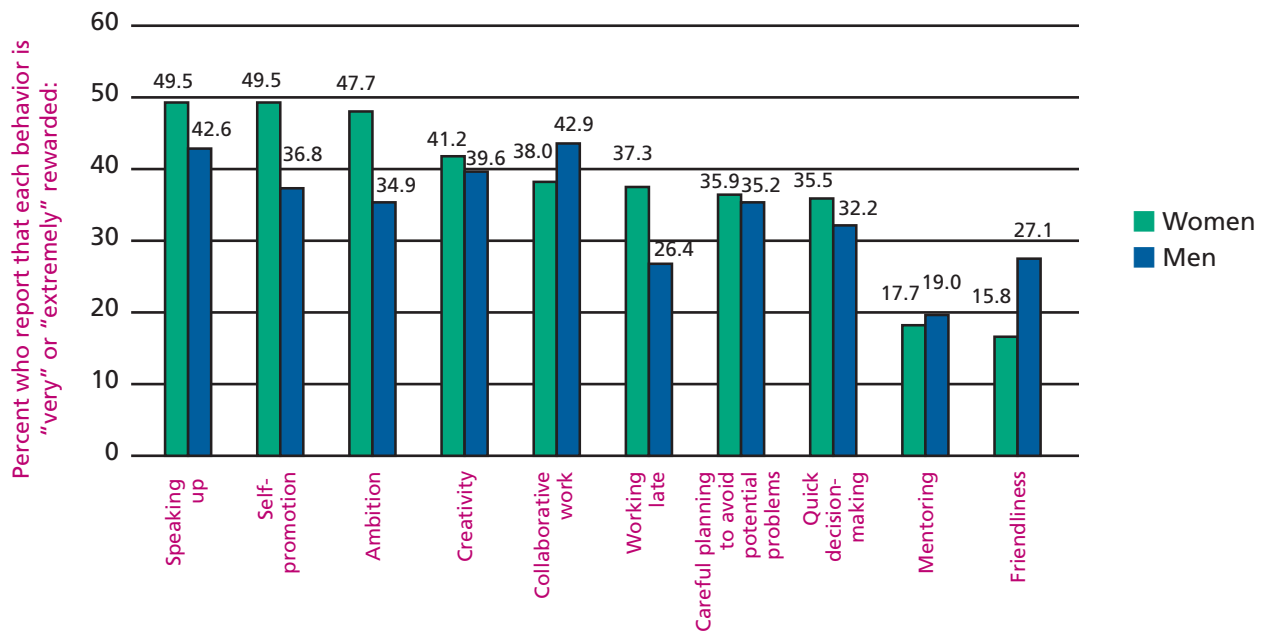
"[My first job in high-tech] had a very masculine culture. I survived it because I had three older brothers and I knew how to deal with men. I knew what affection looked like from men — insulting you can be affection. If they don't insult you, then they don't like you. And so I didn't get my feelings hurt. The way you won in that culture was to be the one left standing at the end of a meeting of nose-to-nose screaming ... It was more than competitive: it was aggressive."
– mid-level technical woman

"I'm Asian. I was raised to not be aggressive, but to be very modest... In America you need to be a little more assertive. You often have to promote yourself — let people know what you've done and what you're capable of doing... I was not very assertive. It was very easy to shut me up in meetings. If someone raised their voice and disagreed with me, I would keep quiet. I often did not take the initiative to speak up even though I knew I had a good idea or a valid comment. A lot of it was cultural ... and it took a few years to figure it out."
– mid-level technical woman

Breaking the mold

"The only barriers I've faced have been humanistic ones. Unless there's a good reason, I'm not one who's prone to ask people to work excessive amounts of time. I do value other people having balanced lives and, at times in my career, that has been detrimental to me. What happens is this: emails start coming around about people needing to work weekends ... We need to make our deadline, although no one can express a really good reason why except that we need to do it. This means that if I'm going to get my next career promotion, then my employees need to work the weekend."
– high level technical man

By rewarding only one style of communication (typically associated with male characteristics), high-tech companies are losing out on the benefits of a diverse human capital base that offers a broader set of skills.

It is noteworthy that male and female technical employees show a diversity of communication styles; the cost is high for anyone who does not fit the mold. One mid-level woman recalled how her male colleague, and close personal friend, *"never said a word in meetings. He is a classic Type B personality. He never got recognized and I was appalled by the way he was treated. He finally left."* **In fact, many of the men whom we interviewed commented on barriers to their advancement because they offered a different communication style than that of the assertive and competitive style favored by their workplace culture.**

Perceptions of Organizational Culture

While both mid-level men and women agree that high-tech work unfolds in an achievement-oriented culture, they disagree about how much power, influence, and formal rules determine successful career outcomes. Survey participants overwhelmingly agree that "taking initiative to get the job done" is the most important thing for new employees to learn. However, women — more than men — believe that learning the company's formal rules and knowing who has influence and runs "high visibility" projects is essential for employees to get ahead.[82]

Indeed, many of the technical women whom we interviewed carefully explained that they do not experience a meritocratic environment. If they entered technology thinking that they would be evaluated based on merit and accomplishment alone, then they have lost confidence in meritocracy over time.

Chart 4b. Perceptions of "What New Employees Need to Learn" among Mid-Level Technical Women and Men

Percent who agree that new employees need to learn:

Category	Women	Men
How to take the initiative to get the job done	89.1	83.0
Who has influence	77.7	70.4
How to cooperate and be a "team player"	75.0	78.6
Who runs "high visibility" projects	72.5	62.0
The formal rules and standard operating procedures	70.2	62.5
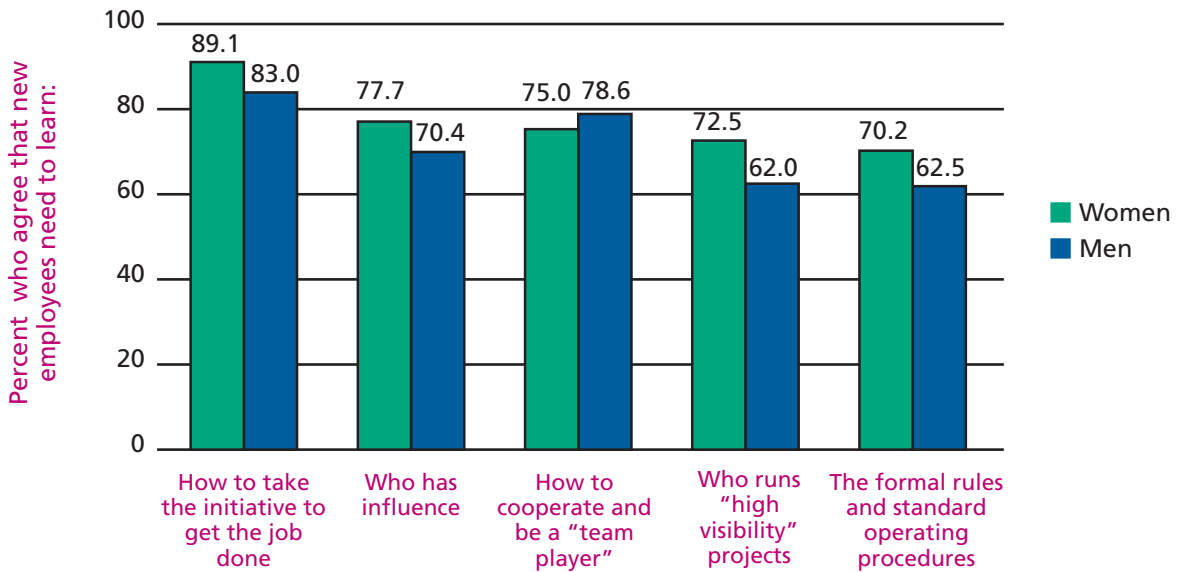
The reality of gender issues

"I have to admit, back then [in college] I thought gender issues were stupid. I always thought, you just go in and you do your job. If you're a confident person then you'll be rewarded for that. Boy was I naïve."
– mid-level technical woman

"I had general expectations that I'd be evaluated on my merits alone and not necessarily on my gender. That was the case earlier in my career ... But progress through the ranks to get past middle management – is it based upon your individual merit or is it based upon who you know and being 'in the right place at the right time?' Other factors definitely come into play the more senior you become ... It becomes a club. The connections seem to count quite a bit."
– high-level technical woman

Unlike technical women, men whom we interviewed experienced their environment as being meritocratic.

The male view of meritocracy

"It's not about gender, it's what have you done."
– high-level technical man

"In the technical world, it's ninety-five percent about what you know and what you've done. Then there's personality and odds and ends in there. In the technical world, I haven't seen political positioning and posturing."
– mid-level technical man

An unrewarded behavior: mentoring

Mid–level men and women report that mentoring is one of the least rewarded work behaviors. This should be of great concern to high–tech companies because research on mentoring indicates it is essential to the retention and advancement of women and underrepresented minorities.[83] Mentoring must be a rewarded feature of company culture to create employee buy–in. Without company–wide support, mentoring cannot have a positive impact on the retention and advancement of women.

Chart 4c. Perceptions of Relationships Between Workgroups among Mid-Level Technical Women and Men

Percent who agree that workgroups are:

	Competitive	Cooperative	Siloed	Fluid/friendly
Women	66.4	39.5	38.4	21.3
Men	47.1	41.9	36.7	25.1
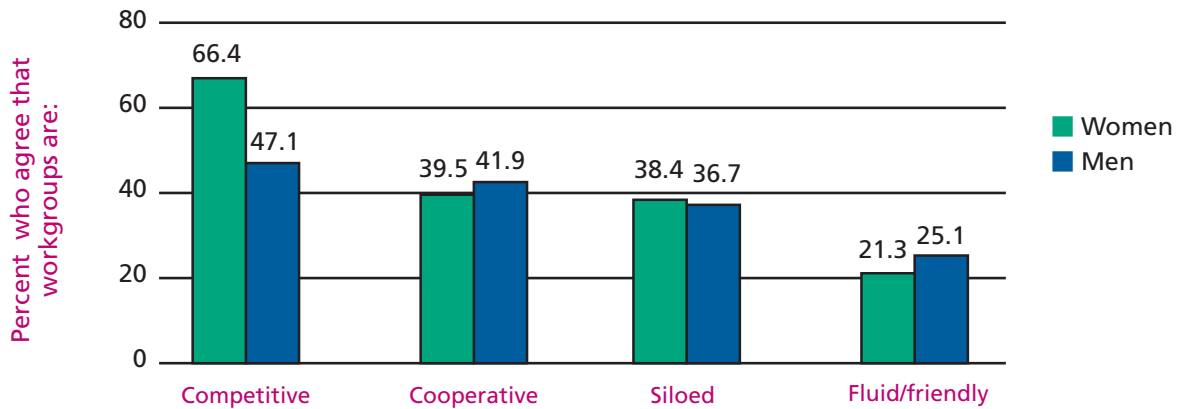
Relationships among workgroups

Yet another indicator of workplace culture is the relationship among workgroups. Experts distinguish four basic types of workgroup relationships: competitive, cooperative, siloed, and fluid/friendly. Here we find significant differences between mid-level men and women. **Women are more likely than men to experience the relationship between workgroups as one of competition. (Notably, this gender difference is significant at the mid level only.) Men, on the other hand, experience their work environment as an equal mixture of competition and cooperation, also known as "coopetition."** Coopetition is generally beneficial to organizations in that they encourage knowledge sharing and internal competition, raising the overall efficiency of the organization.[84] This cooperation to achieve common goals is very much aligned with the dominant achievement-oriented workplace culture.[85] However, women experience the competitiveness of this workplace culture more than do men.

Mid-level women experience workplace culture differently than do men in part because they do not share the same access to power and status. That is, women experience workplace culture less as a meritocracy and more as an environment that requires competition and connections in order to access power. This is also evident in technical women's perceptions that they must be especially assertive and visible in order win equal opportunities for advancement.

Mid-level women perceive a sharp divide between cooperation and competition at their high-tech companies. Throughout our interviews, mid-level women described this gap as especially acute during the competitive promotion review process. Further, for some employees, workgroup competition is heightened by scarce resources and the fear of pending layoffs.

Cooperation versus competition

"[My company] continues to stress the cooperative side. However, its focal review process focuses on the competitive side. So it says one thing and does another."
– mid-level technical woman

"It's cooperative because we work in teams. Most of us come here not to be singletons. It's competitive because every year our performance is evaluated as an individual… So once a year people get reminded of this, and they start getting darkly competitive."
– high-level technical man

"The subculture was always competitive. But now it's changed because of the budget. It's pretty stressed and tense — that's how most people feel. You don't know if the person who you're talking to today will be there to talk to tomorrow as well. A lot of projects are being put on hold while they're figuring out [reorganization]. It's a 'here are the names, when are we going to tell them,' kind of thing."
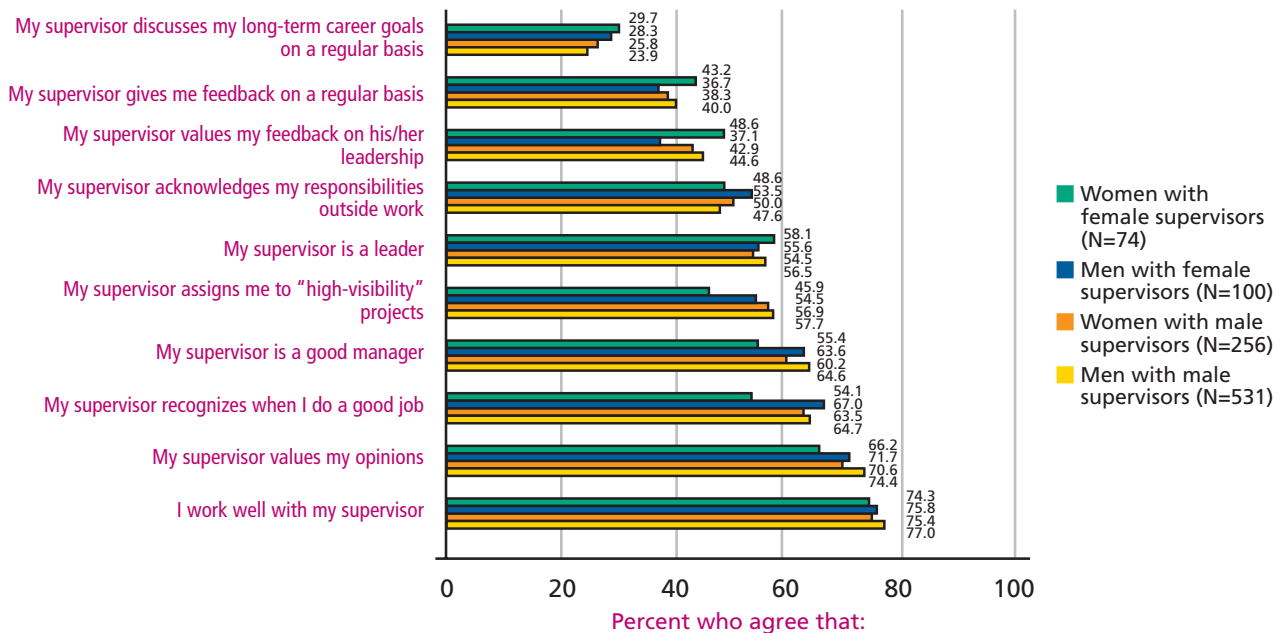– entry-level technical woman

"[My company] pretends like it's consensus driven, but it's not. It's very competitive."
– mid-level technical woman

Measuring gender diversity at your company: pockets of excellence

High-tech companies can measure their workplace culture by learning more about the prevailing cultures in specific departments and workgroups. By interviewing technical women and men in various departments and workgroups, a company can identify pockets of excellence, defined by positive work cultures in specific departments or workgroups. These pockets of excellence can then be replicated across the company. Workplace cultures that embrace gender diversity are open to diverse communication styles, encourage cooperation, and discourage an always-on mentality. These key questions will help you to unearth those departments or workgroups that foster gender diversity:

- Are diverse communication styles rewarded, or is it the case that "the most assertive gets heard?"
- Is cooperation rewarded? (What are the department, workgroup, or company practices that hinder cooperation?) Are promotions and other rewards based on individuals or teamwork?
- Does your workgroup or department have an always-on mentality? In other words, is the pace of work dictated by well-defined project needs or by a vague sense that constant availability is required?

Chart 4d. Perceptions of Supervisors Among Mid-Level Technical Workers, by Gender of Respondent and Gender of Supervisor

My supervisor discusses my long-term career goals on a regular basis: 29.7, 28.3, 25.8, 23.9

My supervisor gives me feedback on a regular basis: 43.2, 36.7, 38.3, 40.0

My supervisor values my feedback on his/her leadership: 48.6, 37.1, 42.9, 44.6

My supervisor acknowledges my responsibilities outside work: 48.6, 53.5, 50.0, 47.6

My supervisor is a leader: 58.1, 55.6, 54.5, 56.5

My supervisor assigns me to "high-visibility" projects: 45.9, 54.5, 56.9, 57.7

My supervisor is a good manager: 55.4, 63.6, 60.2, 64.6

My supervisor recognizes when I do a good job: 54.1, 67.0, 63.5, 64.7

My supervisor values my opinions: 66.2, 71.7, 70.6, 74.4

I work well with my supervisor: 74.3, 75.8, 75.4, 77.0

Legend:
- Women with female supervisors (N=74)
- Men with female supervisors (N=100)
- Women with male supervisors (N=256)
- Men with male supervisors (N=531)

Percent who agree that:

Managers

Perceptions of managers

- 18.1 percent of mid-level male and female respondents have a female supervisor.

Mid-level technical men and women are generally satisfied with their managers. Men and women agree that they work well with their supervisors (female or male), reporting that their supervisors are good managers who recognize their work and value their opinions.
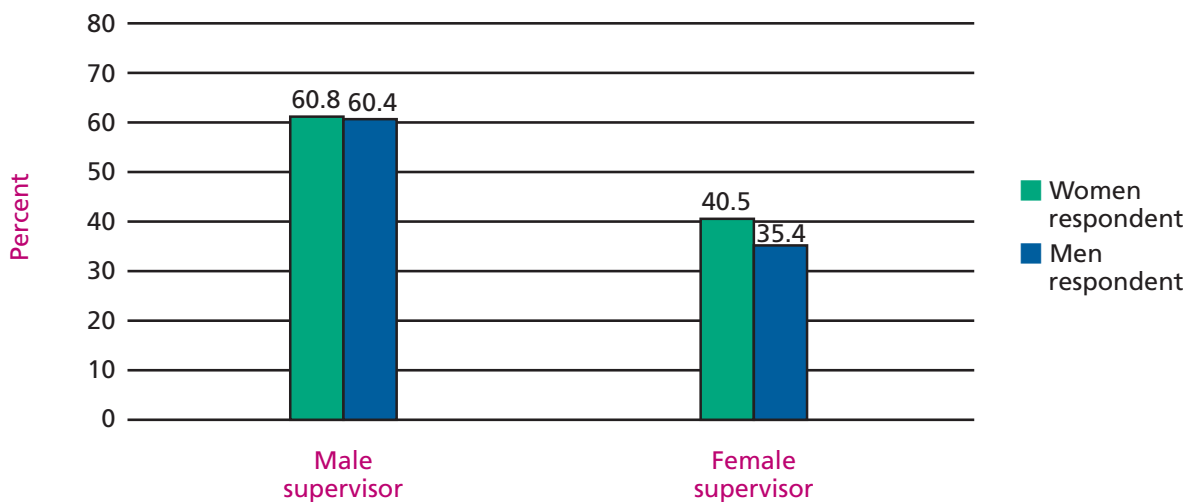
However, supervisors' gender appears to matter in at least one important way. **Mid-level respondents (men and women) with female managers are less likely to describe their managers as having strong technical skills than are those with male managers.** Research in other industrial settings shows female leaders are subject to a double standard when it comes to their employees' perceptions. Women leaders (regardless of their accomplishments) are more likely to be judged less favorably and perceived as less competent than are their male counterparts because they defy deeply seated stereotypes.[86] The double standard for female leaders appears to be alive and well in high-tech culture, too. **Women in management positions are perceived as less techni-** **cally competent than are male managers. Thus, women leaders may have to work harder than their male peers to prove technical competence.** The bar is higher and the pressure is on because women are not expected to excel in technical areas.

This finding also reflects at least one other dynamic: technical women at the mid-level are more likely than mid-level men to have non–technical degrees (see Chapter 1). This can exacerbate stereotypes about women's technical ability at all levels. However, the double standard means that even women with "normative" technical capital may have a long way to go to prove it. **This is highly problematic in a culture that places a premium on technical competence, and can be a significant barrier to technical women's advancement.**

As discussed in Chapter 1, high-tech companies should invest in developing the technical skills of their female leaders to help minimize gender disparities in normative forms of technical capital (e.g., formal engineering and computer science degrees). **Company–wide initiatives to combat negative gender stereotypes should include occasions for female leaders to demonstrate their technical competence.**

Chart 4e. Percentage of Mid-Level Technical Workers Who Agree that Their Supervisor Has Strong Technical Skills, by Gender of Respondent and Gender of Supervisor

Male supervisor — Women respondent: 60.8, Men respondent: 60.4
Female supervisor — Women respondent: 40.5, Men respondent: 35.4

Taking technical women seriously

"I notice that women in technical positions are not always taken very seriously or are not as respected as their male colleagues."
– mid-level technical woman

"I've had a couple of experiences where I've worked with guys and it was very hard for them to take me seriously until I proved myself. It might be a little bit harder for women than for men. If a guy walks into the room, it's easier (especially if it's a room full of guys) for him to believe that he knows what he's talking about. If you're a woman, you have to try just a little bit harder until you prove yourself."
– high level technical woman

"I was constantly getting interrupted, even from people who I didn't consider to be jerks ... When I would suggest something, people would talk over me. Then a guy would suggest the same thing and, of course, people didn't talk over him."
– mid-level technical woman

Most interviewees draw a clear distinction between technical competence and good management. That is, good management is seen as something distinctly separate from technical expertise. Technical employees are the first to agree that an accomplished engineer does not always make for a good manager. One mid-level man described this phenomenon as *"Dilbert managers,"* who were promoted strictly on the basis of their technical skills. *"What happens is you lose a good engineer and gain a bad manager."* But perceptions of technical competence envelop every "good" manager because it is often an unspoken rule that leaders must be technically proficient in order to earn the respect of their technical employees. As another mid-level technical man explained, *"If you have a manager in a tech company like ours who doesn't understand the technology and doesn't keep up with the technology — it changes — a manager can lose credibility."* This unspoken rule heightens the double standard of technical competence for women managers.

Interactions with managers

Despite the fact that both technical men and women at the mid-level are generally satisfied with their managers, our survey and interview data show an absence of long-term career discussion and ongoing performance feedback. **In fact, less than half of our respondents indicated that their managers regularly reviewed their career goals or provided performance advice.**

Our interviews revealed several reasons for this deficiency. Perhaps the main reason mid-level employees miss out on career guidance and regular performance feedback is that they lack a consistent supervisor. Many mid-level men and women explained that rapid turnover in the high-tech industry meant that they had been through several different managers. **As a result, most technical men and women simply do not expect to have a long-term relationship with their managers.**

The managerial shuffle

"There are so many reorganizations that whoever you have as your manager is temporary."
– mid-level technical woman

"[My company went through a merger] and I had three managers in one year. Three different managers, charters, and projects. I wouldn't say I was productive. I was not well used overall."
– mid-level technical woman

Many mid-level employees have low expectations of their managers, assuming that managers will not help them with long-term career advancement plans. As a result, many mid-level men and women look for managers who have enough confidence in their ability to "leave them to do what they do best." However, "hands-off" managers are not there to help mid-level technical women gain company-wide visibility. Thus, mid-level women miss out on this advantage when it comes

time for promotion. As one mid-level woman explained, *"to get promoted you need the buy-in of Directors and VPs outside of your functional group. That's a big problem if your job doesn't come with visibility."*

Hands-off management

"It's all about respect. That is number one. I don't care about anything else. One of the things that come with respect is to be left alone to do my job. That's respect and trust. I solve 95 percent of my problems by myself, yet I keep my manager informed."
– mid-level technical woman

"My manager's background is technical and he's very hands off. And I think that's good — except when I need a decision from him or I need him to review something and sign it."
– mid-level technical man

"We're at a level where we're expected to just buzz off and do good things. We don't have a traditional, closely managed team. My manager doesn't know what's going on month-to-month. He doesn't think about me and my career because he's off with his own deliverables."
– mid-level technical man

Mid-level views of promotion criteria and processes

In our interviews, **technical employees commented that their company's evaluation and promotion practices rewarded a single style of communication and visible work performance, putting anyone who is not highly visible and assertive at a disadvantage.** Several interviewees also noted that existing promotion and evaluation practices rewarded competition instead of collaboration.

Research shows that bias in evaluation and promotion practices reproduce inequality in organizations and stifle diversity. Many other studies document how workplaces that appear to be gender-neutral and meritocratic are actually organized around men's work styles and life cycles.[87] Further, subtle gender bias can permeate performance evaluations,

where men's accomplishments are attributed to effort and individual skill, while women's accomplishments are more likely to be attributed to luck and easy assignments.[88]

The majority of interviewees described highly competitive evaluation processes, where they were judged "on a curve" or placed on rank-lists. Such promotion processes create little incentive for those "at the top" to mentor those "at the bottom" because successful employees will be educating their future competition. Further, placing technical personnel "on a curve" and leaving managers to "battle it out" to achieve higher rewards for their employees reinforces a single, assertive communication style. This re-creates workplace inequality and feeds perceptions that the promotion process is not meritocratic.

The competitive ranking and rating curve

"Ten percent may be on the top, 80 percent in the middle, then 10 percent — somebody has to get the bottom. This is a very fearful way of making people to work. It's a very cutthroat world. We get so competitive that we forget that we are mothers and fathers, we are humans."
– mid-level technical woman

"You get a rating and a ranking. These both determine your bonus and your raise ... All the managers, from what I gather, go into this meeting with a giant list of everyone, ranked from one to, let's say, 200. The managers fight to try and move people up and down the list. Basically, your manager has to go to bat for you in that meeting — to get you moved up the list."
– mid-level technical man

Remote work

Even though high-tech companies have the technical proficiency to make remote work a reality, this is not yet the norm for technical employees in our survey. Some forms of remote work are more common than are others, however. Mid-level respondents are more likely to be in workgroups with colleagues who report from a remote company office/site than from a home office.

- 18.4 percent of men and 23.7 percent of women at the mid level are in workgroups where more than half of the group works from a remote site (two days a week or more).

- 11.0 percent of mid-level men and 15.1 percent of mid-level women are in workgroups where more than half of the group works at home (two days a week or more).

During the course of our interviews it became clear that being able to work from home is a relatively new feature of the high-tech workplace. As one high level technical woman explained: *"Telecommuting has only really been working for the past five years. Prior to that, it was very difficult to get in from home."* Some women, especially at the mid-level, report that telecommuting is the foundation of their overall job satisfaction. As one mid-level technical woman made clear: *"Telecommuting and flexibility are very important and I have been taking them for granted. If I didn't have any of those options, I wouldn't be as happy as I am today."*

Yet for many technical workers telecommuting seems to be a tenuous benefit. Some interviewees described eroding remote work policies because their companies were starting to limit telecommuting benefits.

Eroding remote work policies

"In my company there is a telecommuting policy and it's something that you have to work out with your manager. But now all of my department — whoever is telecommuting — can no longer telecommute more than one day a week."
– mid-level technical woman

Mid-level employees more often reported that company *practices* — not company policies per se — made securing a telecommuting schedule difficult. This is because managers act as gatekeepers to telecommuting opportunities, controlling remote work practices through formal authority or informal comments. In either case, manager expectations can put palpable "face time" pressure on mid-level employees.

Face time pressure

"I have been pressured to put in longer hours at work, while also discouraged to work from home when I propose that as a compromise. I feel that if a position can be viably performed from home, it should be more aggressively supported by a company to compensate for the extra work requests."
– mid-level technical woman

"The general manager ... he wants to see your face. He wants you to be there on-site every day. And yet we sell technology that makes it possible for you not to do that!"
– mid-level technical man

High-tech companies that do not support telecommuting policies can place an additional burden on mid-level women. Women interviewees, especially those with children, commented that the ability to telecommute was essential to their ability to perform their work while meeting the demands of family. Companies that have flexible schedules and telecommuting benefits are likely to see increased retention of their technical workforce.

The telecommuting imperative

"Being required to sit on-site ten to twelve hours a day makes having a valuable, rewarding family life almost impossible. I have been told by management that I need to choose between motherhood and my career."
– mid-level technical woman

"Before this happened [company eliminated telecommuting] I was able to balance my family with a heavy work load easily. It was rewarding to have both a highly technical position and a family life."
– mid-level technical woman

What are the implications of telecommuting for career opportunities generally? Interestingly, mid-level men are more likely than are women to believe that employees who work from home *do not* have the same career opportunities as

do those who work in the office (58.2% of men report that working from home affects career opportunities, versus 49.2% of women). It may be the case that some mid-level women do not believe in a career penalty for working from home because they have experienced the benefits of telecommuting firsthand. Men, who are less likely to see the benefits in the first place, may be more likely to favor face time for their employees and not take advantage of telecommuting benefits for themselves.

Even though the majority of technical men and women in our survey are not telecommuting during business hours, they still report working from home early in the morning and evening — hours that were once traditionally reserved for family. Many interviewees explained that high-tech work culture demands have been compounded by globalization. Mid-level women with young families spoke of running on two incongruous time clocks: global and family.

Two incongruous time clocks

"I spend lots of time working until one or two o'clock in the morning. It's really, really tough … Outsourcing costs us more time because the other site is in India. You have to spend your morning or late afternoon or late evening communicating with them."
– mid-level technical woman

"Monday I have a meeting that starts at 6 in the morning because it's with the India team … Even though I'm not supposed to be working on Mondays, I'm up at 5:45 so that I can take that call from 6 to 7. Then I get my son ready for school from 7 to 8."
– mid-level technical woman

Culture Clashes: Part-time Work and Vacation Time

Part-time work

The difficult reconciliation of family and work priorities is one negative consequence of high-tech culture for mid-level technical women. Some interviewees indicated that part-time work solutions, arranged directly with their managers, was the

only way they could stay in high-tech while raising young families. But this solution comes at a steep price. **Because part-time technical work is outside the "achievement–oriented" workplace culture norm, many women who temporarily take part-time positions believe they are taking a "step down" on the career ladder.** Further, these women often experience subtle reminders that they have been given "special treatment" and, as a result, end up working extended hours. As one technical woman says of part-time work, *"The norm is that people are not open to it, even in those roles where part-time really works."*

The major reason why high-tech managers have difficulty accepting part-time work is due to headcount allocation across workgroups. A common method in the high-tech industry is to allocate workgroup resources by a single "headcount" –whether the employee is part-time or full-time. Therefore, a manager who allows an employee to work a 60 percent schedule will not realize the additional 40 percent as a resource allocated back to his or her group. This acts as a major deterrent for managers to agree to part-time arrangements. There are new solutions to the part-time problem. A "cost of workforce" solution has been proposed by some large technology companies, such as HP, as an effective strategy to remove this barrier.[89] Workplace cultures that do not support part-time work arrangements make it inherently difficult for men and women who are primary caretakers for children or for elderly parents (see Chapter 2).

Part-time work, full-time expectations

"When I went part time (and this was the unspoken part of the agreement) I got the work no one else wanted. But I had to do it, and then I got paid … [The biggest barrier faced was] the grudging acceptance of the status as a part-time worker. If only the company had said, 'Here's our policy, you tell us how much you want to work for this time period and we'll pay you for that,' then I'd still be a manager. I'd be a very high up manager because I'm a natural facilitator … I was doing great.
– mid-level technical woman

"The company is not conducive to part-time work. I know other women who have tried to look for part-time work and it's been hard. If you persist then you can find something, but you have to be ready for one of two things: know that you're working more than what you're being paid for — and just be prepared to say 'that's a price I pay for being engaged in the workforce;' or be prepared to be mediocre. Because you cannot do a good job if your workload is not cut back to match the hours that you're putting in."
– mid-level technical woman

"I'm technically working Tuesday, Wednesday, Thursday. But our all-hands with my manager is on Friday. I asked him, 'Friday's my day off. I'm not supposed to be working. Can we change this meeting?' He said, 'No.' ... He doesn't want to change it. So I am there on Fridays, which is my day to go pick up my kids ... Part-time is really a misnomer."
– mid-level technical woman

Vacation time

Although mid-level technical employees generally feel satisfied with the amount of vacation time they earn, our interviews reveal that they experience pressure nonetheless because taking vacation time is often discouraged. We spoke with many mid-level employees who feel guilt when it comes to using their vacation time. This hesitation over vacation time is not exclusive to women. One senior level man recounted how he willingly passed on his vacation when joining his current company in order to show his loyalty.

Vacation time guilt

"We have a vacation planned ... but I find it very hard to tell my boss that this is what I want to do. I can be equally productive and probably happier if I get that time. I don't think he would say no. But there's definitely a mentality with the people around you that 'you don't take time off.'"
– mid-level technical woman

"The first year and a half that I was here I didn't use any vacation time ... Part of it was that I wanted to establish that I was a hard worker."
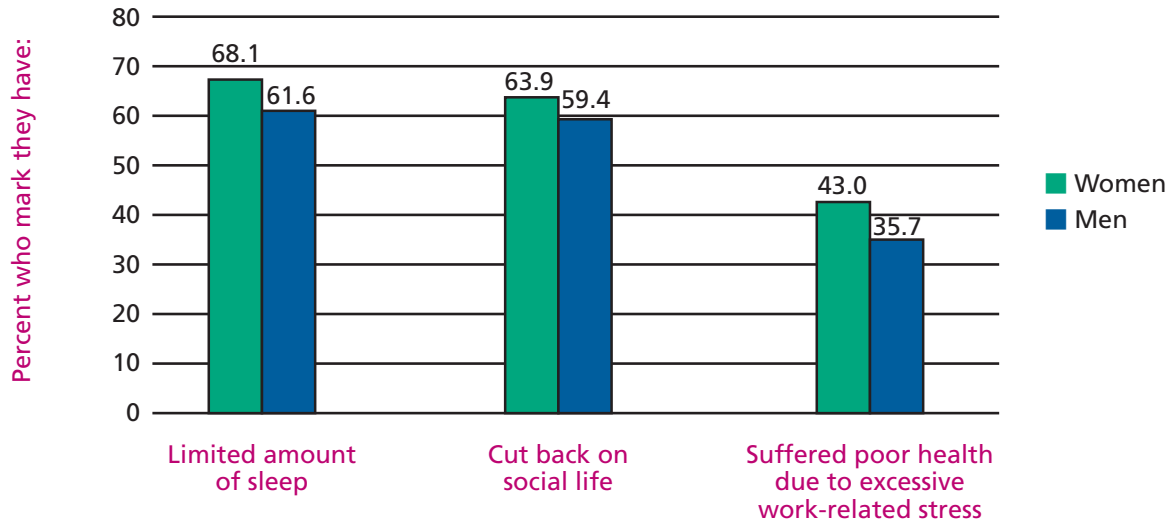– high level technical man

Sacrifices and Compromises

Achievement-oriented work cultures — while marked by innovation and intrinsic motivation — come with a price, especially for technical employees who balance the demands of work and family. Achievement cultures are vulnerable to employee burnout.[90] To measure the impact of an achievement culture, we asked mid-level technical workers if they had made any sacrifices in order to achieve their career goals. The results are sobering. **Mid-level technical men and women regularly give up sleep and cut back on their social lives in order to meet work expectations. We find that mid-level women are significantly more likely than men to suffer poor health due to work stress.**

Survey results also show that mid-level women are more likely than men to forego marriage/partnership and/or delay or forego having children in order to achieve their career goals (see Chart 2d). It is noteworthy that the women who make this level of sacrifice are in the minority. Still, these career pressures are compounded by the fact that mid-level women suffer from stress-related health problems. We interviewed many women who described giving up sleep in order to meet work and family deadlines. One mid-level woman now questions the impact of regularly cutting back on sleep in order to raise her children while working full-time. Her son, who studied computer science at U.C. Berkeley, refuses to follow in his mother's footsteps: *"He was impacted by me. He doesn't want to be an IT dude who works in an information technology group. That's because he saw me work long hours everyday. He's now saying 'I don't want to work that long. It's no life.'"*

Chart 4f. Health Compromises to Achieve Career Goals among Mid-Level Technical Workers, by Gender

Percent who mark they have:

Category	Women	Men
Limited amount of sleep	68.1	61.6
Cut back on social life	63.9	59.4
Suffered poor health due to excessive work-related stress	43.0	35.7

The over-work ethic

"There's a certain work ethic in this field. Someone loaned me a book about people who worked on a high profile computer project as a model. I thought it was a very sick model. It was geared toward people who only worked (particularly at start-up companies). And that's the norm — you basically go home to sleep. I don't think it's the nature of the work, but it's the way the culture has grown up ... When I was much younger, there was a hero mindset that if you're working a lot of hours then you're somehow doing something wonderful. If your social life and your work life are the same, then being at work all the time is fine because they're your friends."

– high level technical man

Conclusion

High-tech workplace culture is one of the biggest road-blocks to the retention and advancement of mid-level technical women.

1) **Remote work and part-time work remain culturally challenging for high-tech companies and have yet to be widely accepted by technical managers. This places an additional burden on mid-level women with childcare responsibilities. Women interviewees with children commented that the ability to telecommute was essential to their ability to perform their work while meeting the demands of family.**

2) **Men and women agree that mentoring, which includes long-term career development, is not rewarded by high-tech companies. This further dampens the possibilities for retention and advancement of technical women.**

3) Due in no small part to prevailing gender stereo-types, technical women in management positions are perceived as less technically competent than are their male counterparts. This can create an environment where women are viewed (and can view themselves) as "not fitting in" with the company culture.

4) Mid-level women experience their company's culture as more competitive than do men. They do not perceive their workplaces as true meritocracies; rather, they see a workplace culture that requires connections to power and influence to advance.

5) Employee advancement in the current high-tech workplace culture may come at the cost of family and health. Such a culture is sure to experience poor retention and advancement rates for family oriented employees. As we see in Chapter 3, the majority of mid-level men and women view themselves as family oriented. However, family responsibilities are particu-larly pressing for mid-level technical women because they are less likely to have a partner who takes primary responsibility for the household.

Recommendations

1) Make mentoring matter in order to give mid-level technical women seamless, internal support for their professional development. Create a mentoring culture by adding mentoring to your company's evaluation and promotion criteria. This will encourage women and men — at all rank levels — to participate in mentoring activities. High-tech executives must participate, whether or not your company has a formal mentoring program. No mentoring program will be successful as long as it is perceived as being one of your company's least rewarded behaviors.

2) Train your mangers to manage. Company evalua-tion and promotion criteria for managers should require their general awareness of gender issues in the workplace. This gender awareness training should highlight the barriers to advancement that technical women most often encounter as well as the simple gestures that will create family-friendly workgroup environments, such as enabling employees to telecom-mute when possible. Reward managers for taking an interest in the long-term career aspirations and professional development of the technical women and men reporting to them. The technical women whom we interviewed attributed their successes to having a manager "who got it."

3) Update your company's promotion criteria to ensure measurable milestones for promotion are clearly articu-lated. The first step is to remove subjective language from promotion criteria. Add promotion coaching to company mentoring programs. This should include test reviews to prepare technical women for the formal review process. Experiment with fast-track programs for top performers. Reward managers for being actively engaged in the career advancement of their employees.

4) Create company awareness about diversity of commu-nication styles. Technical employees agree that being assertive is essential to success. However, assertiveness can stifle variety in communication styles, pushing women and men into a single mode of communication that only further exacerbates gender stereotypes. One dimensional styles of interaction may also undermine ethnic diversity, as some cultures emphasize listening and humility rather than assertiveness. High-tech companies should ensure that a variety of communica-tion styles are represented in the executive ranks in order to foster company-wide diversity.

Policies and Practices for Retention and Advancement of Mid level Technical Women

Silicon Valley high-tech companies have earned a nation-wide reputation for providing extensive benefits and career advancement opportunities to attract and retain employees. Technical employees appreciate the myriad benefits and career opportunities now available to them. But high-tech company leaders need to better understand what policies and practices are most valuable to their technical workforce.

In this chapter, we provide data to show what company benefits are most important to mid-level technical men and women. We show areas of critical disconnection between the most important policies and mid-level technical women's perceptions of how their companies deliver on these policies. We also investigate the policies and practices that have the greatest positive impact on the advancement of technical women at the mid level.

Mid-Level: Top Company Policies and Practices

Healthcare and financial rewards are among the most important benefits for men and women at the mid-level. **However, we find that mid-level women are more likely than are men to rate nearly all other company benefits and practices as "very" or "extremely" important to them.** Perhaps because they experience signifi-cant barriers to advancement, technical women value support from their companies.

Work schedules

Mid-level women are significantly more likely than men to rate the following polices and practices as important. (See Chapter 2 to learn about the high proportion of mid-level personnel raising young children, often in the context of dual-career households.)

- vacation time
- flexible schedules
- personal time off
- telecommuting
- leave of absence programs
- parental leave

Career development

Mid-level women are significantly more likely than men to rate the following policies and practices as important. (See Chapter 3 for data on how mid-level employees update technical skills.)

- professional development for leadership and management skills
- career planning
- promotion development and fast-track programs
- coaching on evaluation and promotion process
- networking
- mentoring

Chart 5a. "High Importance" Company Practices to Mid-Level Technical Women and Men

Practice	Women	Men
Healthcare benefits	93.7	89.9
Vacation time	88.9	76.7
Financial rewards (bonuses/stock options)	86.1	87.3
Flex time	84.9	78.7
Professional development for technical skills	84.2	82.1
Professional development for leadership skills	83.1	72.2
Personal time (PTO)	77.6	68.6
Career planning	76.1	59.8
Coaching on evaluation/promotion processes	75.1	61.4
Professional development for managerial skills	70.4	62.8
Promotion development/fast track program	69.3	58.7
Telecommuting	69.0	54.3
Networking opportunities	69.0	54.9
Mentoring	67.6	52.4
Leave of absence programs	60.0	37.0
Parental leave	53.7	31.5

Percent who report that each practice is
"very" or "extremely" important:

(see method note in Appendix B)

Chart 5b. Importance of Other Company Practices to Mid-Level Technical Women and Men

Practice	Women	Men
Diversity training	38.0	21.6
Leisure and morale activities	35.7	32.5
Sexual harassment training	34.6	13.7
Emergency childcare program	31.4	23.0
Job sharing	27.6	23.6
Onsite health services	24.1	18.0
Off-site day care program	24.0	14.7
Onsite day care program	23.0	14.5

Percent who report that each practice is
"very" or "extremely" important:

(see method note in Appendix B)

Proportionately more mid-level women than men rate diversity training and sexual harassment training policies as important as well. These differences may stem from the fact that mid-level women, on average, have been working in tech-nology for nearly 15 years. Thus many mid-level women were some of the first to break through the technology profession's gender barrier.

"Professional women were very rare when I was hired at [my previous company]. They were secretaries and people who punched the old fashioned calculators and did card keypunch. By the time I left, there was a very high percentage of women in professional jobs, especially in software. That changed the entire culture. I think it was great."
 – mid-level technical man, with 30 years experience.

Breaking through the gender barrier

"Early on, it was awful to be a woman in technology. I had to work twice as hard as men. Then you got called 'honey,' and they would pinch your butt. It was blatant harassment, but we didn't know what it was in those days."
 – mid-level technical woman, with over 30 years of experience

"I've been in the tech industry since I graduated from college, which has been 21 years. Back then you had to be careful (if you were a woman) when choosing what companies you worked for — in the tech industry, some were definitely better than others."
 – mid-level technical woman

We find that mid-level women are more likely than men to rate as important childcare benefits, such as onsite and off-site daycare. Not surprisingly, parent status makes a differ-ence. Childcare benefits are particularly important to women with children as compared to women without children; the same pattern is true among men. Interviews also suggest that childcare needs are especially acute when children are youngest. This issue merits further research as there may be a window of time where technical employees with children especially need such programs.

It is noteworthy that the proportion of women who rate childcare benefits (such as onsite and emergency childcare) as important is considerably smaller than is the proportion of women who rate professional devel-

Chart 5c. Variations in Importance of Company Practices to Mid-Level Employees, by Gender and Children Status
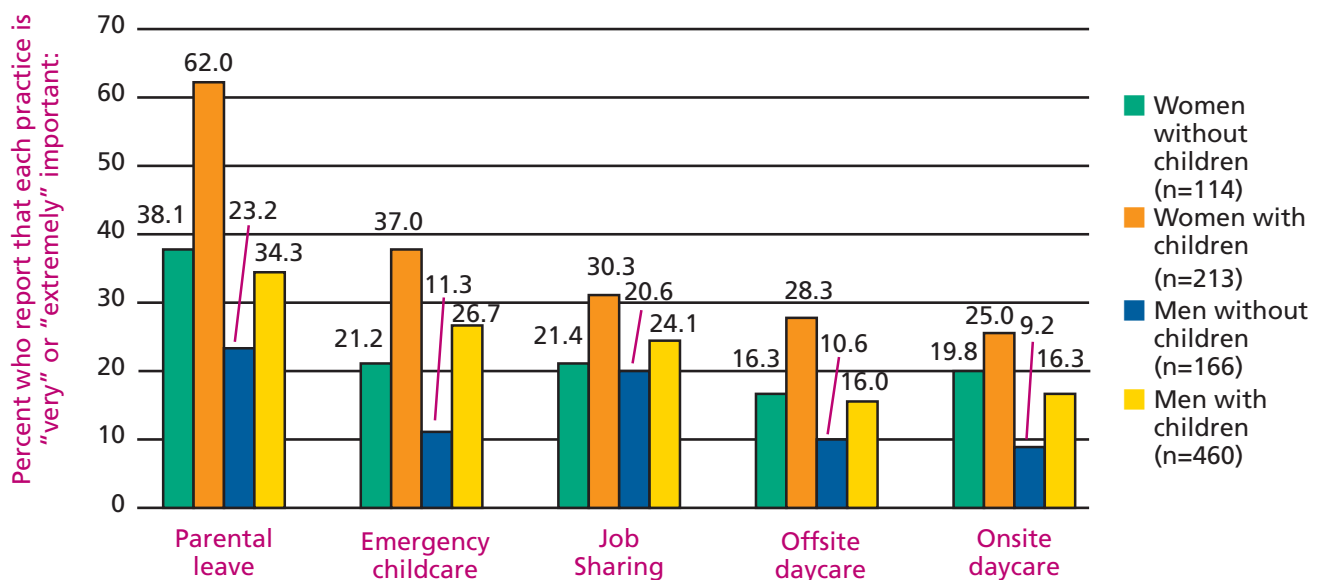
(see method note in Appendix B)

opment as important. This suggests that formal childcare benefits are lower on women's lists when thinking about the full spectrum of company policies and the obstacles they face updating their technical skills.

Parental leave flexibility

"One thing I've noticed in my career is that a lot more men are taking time off for family issues. That has definitely gotten better. The generation coming up after me (the guys who are ten to fifteen years younger than I am) are definitely taking as much responsibility as the women. They're leaving work early to make sure that they're at the kid's game, and taking the kids to appointments, and watching the kids."
– mid-level technical woman

"When I was raising my son and working full-time, the company didn't even acknowledge these issues. It was not discussed. Things are much better for women now."
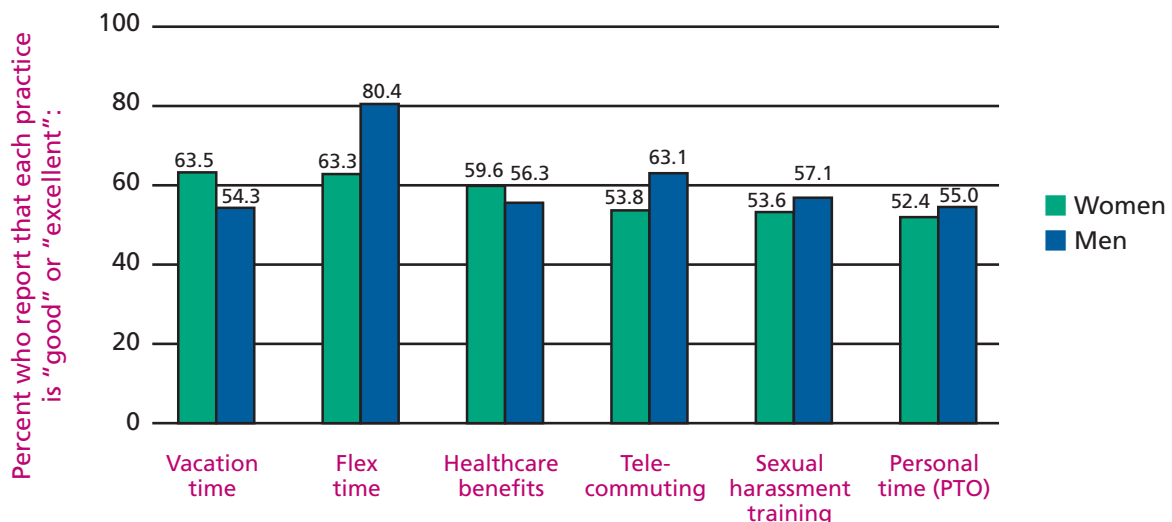– mid-level technical woman

Key policies and practices for mid-level success

When examining the importance of company policies and practices by gender at each rank level, we find three policies where women and men differ at mid-level only:

FLEX TIME: Mid-level women want flex time. They are more likely than are men to rank flexibility as important. Flexible schedules are an essential practice for retaining mid-level women, who often face unique work/life challenges (see Chapter 3). High-tech companies need to foster workplace cultures that encourage women and men to take advantage of flexible schedules. Research shows that flexible schedules reduce employee absenteeism and turnover.[91]

EMERGENCY CHILDCARE: Mid-level women, more so than men, rate emergency childcare programs as important. This points to the work/life challenges of women at the mid-level, who often work on two incongruous time clocks: global and family.

Chart 5d. Evaluation of Company Practices by Mid-Level Technical Men and Women: the "Top 6"

Percent who report that each practice is "good" or "excellent":

Practice	Women	Men
Vacation time	63.5	54.3
Flex time	63.3	80.4
Healthcare benefits	59.6	56.3
Tele-commuting	53.8	63.1
Sexual harassment training	53.6	57.1
Personal time (PTO)	52.4	55.0

(see method note in Appendix B)

PROMOTION DEVELOPMENT & FAST-TRACK PROGRAMS: Mid-level women value development for promotion and fast-track programs. As we found in Chapter 4, mid-level women start losing faith in the promotion structure of their company when they encounter unexpected barriers to merit-based advancement. Investing in coaching programs and encouraging women's participation in fast track programs will help women to climb the technical ladder with greater agility.

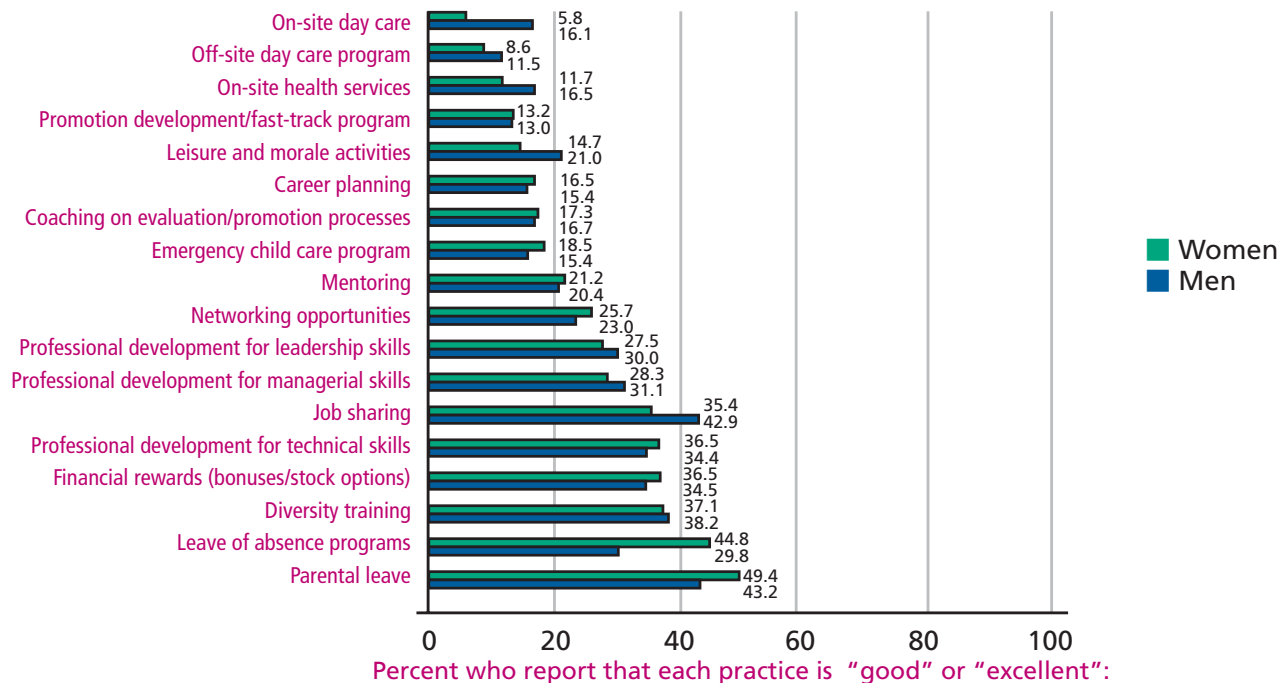## Mid-Level: Evaluation of Existing Company Policies and Practices

Many high-tech companies already invest heavily in programs to attract and retain top technical talent. But how satisfied are technical employees with the existing policies and practices at their companies? **Survey results show clear areas of disconnect between official workplace policies and the actual experiences of mid-level employees.** High-tech companies that address these points of disconnection, and

work to close the gap, will improve the retention and advancement of technical women.

Here we take a closer look at how mid-level men and women evaluate the workplace policies and practices that they consider most important. We find the majority of mid-level men and women are satisfied with a total of six policies and practices: vacation time, flex time, healthcare benefits, telecommuting, sexual harassment training, and personal time off. However, we also find key gender differences:

• Mid-level women are less likely than men to rate their company policy on flexible work arrangements as "good" or "excellent." Similarly, women are generally less satisfied than are men with existing telecommuting policies. These gender differences reinforce our findings on the family situation of mid-level technical women. High-tech companies should expand their flexible and telecommuting work arrangements to adequately meet the needs of mid-level technical women.

Chart 5e. Evaluation of Company Practices by Mid-Level Technical Men and Women: "Disconnects"

Practice	Women	Men
On-site day care	5.8	16.1
Off-site day care program	8.6	11.5
On-site health services	11.7	16.5
Promotion development/fast-track program	13.2	13.0
Leisure and morale activities	14.7	21.0
Career planning	16.5	15.4
Coaching on evaluation/promotion processes	17.3	16.7
Emergency child care program	18.5	15.4
Mentoring	21.2	20.4
Networking opportunities	25.7	23.0
Professional development for leadership skills	27.5	30.0
Professional development for managerial skills	28.3	31.1
Job sharing	35.4	42.9
Professional development for technical skills	36.5	34.4
Financial rewards (bonuses/stock options)	36.5	34.5
Diversity training	37.1	38.2
Leave of absence programs	44.8	29.8
Parental leave	49.4	43.2

Percent who report that each practice is "good" or "excellent":

(see method note in Appendix B)

- Mid-level women are more likely than men to rate existing vacation time policy as "good" or "excellent." Retention rates may be improved for men as well as women by making vacation a part of the company culture.

We also find some major disconnects between the policies and practices most important to mid-level technical women and their perceptions of how their companies deliver on these policies. We discuss findings below:
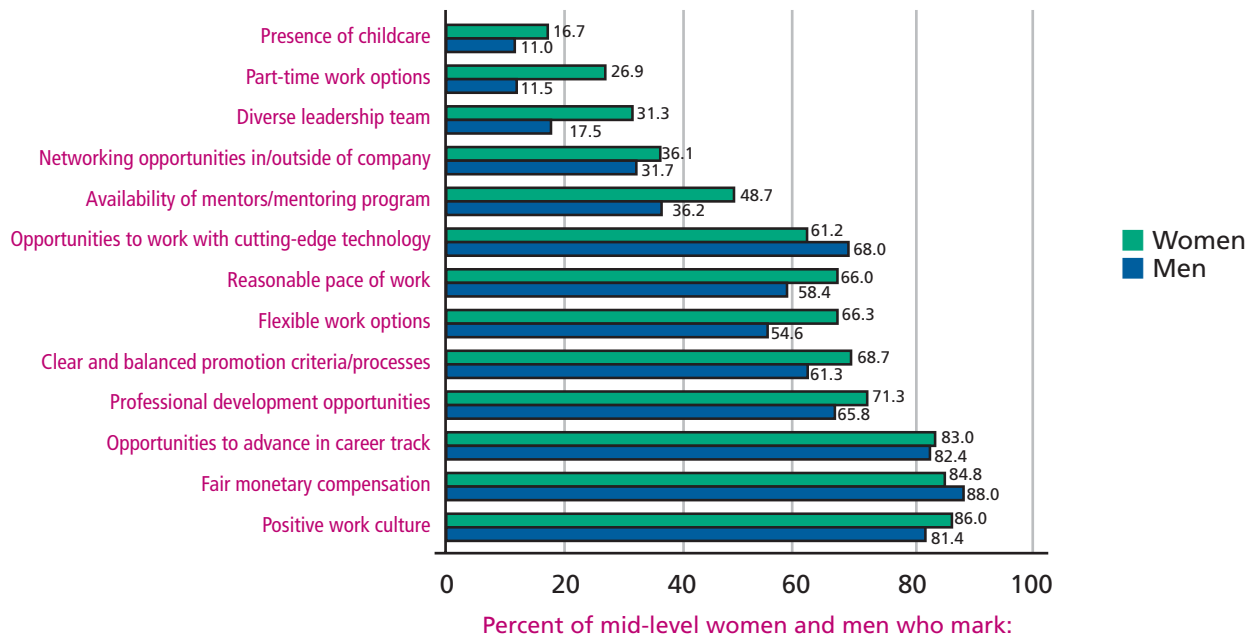
- **Despite its high importance rating, just over one third of mid-level men and women are satisfied with their company-sponsored opportunities for technical development.** Only 36.5 percent of women and 34.4 percent of men rate their existing opportunities for technical development as "good" or "excellent."

- **Career-development programs also received poor marks from mid-level men and women, especially career planning, promotion development, and coaching on promotion.** Thirteen percent of men and 13.2 percent of women report that their company's program for promotion development is "good" or "excellent." Similarly, few men and women rate their company's career coaching on evaluation/promotion processes as "good" or "excellent."

- **Professional development for leadership skills, mentoring, and opportunities for networking (all practices rated as important by mid-level technical women) are rated low by mid-level men and women alike.** In particular, high-tech companies should bolster their mentoring and career and promotion planning practices. As our survey and interview data clearly show, mentoring is not yet a rewarded behavior in workplace culture and most employee-supervisor relationships do not include career development (see Chapter 4).

Mid-Level Perspectives on Retention

Our survey asked for mid-level technical men's and women's perspectives on how to improve the retention of technical employees. **The majority of both men and women care about fair pay, a positive work culture, opportunities for advancement, professional development, fair promotion criteria, and flexible work options.** However, we find meaningful differences between mid-level men and women on the following retention factors:

Chart 5f. Strategies to Retain Technical Employees

Strategy	Women	Men
Presence of childcare	16.7	11.0
Part-time work options	26.9	11.5
Diverse leadership team	31.3	17.5
Networking opportunities in/outside of company	36.1	31.7
Availability of mentors/mentoring program	48.7	36.2
Opportunities to work with cutting-edge technology	61.2	68.0
Reasonable pace of work	66.0	58.4
Flexible work options	66.3	54.6
Clear and balanced promotion criteria/processes	68.7	61.3
Professional development opportunities	71.3	65.8
Opportunities to advance in career track	83.0	82.4
Fair monetary compensation	84.8	88.0
Positive work culture	86.0	81.4

Percent of mid-level women and men who mark:

- **Women are more likely than men to view clear and balanced promotion criteria and processes as important to retention (68.7% versus 61.3%).** This suggests that technical women, in particular, experience evaluation practices as a source of a bias. Still, a high proportion of men also see fair and transparent promotion practices as essential to retaining technical employees.

- **Women at the mid-level are more likely than men to view flexible work and a reasonable pace of work as important to retention.** This difference is statistically significant at the mid-level only, which suggests that family pressures for mid-level women are particularly acute. However, it is noteworthy that a high proportion of men also value these practices, with 58.4 percent of technical men at the mid-level calling for a reasonable pace of work and 54.6 percent of technical men pointing to flexible work arrangements.

- **Women at the mid-level are more likely to rate the availability of mentors and mentoring programs as important to retention than are men (48.7% versus 36.2%).** (The gender difference on this item is especially wide at the entry level, where 60.6% of technical women point to a need for to mentoring programs, compared to 39.1% of men.)
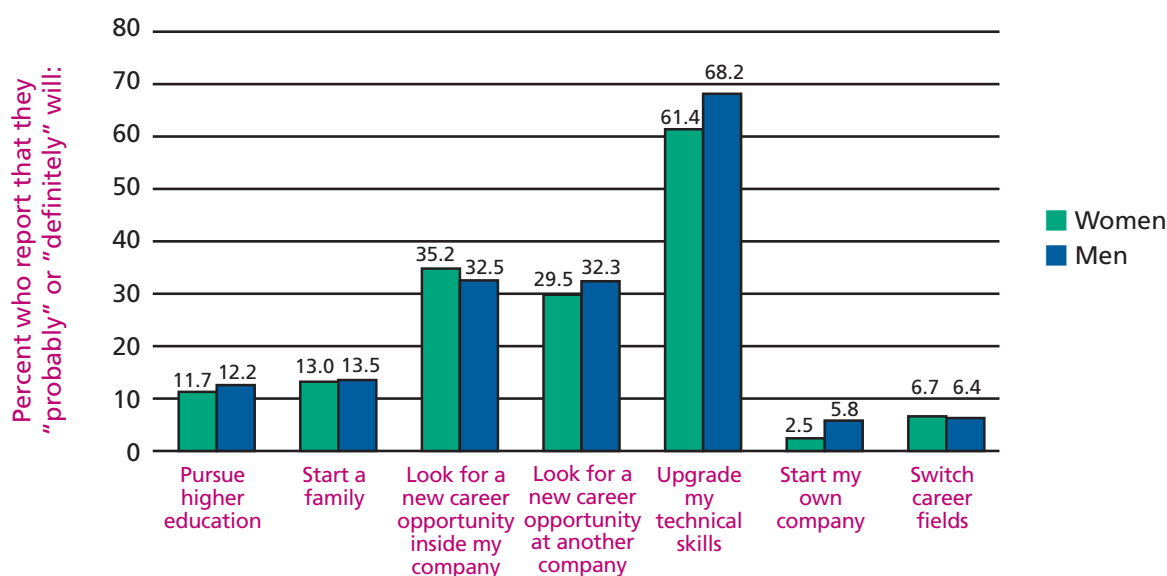
- Although in smaller proportions, mid-level women are more likely than men to say that having a diverse leadership team is one way to improve retention.

- **Women are also more likely than men to point to the presence of part-time work options and childcare as ingredients for retention.**

Mid-Level Career Plans

We close our report with a look at the upcoming career plans of mid-level men and women. **Here we find that mid-level men and women are equally likely to seek employment outside their current companies, with approximately one-third reporting that they will look for an opportunity outside their current company during the next year.** Thus, even though our study findings reveal that mid-level technical women face significant barriers to retention and advancement, mid-level women do not plan to pursue other work at greater rate than do men. (Because we lack data on attrition rates for our participating companies, we cannot make inferences on whether or not technical women in our sample are leaving their companies at a greater rate than are men). This mobile workforce, with significant opportunities

Chart 5g. Mid-Level Technical Workers' Plans for the Next 12 Months, by Gender

Percent who report that they "probably" or "definitely" will:

	Women	Men
Pursue higher education	11.7	12.2
Start a family	13.0	13.5
Look for a new career opportunity inside my company	35.2	32.5
Look for a new career opportunity at another company	29.5	32.3
Upgrade my technical skills	61.4	68.2
Start my own company	2.5	5.8
Switch career fields	6.7	6.4

(see method note in Appendix B)

for employment in Silicon Valley, makes retention imperative for companies.

Also noteworthy is our finding that approximately one-third of mid-level respondents plan on looking for a new career opportunity inside their current companies. This suggests that a good proportion of mid-level women are looking for new work experiences that may help them to advance within their current companies. This finding is also reflected by employee plans to upgrade their technical skills. **As we have seen throughout our study, upgrading technical skills is very important to mid-level men and women. Fully 68.2 percent of men and 61.4 percent of women plan on upgrading their technical skills in the next twelve months.**

4) Women are more likely than men to view clear and balanced promotion criteria and processes as important to retention (68.7% versus 61.3%). This suggests that technical women in particular experience evaluation practices as biased. Still, a high proportion of men also see fair and transparent promotion practices as essential to retaining technical employees.

5) Women at the mid level are more likely to rate the availability of mentors and mentoring programs as important to retention than are men (48.7% versus 36.2%). (The gender difference on this item is especially wide at the entry level, where 60.6% of technical women point to a need for to mentoring programs, compared to 39.1% of men.)

Conclusion

1) Technical women value professional development above all else. Career development policies and practices should include training to enhance technical, leadership, and managerial skills, coupled with career planning and coaching, mentoring, and networking opportunities.

2) Both women and men at the mid-level who have children consider parental leave, emergency childcare, and the presence of on-site and off-site daycare valuable. As our data clearly show, high-tech companies would be wise to implement strong parental leave policies to retain mid-level technical women.

3) Mid-level women want flex time. They are more likely than are men to rank flexibility as important. Flexible schedules are an essential practice for retaining mid-level women, who often face unique work/life challenges. High-tech companies need to foster workplace cultures that encourage women and men to take advantage of flexible schedules.

Recommendations

1) Create opportunities for technical employees to participate in leadership and management development, on company time. Technical women value opportunities for professional development of leadership and management skills. Above and beyond a core investment in their technical professional development, high-tech companies can improve technical women's advancement by investing in their career development.

2) Update your company's promotion and evaluation practices. The following questions can help uncover systematic bias in evaluation and promotion practices: Is the process rewarding assertive behavior as opposed to accomplishment? Is the language used to evaluate men and women equivalent? Are collaboration and mentoring rewarded in the evaluation process? Is there an unspoken penalty for working parents who need to leave the workplace at a specific time to attend to their family?

3) Technical men and women — at every rank level — consider adequate compensation a top priority. Despite the fact that our survey results show that both men and women place equal importance on their financial

compensation, women's salaries — in all professions — are systematically lower than men's salaries.[92] Examine your company's compensation structure. Is there a wage disparity between technical men and women who have equal qualifications? Eliminating the wage gap between technical men and women signals that your company values technical women and fairness in the workplace. Previous research shows that closing the wage gap is a key predictor of women's retention and advancement.[93] High-tech companies should train managers to be aware of the serious implications of perpetuating wage disparity between their men and women technical employees.

4) Offer flexibility as a work benefit and expand it to include options for part-time schedules, flexible schedules, and telecommuting. Change employee allocation practices to encourage managers to consider part-time work arrangements. Encourage women and men to take advantage of flexible schedules. Make flexibility a part of your company culture by modeling it at the executive level.

5) Companies can also significantly increase retention by providing extended parental leave options and including *both* women and men as eligible for parental leave.

6) Encourage managers and executives to take their vacation time and adjust workflow accordingly. Develop a reputation for being a company that acknowledges the health and well-being of its employees. (See Chapter 4 for further data on how workplace culture may come at the cost of family and health.)

Appendix A: Methodology

In 2007, the Anita Borg Institute for Women and Technology and the Michelle R. Clayman Institute for Gender Research at Stanford University initiated a major study of the technical workforce in Silicon Valley. As the "mecca" of technical work in the U.S., Silicon Valley has captured the world's attention as a region where high-technology companies efficiently attract the best human capital in technology. Silicon Valley narrowly denotes San Mateo and Santa Clara counties. However, for the purpose of our study, we expand the "valley" to include all technical companies and employees in the greater San Francisco Bay Area.

Company Recruitment and Characteristics

Research directors at both institutes recruited a total of seven companies to participate in the study. Our recruitment strategy was designed to capture organizational variation within the broad computer and information technology industry and to focus on companies that were known to employ top technical talent. Software and hardware industry segments are the largest employers in the high-technology sector in Silicon Valley and constitute our company sample.[94]

Characteristics of participating companies	
Worldwide workforce size	Average ~50,000
Number headquartered in Silicon Valley	5 of 7
Average company age	27
Average % women trustees	16%
Average % women on executive list	19%
Primary Industry represented	Hardware and software

Survey Design and Administration

Our study involved a major survey of employees who comprised the core Silicon Valley technical workforce at each participating company, as well as in-depth interviews with a subset of survey respondents (see "Interviews" below). Companies defined their "core technical workforce in the Silicon Valley region" for us. At most companies, the core technical workforce included employees on their formal technical career ladder (or their dual technical career ladder: one for technical individual contributors and one for technical managers). Companies that did not have a formal technical career ladder typically identified their core technical workforce as employees who worked in engineering, software development, information technology, and quality assurance. The vast majority of our survey respondents identified their field of expertise as software development/engineering, and hardware engineering.

The survey instrument, titled "Climbing the Technical Ladder," was developed over a four-month period. The survey covered several aspects of technical work and careers, including:

- Demographics (gender, age, ethnicity, field, and type of degree, years of technical experience, current rank, and title)
- Attitudes towards and perceptions of technical work (perceptions of success in technology, self-concept, perceptions of company culture and climate, perceptions of manager, importance and rating of company policies)
- Retention and advancement (professional goals, "life" priorities, and values)
- Family (partnership status, household income, children, household responsibilities)

The survey was piloted in spring of 2007 with ten volunteer respondents, all of whom were men and women in technical professions. Pilot participants provided extensive feedback and

the survey was refined accordingly. Company representatives also advised on survey development in order to assure validity and relevance of survey questions to their workforce. The final instrument was identical across participating companies except for those customized survey items that asked respondents to identify their position, department, and level (positions, departments, and levels were unique and specific to companies' respective workforces).

The survey was administered online to all employees in each company's core Silicon Valley technical workforce over a seven-month period in 2007-2008 (companies did not administer the survey at the same time — start dates were at the discretion of the companies, which meant that administration was "rolling"). At each company, surveys were "live" for approximately four weeks. Researchers did not directly administer the survey to employees — rather, companies emailed an invitation to participate in the study (with a link to the survey) using a template provided by the researchers. Respondents were assured that their responses would remain strictly confidential and anonymous (survey data were submitted to an independent data processing firm and were accessible and downloadable to researchers only). All research procedures were approved by the Institutional Review Board for Human Subjects Research at Stanford University.

Most companies emailed three reminders after the initial invitation to participate, with one reminder per week, based on templates provided by the researchers. One company staged a particularly enthusiastic recruitment campaign that was primarily targeted at technical women in its workforce — this resulted in a relatively high proportion of women who responded to the survey at this company, the sampling and analytic implications of which are discussed in the next section. ("Survey response Rate and Sample Representativeness"). In addition, one company emailed only one reminder, and another company did not send any reminders. Thus, there was some amount of variation in company follow-up to the initial invitation, resulting in variation in response rates, also discussed below.

Survey Response Rate and Sample Representativeness

The survey was administered to a total of 12,805 technical employees across the seven companies; 1,795 employees completed the survey, constituting a response rate of 14.0 percent. Company-by-company, response rates ranged from 9.0 percent to 41.0 percent. The lowest rate was that of the company that decided against sending a reminder; the second lowest at the company that limited itself to one reminder.[95]

Several measures were taken to assess representativeness of the survey sample. Data on the technical population at each company were sparse as most companies did not release demographic statistics to the researchers. As such, we sought broader "valley-wide" and national indicators to help us understand how closely our sample of respondents resembled the population of technical workers under study. The following table lists and compares these indicators to our sample.

First, at 34.2 percent of respondents, women comprise a greater proportion of our sample that national, statewide, and regional indicators would lead us to expect. The overrepresentation of women is partly a function of the one company that specifically targeted their female technical employees in their survey recruitment efforts. To account for the overrepresentation of women (and the fact that men and women were significantly different on many key measures in our study), we conduct and report nearly all of our analyses for women and men separately.

Other indicators that we used to determine the representativeness of our sample include national, statewide, and county (or "valley") estimates for race and ethnicity, median income, and the percentage of technical workers who are foreign-born (as well as country of origin). On all of these indicators, our sample is more closely aligned to Silicon Valley estimates than to statewide or national estimates. We interpret our data and discuss our results accordingly.

Indicator	Climbing the Technical Ladder Survey Sample (N=1,795)	National Estimate	State Estimate	Silicon Valley Estimate
Women	34.2%	26% of computer and math occupations (Source: US Department of Labor Statistics 2007)	25% of engineering and computer professionals* (Source: California Census EEO Occupational Data, 2000); 24% of California IT workforce (Population Reference Bureau 2007)	24% of engineering and computer professionals in Santa Clara County (Source: California Census EEO Occupational Data, 2000)
Underrepresented racial/ ethnic minority	6.6%	12% of computer and math occupations (Source: US Department of Labor Statistics 2007)	11% of engineering and computer professionals (Source: California Census EEO Occupational Data, 2000)	6% engineering and computer professionals in Santa Clara County (Source: California Census EEO Occupational Data, 2000)
Asian	39.1%	18% of computer and math occupations (Source: US Department of Labor Statistics 2007)	26% of engineering and computer professionals (Source: California Census EEO Occupational Data 2000)	44% of engineering and computer professionals in Santa Clara County (Source: California Census EEO Occupational Data)
Income	Median: $125,000-$149,999	Median: $101,000 for IT managers; $65,000 for programmers; $94,000 for software developers; $85,000 for software engineers (Source: Bureau of Labor Statistics Occupational Outlook, salary data from 2006)	Mean: $77,000-$120,000 for computer occupations (Source: California OES Employment and Wages by Occupation 2008)	Median $132,000-$140,000 (Source: Index of Silicon Valley 2006); Mean: $145,000-$160,000 (Source: Index of Silicon Valley 2007)
Percent foreign-born	48.6%	21% of computer scientists, analysts, and programmers; and 16% of electrical engineers (Source: CPST)	38% of IT and engineering workers in California (Source: Population Reference Bureau 2007)	55% of science and engineering occupations (Source: Index of Silicon Valley 2007)
Percent foreign-born who are Asian	70.0%	62% (Source: CPST)	n/a	n/a

* For the purpose of comparison to our study, "science, engineering, and computer professionals" include: computer scientists and systems analysts, computer programmers, computer software engineers, network/computer systems administrators. network systems and data communications analysts, database administrators, computer hardware engineers, computer and information systems managers, and engineering managers.

Note: "Climbing the Technical Ladder" survey categories for occupation, race, income, and country of origin are not always identical to national, state, and/or Silicon Valley categories. These estimates are provided as general points of reference only. Median income in our sample is calculated among survey respondents without working partners.

Interviews

The "Climbing the Technical Ladder" survey concluded with an invitation to volunteer for an in–depth follow–up interview. Respondents were asked to email project researchers if they were interested.

A total of 112 men and women from six of the seven partici–pating companies volunteered to be interviewed. We selected interviewees based on 1) gender 2) level and 3) position as individual contributor or manager. We were particularly interested in a minority segment of our sample: women at the mid–level. Our final interview sample demographics reflect that objective (see below).

The interview protocol was developed to complement the survey instrument in order to probe trends that emerged in the survey data. The interview protocol was piloted with five volunteers in the fall of 2007 and was then refined. Interviews

were conducted and recorded between January and July of 2008. Each interview was transcribed. Twenty-seven interviews were conducted in total.

Among our 27 interviewees:
- 17 are women; 10 are men
- 20 are at the mid-level
- 20 are in individual contributor technical positions

Analyses

Definition of "mid level." At the heart of our study is a detailed exploration of technical women and men at the middle level of their careers. Accordingly, we undertook a rigorous review and classification of job positions and categories across all seven companies to generate our level scheme.

Companies were asked to provide general information about their respective career ladders or structures. Using this information and respondents' self-reported title, level, and/or rank (recall that the survey was customized to reflect each company's specific career ladder or structure), we developed a level scheme within which respondents were classified as entry, mid, or high, and as an individual contributor or manager, according to their respective company rubric. Rubrics at some companies were relatively clear and the classifications were "neat." At other companies, however, we had to probe the respondent data and work with company representatives more extensively to organize jobs and titles.

We then ran a series of analyses to understand if and how the mid-level varied by company in terms of years of technical experience. Although there was significant variation in mean years of experience by company and level, the overall pattern was consistent. Mean years of experience among entry-level respondents ranged from a low of 4.4 at one company to 14.1 at one of our oldest companies. Mean years of experience among mid-level respondents ranged from 9.4 to 19.5, while mean years of experience among high-level respondents ranged from 15.8 to 22.8. This mid-level range (9.4 to 19.5) is consistent with other "mid-career" definitions as being between 10 and 20 years of experience.[96]

It is important to note that we have a particularly small number of high-level women who responded to our survey — which no doubt reflects the proportionately few numbers of women in high-level or executive industry positions in Silicon Valley. This means that when we examine gender differences at each rank level (entry, mid, and high), we do not have the same level of statistical power to detect significant differences at the high level as we do at the mid or even entry level. Nonetheless, we do discuss our high-level women selectively, as a suggestive data point, with caveats as appropriate.

For survey data, we conducted descriptive analyses to compare groups (e.g., mid-level women and mid-level men) by way of cross-tabulations, t-tests, and one-way analyses of variance (ANOVA). All between-group differences discussed in the text of the report are statistically significant at $p<.05$, unless otherwise noted.

Appendix B: Notes on Charts

All data in charts are derived from the "Climbing the Technical Ladder" survey. (For details about all items and scales on this survey, please contact the report authors.) Valid percentages are reported. Some percentages may not add up to 100 due to rounding. Not all charts have an accompanying methods note.

Chart 1a. For this and subsequent charts on race/ethnicity: Respondents who marked Mexican American/Chicano, Central/South American, and/or Other Latino/Puerto Rican are classified as Hispanic/Latino(a). Respondents who marked South Asian/South Asian American, Southeast Asian/Southeast Asian American, East Asian/East Asian American, Other Asian/Asian American, and/or Native Hawaiian/Other Pacific Islander are classified as Asian. Respondents who marked African American/Black are classified as African American, and respondents who marked White/Caucasian are classified as White. "Other" includes respondents who marked multiple racial/ethnic categories and/or American Indian/Alaska Native. Those respondents in "Other" who are from at least one underrepresented racial/ethnic background (defined as Hispanic/Latino(a), African American/Black, and American Indian/Alaska Native) are included in the total count of underrepresented minorities in Chapter 1.

Chart 1b. Standard deviations for each data point are as follows:

Women, age: 8.81
Men, age: 8.92

Women, years since degree: 8.75
Men, years since degree: 9.07

Women, years of technical expertise: 7.63
Men, years of technical expertise: 8.44

Women, years since hire: 6.54
Men, years since hire: 6.74

Women, years in current position: 4.12
Men, years in current position: 3.83

Chart 1d. For this and subsequent charts on field of degree: "Other" includes: Biological/Health Sciences; Business; Earth, Atmospheric, and Ocean Sciences; Education; Humanities; Law; Mathematics and Statistics; Physical Sciences; Social Sciences; and Other.

Chart 1g. Respondents who marked that women comprise 10 percent or less of their workgroups are classified as working in "Predominantly male workgroups — extreme." Respondents who marked that women comprise 11-50 percent of their workgroups are classified as working in "Predominantly male workgroups — moderate." Respondents who marked that women comprise 51-90 percent of their workgroups are classified as working in "Predominantly female workgroups — moderate." Respondents who marked that women comprise 91 percent or more of their workgroups are classified as working in "Predominantly female workgroups — extreme."

Chart 1h. Respondents who marked that non-White technologists comprise 10 percent or less of their workgroups are classified as working in "Predominantly White workgroups — extreme." Respondents who marked that non-White technologists comprise 11-50 percent of their workgroups are classified as working in "Predominantly White workgroups — moderate." Respondents who marked that non-White technologists comprise 51-90 percent of their workgroups are classified as working in "Predominantly non-White workgroups — moderate." Respondents who marked that non-White technologists comprise 91 percent or more of their workgroups are classified as working in "Predominantly non-White workgroups — extreme."

Chart 2a. Percentages are computed among respondents who have children.

Chart 2g. Percentages are computed among respondents with partners who work full- or part-time only. Respondents who marked "my partner also works in the high-tech industry" are classified as those in "dual technical career households."

Chart 5a. "Don't know" was included as a response option for these items. "Don't know" responses constituted 10 percent or less of all responses on any given item. Respondents who marked "don't know" are excluded from the analyses.

Chart 5b. "Don't know" was included as a response option for these items. "Don't know" responses constituted 10 percent or less of all responses on any given item. Respondents who marked "don't know" are excluded from the analyses.

Chart 5c. "Don't know" was included as a response option for these items. "Don't know" responses constituted 10 percent or less of all responses on any given item. Respondents who marked "don't know" are excluded from the analyses.

Chart 5d. For each practice, percentages are computed among respondents who had rated the practice as "very" or "extremely" important.

Chart 5e. For each practice, percentages are computed among respondents who had rated the practice as "very" or "extremely" important.

Chart 5g. "Don't know" was included as a response option for these items. "Don't know" responses constituted 6 percent or less of all responses on any given item. Respondents who marked "don't know" are excluded from the analyses.

Endnotes

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[59] We consider "advanced" degrees to be those above a bachelor's degree.

[60] At the graduate degree level, gender representation is slightly better with women earning 28.5% of master's and 19.8% of PhDs in computer science in 2005, and 22.3% of master's and 18.3% of PhDs in engineering. National Science Foundation, Division of Science Resources Statistics, special tabulations of U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, Completions Survey, 1996–2005. Accessed on August 15, 2008 at http: //www.nsf.gov/statistics/wmpd

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[64] Standard Deviation=10.05 for women and Standard Deviation=9.56 for men.

[65] Standard Deviation=7.56 for women and Standard Deviation=8.21 for men.

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[80] Using a subset of the organizational culture assessment by Harrison & Stokes (1992), (Harrison, R., & Stokes, H. (1992). *Diagnosing organizational culture.* San Francisco: Pfeiffer), our survey asked respondents to clarify what "new employees need to learn" in order to be successful in at their high-tech company. We used this question to shed light on high-tech company culture. We also asked respondents to describe relationships between work groups.

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[82] These findings are based on Harrison & Stoke's work. The three measures – learning who has influence and who runs high visibility projects – are the hallmarks of a "power culture" orientation where access to resources is unequally distributed based on power (Harrison, R., & Stokes, H. (1992). *Diagnosing organizational culture.* San Francisco: Pfeiffer).

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[95] While organizational research would certainly consider 14% in the low range of response rates, the lowest response rates in organizational studies are found in private sector research, which presents difficulties of accessibility (Baruch, Y. (1999). Response rates in academic studies - A comparative analysis. *Human Relations*, 52, 421-424). When dealing with top managers and professionals, a survey response rate around 20% is to be expected (Denison, D. R., & Mishra, A. K. (1995). Toward a theory of organizational culture and effectiveness. *Organization Science*, 6(2), 204-223), and studies of the high-technology sectors have shown similar response rates (Gemunden, H. G., Ritter, T., & Heyderbreck, P. (1996). Network configuration and innovation success: An empirical analysis in German high-tech industries. *International Journal of Research in Marketing*, 13, 449-462). By comparison, a recent study by Catalyst reports a response rate of 9% (Catalyst. (2005). *Women take care, men take charge: Stereotyping of US business leaders exposed.* New York: Catalyst). Survey response rates generally have been declining over time. (Krosnick, J. (1999). Survey research. *Annual Review of Psychology*, 50, 539). However, response rates themselves do not constitute bias. More important to consider is whether the survey sample is reasonably representative of the population under study (Sax, L., Gilmartin, S., & Bryant, A. (2003). Assessing response rates and nonresponse bias in web and paper surveys. *Research in Higher Education*, 44, 409-432; Krosnick, J. (1999). Survey research. *Annual Review of Psychology*, 50, 540-541).

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CLIMBING THE TECHNICAL LADDER: OBSTACLES AND SOLUTIONS FOR MID-LEVEL WOMEN IN TECHNOLOGY

About the Anita Borg Institute for Women and Technology

The Anita Borg Institute for Women and Technology (ABI) seeks to increase the impact of women on all aspects of technology and increase the positive impact of technology on the world's women. Since 1995, ABI has developed programs designed to help industry, academia and government recruit, retain, and develop women technology leaders.

About the Clayman Institute

The Michelle R. Clayman Institute for Gender Research at Stanford University is one of the nation's oldest research organizations devoted to the study of women and gender. Founded in 1974, the institute promotes gender equality through innovative research and dissemination of key findings to decision makers in universities, business, government, and the broader community.