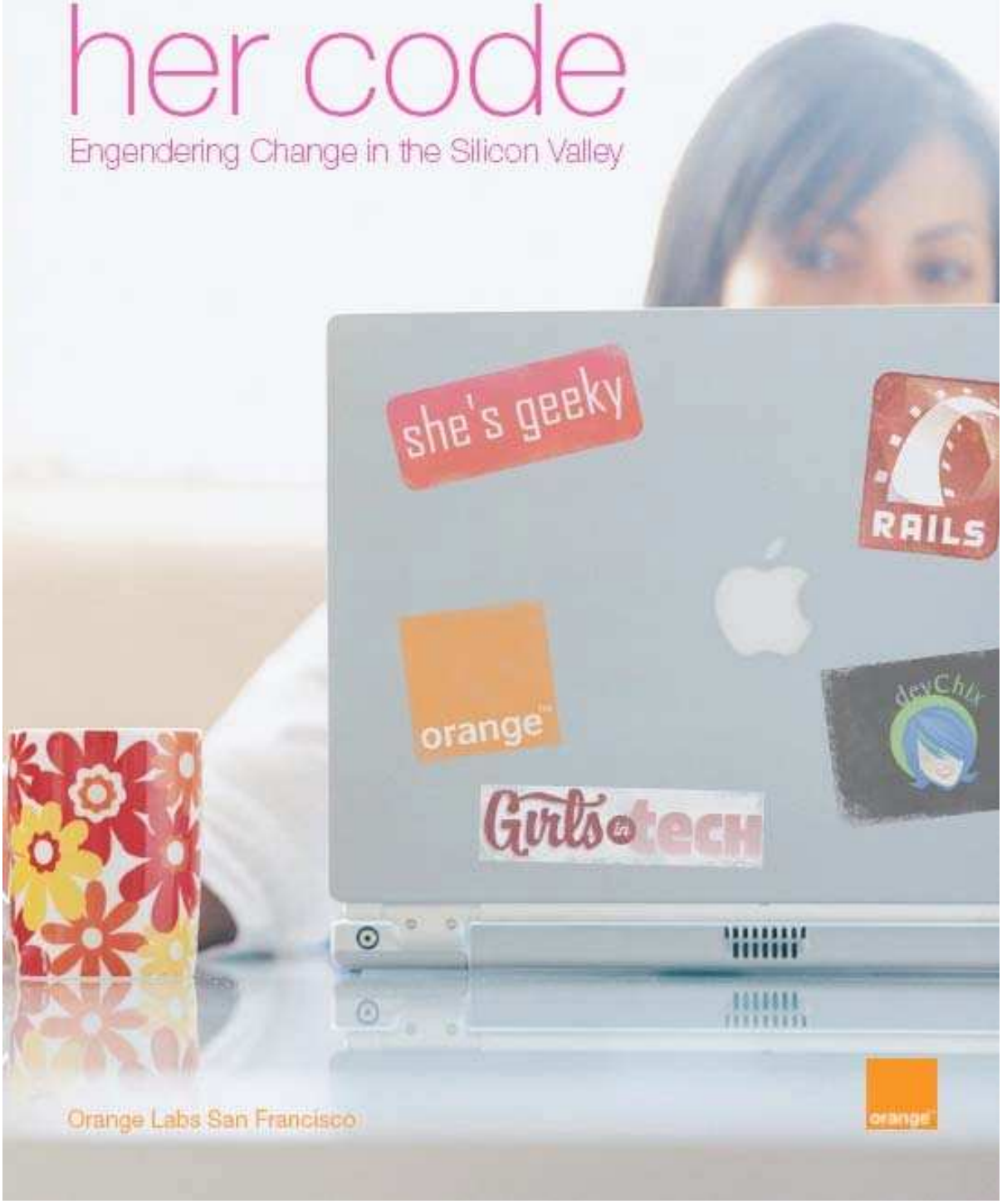
her code

Engendering Change in the Silicon Valley



Orange Labs San Francisco

Acknowledgements

The research team consists of Pascale Diaine (Project Lead), Matthew Farwell, Mark Plakias, and Natalie Quizon (Co-lead). We would like to thank the following people for their contributions to this study. To our first wave of interviewees who provided us with their time and experiences: Ann Winblad at Hummer Winblad, Marissa Mayer at Google, Katherine Barr, Sarah Lacy, Clara Shih, Kaliya Hamlin, and Shaherose Charania of Women 2.0. We gratefully acknowledge our colleagues within Orange who provided early feedback, some important introductions, and more importantly their encouragement: Nathalie Boulanger, Roseline Kalifa, and Beatrice Mandine. Finally we would like to thank Georges Nahon, the CEO of Orange Labs SF who gave us the green light to explore this rich history and vibrant present here in Silicon Valley -- one that deserves a much wider recognition and visibility, which we hope this will in some measure deliver.

Her Code: Engendering Change in Silicon Valley

Table of Contents

Purpose & Methodology

Introduction

The genesis of this research report began at the beginning of 2009, but it had been building for a long time before that. Orange Labs San Francisco (OLSF) researchers and managers had been seeing more and more activity in the Silicon Valley ecosystem being headed up by women. Activity in the broadest sense: events, startups, influential blogs, keynote presentations at major conferences, venture capitalists, CIOs and CTOs at companies like Cisco and Adobe, Sun and Agilent. A core group met to discuss what would be involved in a focused study about the history, current status, and future of women in the cradle of high-tech, Silicon Valley. The questions we asked included ones to which we have been able to reach conclusions, and others which remain open questions. A partial list of such questions we asked:

- Why are women under-represented in engineering schools?
- What are the contributions of women to Silicon Valley historically?
- Why do some women founders leave their company at some point?
- How do we weight the contribution of people-facing disciplines where women are very visible vs 'things' orientation of male-dominated fabrication and engineering?
- To what extent are the issues of 'work-life balance', 'glass ceiling' and 'biological clocks' useful areas of study, and not just stereotypical frames to control the conversation?
- Does Silicon Valley afford women greater opportunity? Is gender less of an issue? Or, more of an issue given the geek culture of the Valley?
- What role has the media played in celebrating the success of 'nerds' (typically young, white Ivy School engineering graduates/dropouts) in obscuring women's contribution?
- What is the impact of gender diversity on innovation rates, on financial performance?

Our initial kickoff meeting took place on January 7, 2009. One week later, amidst an intense media circus, Carol Bartz, the very successful CEO of Autodesk, was announced as the successor to Jerry Yang as the CEO of Yahoo! Suddenly, a lot of other people in the Valley started to look around at the role of women in tech.

Definitions

The phrase "women in tech" has many facets to it. The research team has taken a broad interpretation of the phrase, and offset this with a strong focus on Silicon Valley, where the Orange Labs San Francisco facility regularly hosts interactions with the ecosystem, as well as maintains an active schedule of attending external events and engaging with the Silicon Valley tech community. Indeed, the growing number of richness of networking events designed around the women in tech theme was one of the impetus for conducting the study – a discussion of the Network model for advancing Women in Tech is found in Chapter X. The broad definition of women in tech encompasses over 30 years of activity in multiple disciplines including:

Academia/Education	Engineering	Product/Industrial Design	Marketing	Management & Finance
Professors, Post-Docs, Graduate Students,	Semiconductor, Network equipment,	CE, Internet Services, Social media,	PR, Events design, Evangelism,	CEOs, CIOs, CTOs, Startup Founders, VCs,

	Servers, Software	Videogames, Content	Bloggers, Analysts, Journalists	Angels

Scope, Methods, and Procedures

The primary mission of Orange Labs SF is to extract and interact with the Silicon Valley ecosystem in order to drive innovation that benefits and aligns with FTGroup's strategic objectives. This framing allowed the team to focus its study of the broadly-defined definition of 'women in tech' shown above on the area of Northern California stretching from San Jose in the south to San Francisco to the north – what the world knows as Silicon Valley. As noted above, the chronological scope of the study was the period spanning the '80s to the current time, which demographically encompasses the generations known as Boomers (born post-WWII), "GenX (born post-1965), and "GenY" (born post-1977). Before exploring methodology of the research, a word about the team.

The principal investigators for the Women In Tech study, entitled *Her Code: Engenderiong Change in Silicon Valley*, are both women, with diversified backgrounds. They were assisted by two men. Collectively, the team spanned all three generations covered in the report's scope, and incorporated:

- Cultural anthropologist - GenX
- Wireless software engineer - GenY
- Market researcher - Boomer
- Multimedia intern – GenY

The methodology used in the study consisted of both primary and secondary research sources. These can be summarized as follows:

- *Secondary sources* consisted of a traditional literature search for academic papers and news articles. In addition to the standard literature search, the team focused on a corpus of trade and business publications to conduct some preliminary content analysis studies, in connection with the questions of bias in representation of gender in technology reportage[1].
- *Primary sources* consisted of several observational venues, as well as direct interviews. Direct observation and engagement within the WIT (Women in Tech) ecosystem of Silicon Valley is part of the ongoing mission of Orange Labs SF researchers, so this activity was readily to be incorporated into the study.[2] The other primary source was direct interviews with WIT personae, including high-visibility executives, VCs, developers, and bloggers active in the Valley.

The results of many of the interviews are available in edited form as a short video documentary accompanying this report.

Procedurally, the team set as an objective to conduct the research and production processes using innovations wherever possible. From a tools and a rhetorical perspective, we deliberately sought to avoid established clichés and legacy methods. Instead of circulating source materials and drafts by email for example, we used Google Notebook, a cloud-based collaborative resource, to log links and resources, create lists, and objectives. As noted, we incorporated videography from Day 1 into our primary methodology, which allowed us to frame questions that cut across all three generations of respondents. And finally, speaking of the three generations, we sought a framing mechanism that would transcend the all-too-abundant stereotypical frames of Work/Home, Parity/Inequality,

[1] Publications such as *InformationWeek, ComputerWorld, CIO Magazine*.
[2] This included 'camps' and other 'unevents' such as Girls In Tech, She's Geeky, Woman 2.0; see Chapter 4 for detailed discussion.

Mentoring/Appropriation, and many other memes -- all of which have some grounding in experience, but too often dead-end in obscuring the amazing accomplishments of women in tech.

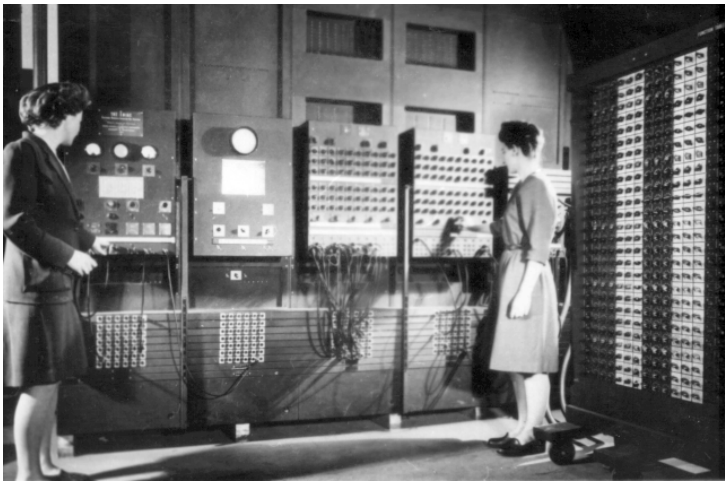
The framing we selected is both appropriate to Silicon Valley, and reflective of the ascendant place for women in the 21st century of the Networked Economy. By locating the three generations of women innovators with respect to the evolution of the Internet, we believe we have created a fresh perspective that provides a global outlook, values diversity, re-examines the role of technology itself, calls for a shared responsibility, and most importantly, is open to all.

Chapter 1: Past & Current Contexts

In this opening chapter we review the historical literature about women's accomplishments in computing generally, with a specific focus on Silicon Valley as it emerges as a locus of activity post-WWI.

I. The Secret History: Past Achievements of Women in Tech

The history of women in tech goes as far back as computer technology itself. In the 1840's, English mathematician Charles Babbage created the idea of a programmable computer. Called the "Analytical Engine," it was capable of computing complex series of equations. Ada Lovelace, also a mathematician, was one of the few people to fully understand Babbage's idea. Given time to study Babbage's notes, Lovelace developed an algorithm for generating a complex series of numbers using the Analytical Engine. As such, many consider her the first computer programmer. Clearly, Ms. Lovelace was ahead of her time, as the computer was not fully realized until close to one hundred years later.



The first modern computer came to fruition in 1946. Called the Electronic Numerical Integrator And Computer (ENIAC), it was capable of computations far exceeding that of any of its predecessors. It was quickly discovered that the ENIAC had severe shortcomings, namely the fact that it took weeks to map a problem from paper to program. A team of computer scientists, led by Adele Goldstine solved this dilemma by developing a modification that cut the reprogramming time on the ENIAC from days to hours and effectively shaped the future of computing as we know it. Called the Stored Program Computer, it was the model for future computers and showed them as something both powerful and efficient.

In the next twenty years, the power and prevalence of computers increased exponentially. The language in which they operated – machine code – was esoteric and in need of change. In 1959, Grace Hopper, a computer scientist employed by the United States Navy posited that computers could operate on a language closely resembling English. It was from this theory that one of the world's most popular computer languages – COBOL – was developed. Hopper was also integral in the standardization of COBOL in 1968. It was around this time that Barbara Liskov challenged the paradigms of academic institutions and enrolled in the Computer Science doctorate program at Stanford University. She was the first female Ph.D. recipient of a Computer Science degree in the United States.

Many of the advancements made in technology in the 1970's were coming out of a swath of land in Northern California that was aptly named "Silicon Valley". It was here that software was designed, semiconductors were built, and venture capital firms sprouted up to fund many of these innovative ideas. A hotbed of technological advancements, it wasn't long before women starting making their impressions felt in Silicon Valley. Because of companies like Apple and Microsoft, personal computers were becoming a reality for many people. They were small and cheap enough for the average person to afford and their software greatly enhanced the lives of users. With this ubiquity came a bevy of data that was quickly becoming unmanageable. To the forward-thinking, computers and software were the wave of the future. In 1976, a computer programmer by the name of Ann Winblad foresaw the growing need

for financial accounting software and co-founded Open Systems, Inc. with a $500 investment. Six years later, Ms. Winblad sold Open Systems for $15 million dollars.

By 1985, computer scientist Radia Perlman invented a network solution called "Spanning Tree Protocol" that would automatically back-up broken links and reduce downtimes in Local Area Networks. Prior to Perlman's discovery, if a LAN failed it would remain in stasis until someone manually remedied the problem. This was the same year that Sandra Lerner, along with her husband Len Bosack, starting hand-assembling the first Cisco routers in the living room of their Silicon Valley home.

The late 1980's was the beginning of women moving beyond the roles of engineers and scientists to become the founders and heads of some of the worlds most influential and powerful technology firms. In 1988, Eva Chen co-founded Trend Micro, an anti-virus software company that today has a market value of over $5.5 billion and is one of the largest software companies in the world. Not long after her, Ann Winblad again used her foresight and expertise to co-found Hummer-Winblad Venture Partners, the first venture firm focusing specifically on investing in software companies. Ms. Winblad is considered Silicon Valley's first female venture capitalist and is featured in the accompanying video, "Three Generations of Women Leaders in Silicon Valley."

In 1992, software company Autodesk was floundering and in need of change. They looked to Sun Microsystems' Carol Bartz to lead them in a new direction; to say she succeeded would be an understatement. Under CEO Bartz, Autodesk became the leading provider of computer-aided design software and established itself as a global powerhouse.

By the late-1990's, Silicon Valley had firmly entrenched itself as the world capital for innovation. Technology's growth began to pervade many aspects of consumers lives. The internet, in particular, was a phenomenon being experienced, exploited, and enjoyed by millions across the globe. One company that aimed to leverage the power of the internet was eBay, a small e-commerce start-up with only 30 employees and relatively limited funding. Seeking to grow from an innovative idea to a viable business, in 1998 eBay tapped Meg Whitman to lead it to new heights. It's interesting to note that prior to eBay, Ms. Whitman had a very limited technical background. Where she excelled was in management, and under Whitman, eBay grew to become the world's foremost authority in online auctions, serving millions of users and generating billions of dollars in annual revenues.

The same year that Ms. Whitman joined eBay, Diane Greene co-founded virtualization firm VMware. In a few short years VMware became the market leader in software virtualization, serving 99 of the Fortune 100 companies. Just one year later, a couple of Stanford engineering students revolutionized internet search and advertising with Google. Their 19th employee and first female engineer was Marissa Mayer, a fresh graduate of Stanford with a keen eye for design. Ms. Mayer, who also appears in our accompanying video, quickly ascended the ranks of Google to her current role as Vice President by leading the design of Google's user interface and managing the proliferation of such services as Gmail and Google News. Also in 1999, HP appointed Carly Fiorina as CEO. This capacity made Ms. Fiorina the first ever female CEO of a company in the Dow Jones Industrial Average. In this capacity, Ms. Fiorina triggered the acquisition of Compaq and saw HP reestablish itself as one of the market leaders in personal computers.

By the turn of the century, the dot-com bubble had burst and many technology firms were reeling. Xerox, an established enterprise with decades of industry service was not exempt. With their business flailing, embroiled in scandal, and on the brink of financial insolvency they installed longtime employee Anne Mulcahy as CEO. Ms. Mulcahy is credited with saving Xerox from a seemingly certain demise and in 2008 was named Chief Executive of the Year by her fellow peers.

As we will discuss later in this report, one of the most important technological developments in the past five years has been the proliferation of social networking sites. Their utility cannot be denied and

their exponential growth cannot be ignored. Very few anticipated this trend as well as Gina Bianchini, CEO and co-founder of Ning.com. Ms. Bianchini, who is featured in our video, has been at the helm of Ning since the beginning and has overseen a company which has raised over $100 million in funding while boasting in excess of 1,000,000 custom social networks and millions of unique visitors.

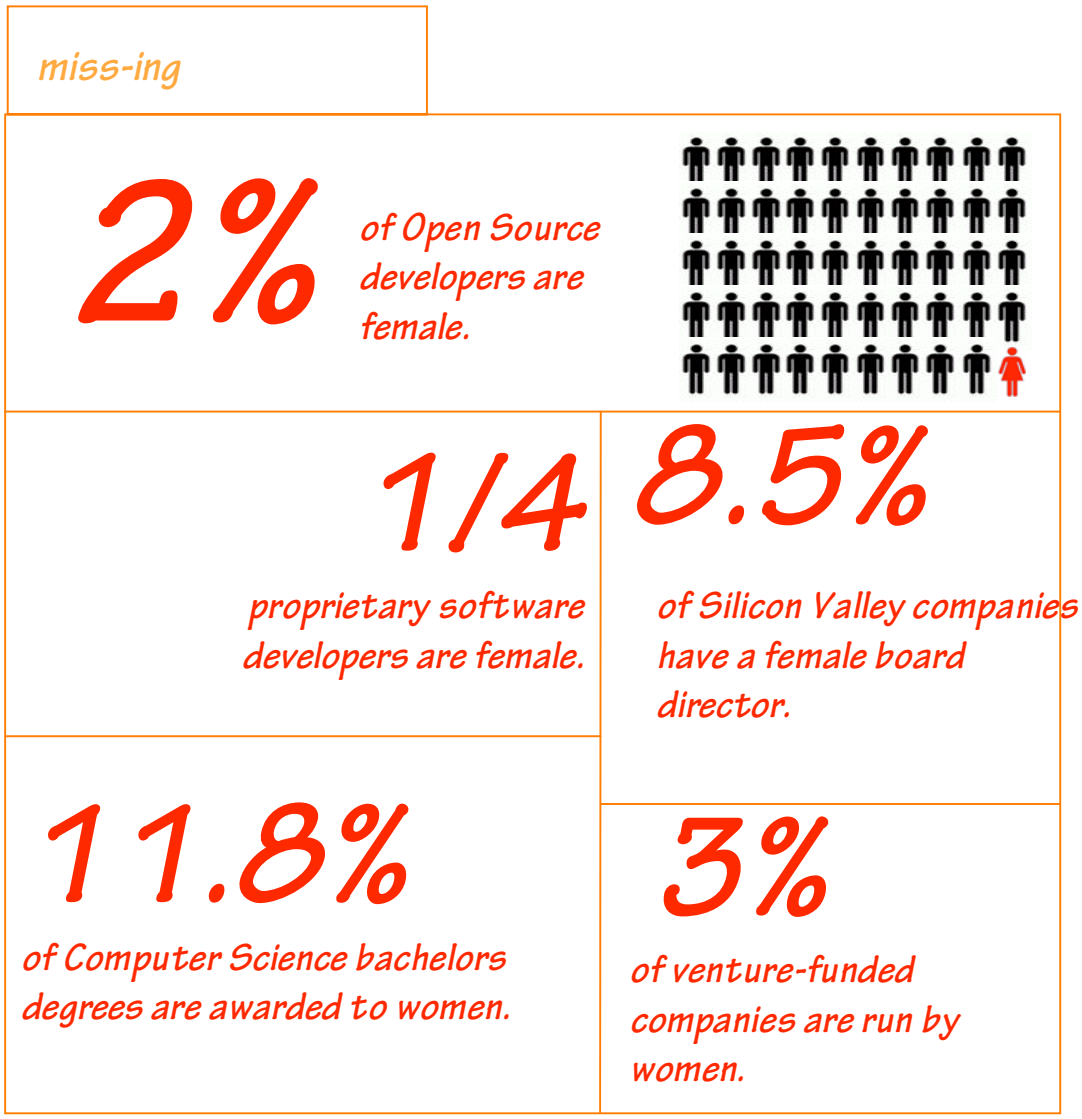
Clearly, the aforementioned women have played a key role in shaping the technological landscape as we know it. Later in this report we will profile some of today's most influential and powerful women in technology. Included are such success stories as Yahoo's Carol Bartz and Cisco's Padmasree Warrior. They are today's example of women leaders, who though relatively small in number have left an indelible mark on the history of technology and computing. One can only surmise that this will continue as technology forges its path ahead, though the contributions will continue to be limited if something is not done to remedy the disparity that exists when it comes to the gender balance of the industry as a whole.

Share of CS/CE Degrees Granted to Women		
	Bachelor's	Master's
1993/94	18%	19%
1994/95	18%	20%
1995/96	17%	20%
1996/97	17%	23%
1997/98	17%	23%
1998/99	17%	26%
1999/2000	19%	26%
2000/01	19%	27%
2001/02	18%	25%
2002/03	18%	26%
2003/04	17%	25%
2004/05	15%	25%
2005/06	14%	23%
2006/07	12%	23%

II. State of Emergency? Computer Curricula and Women

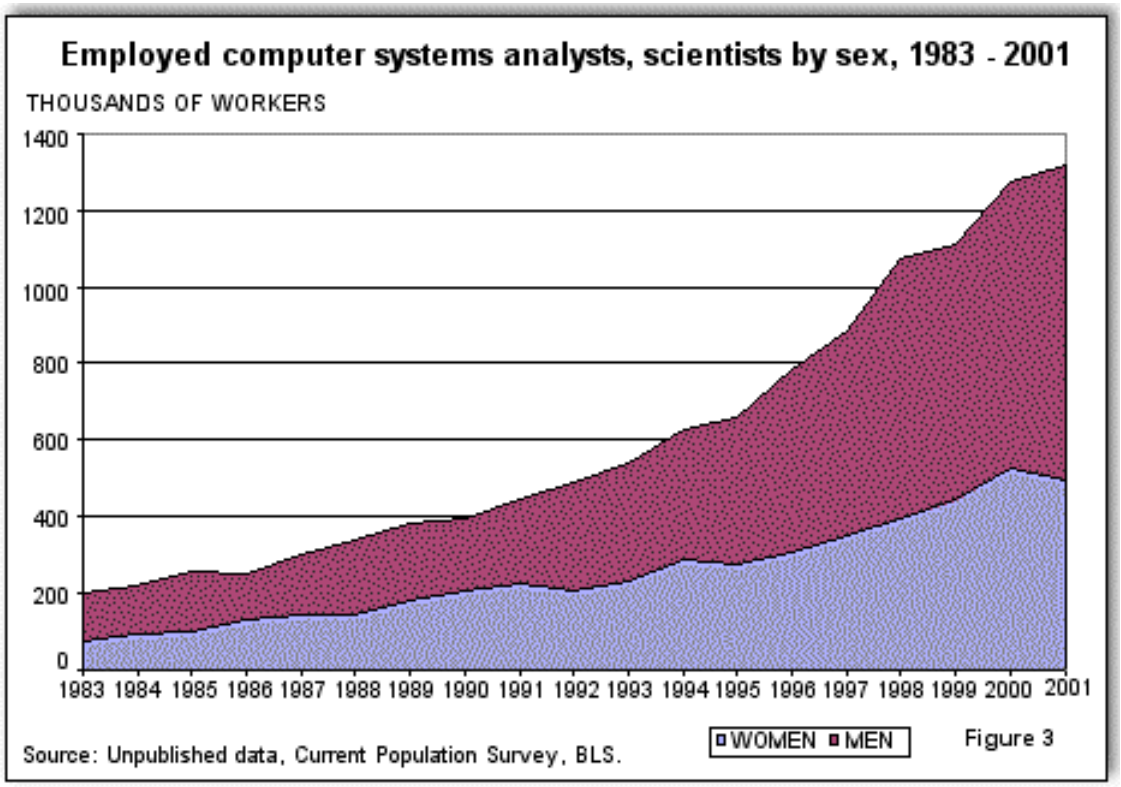
Our review of the literature reveals a strong bias towards framing the discussion about women in tech around traditional analytical frameworks of educational, governmental, and cultural dimensions. From the classroom to the boardroom, abundant statistics show an alarming trend in regards to the number of women in STEM (Science, Technology, Engineering, Math). For instance, a study released by the Computer Research Association shows that Bachelors of Computer Science degrees awarded to women in 2008 were a paltry 11.8 percent[3]. It is no less surprising then that computer science has the dubious distinction of being the only science field to see a fall in the share of its bachelor's degrees granted to women between 1983 and 2002. The numbers are slightly more encouraging at the Master's level, where women account for 23 percent of CS degrees.

[3] http://www.nytimes.com/2009/03/17/science/17comp.html



As one may expect, low enrollment of women in CS programs equates to low involvement of professional women in the tech-sphere. Currently, men outnumber women in tech positions by an average of four-to-one[4]. With the amount of CS degrees being awarded to women approaching an all-time low, it is becoming increasingly clear that these new positions cannot be filled only by women trained in the classical sense – at universities offering computer science disciplines.

[4] Figure 1, Bureau of Labor Statistics



As Leah Culver, of Pownce and SixApart, notes in our project video, only two percent of Open Source developers are women. This is an alarming figure, especially given the traction the Open Source has been gaining both with the Linux and Android operating systems. We can posit two reasons for such meager involvement. First, and perhaps most evident, is that Open Source communities are notorious for long and irregular hours, something that puts a significant strain on the work-life balance. For women planning to have children this can be a significant deterrent.

The second reason is far more troubling, essentially suggesting that some men in Open Source tend to view women as innately inferior and will at times voice their opinions in neither a professional nor polite manner[5]. Strides are being made to combat these issues by creating women-focused groups in Open Source communities, but still more must be done to lessen the gender gap . Much like the number of bachelors vs. Masters CS degrees, a 26 percent female involvement rate in proprietary software[6] seems on the surface a good thing when compared to that of Open Source. However it may simply reflect commercial realities where paid software licensing models create more economic and organizational activity, versus the more innovative and community-based activity of the open source software movement.

Later in this report we will present a more nuanced view of the problem statement than visible in these one-dimensional statistical time series. Moving beyond the educational and occupational frameworks is important if we want to appreciate the true extent of the female contribution, both historical and emergent. We close this opening chapter with a preview of how a more expansive

[5] http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=103777
[6] FLOSSPOLS, 2004-2006

outlook – one that embraces today's global technology platforms – provides an alternative perspective to the insider/outsider, glass ceiling frames that have dominated the discussion to date.

III. Changing Patterns: Technology attitudes and use among Girls

There exists a significant body of literature seeking to explain the scarcity of women in technology-related fields. While there is no definitive answer, there are strong arguments to be made that it begins at a young age, when perceived notions regarding technology are ingrained in young girls' minds. One theory states that as children, boys are much more likely to play video games and engage with toys such as Lego's that require building and spatial attention. Karen Lemone of the University of British Columbia believes that if more girls were exposed and encouraged to such activities at a young age, they would be far more inclined to develop an interest in a field such as computer science[7]. Another widely-held belief is that there is a stigma attached to computers and technology that says they are boring and fit only for the exceptionally smart and nerdy. Perhaps it can also be attributed to a lack of role models.

As the statistics included in this report show, women account for only a small percentage of technical positions. This means there are fewer women for girls to emulate and look to for inspiration. Another possible contributor to the low enrollment of women in tech is that many young girls lack the facts when it comes to computer science. From the interviews we conducted for this project, some women voiced frustration that no one told them that their mathematical prowess or to a greater extent, their general interests, were very much in line with that of a computer scientist. While they went on to study an unrelated subject in college and eventually chose a career path that led them to the tech industry, it could be inferred that they wish they were involved with technology at a much younger age. As Katherine Barr, a successful Silicon Valley VC who fits this profile told us: " I was at the top of my class in math and science through high school and I really didn't know what the different options were -- and it just seemed like getting a B.A. was the path that made the most sense at that time."

Despite these many sobering statistics, new studies are suggesting that we are on the brink of a sea-change when it comes to the use of technology by females. A study published by the Pew Internet & American Life Project found that among web users ages 12 to 17, significantly more girls than boys blog (35 percent compared with 20 percent, respectively)[8]. But perhaps even more encouraging is that girls eclipse boys when it comes to building or working on Web sites for other people and creating profiles on social networking sites (70 percent of girls aged 15 to 17 versus 57 percent of boys)[9]. This shows that young girls are doing more than just casually surfing the web. They are creating, designing, and interacting with technology in a new way, and at a higher rate than their male counterparts to boot. We will drill down deeper into the implications of this 'newer engagement' in Chapter 6.

[7] http://pages.cpsc.ucalgary.ca/~msh/papers/canadawomenincs.pdf
[8] http://www.nytimes.com/2008/02/21/fashion/21webgirls.html
[9] Ibid.

Chapter 2: The Women of Silicon Valley in Context

1. Challenges & Choices

In evaluating the academic and popular literature on the topic of women in tech, it is impossible not to encounter the frames of work/life balance and career path obstacles collected under the 'glass ceiling/glass cliff' meme. Our approach to these well-worn tropes was to acknowledge their enduring relevancy in the workplace today but also examine the very individual ways successful women in the Silicon Valley have addressed these issues head-on. Their portraits provide an important counterpoint to stereotypical frameworks like the "glass ceiling". By focusing on these women and highlighting their personal histories and professional accomplishments, a more nuanced view emerges of what a "woman in tech" really means. We can thus better understand, through different career trajectories, the success or failure of women in tech. In this chapter we examine the careers of very powerful women at three of the largest tech giants in Silicon Valley, indeed the world: Yahoo!, Cisco, and Google.

CAROL BARTZ – The New YAHOO CEO

From 3M to 3F

Two weeks after Yahoo hired Carol Bartz as its CEO, the embattled company recorded a net loss of $303.4 million compared with net income of $205.7 a year earlier. Bartz inherited a company clearly in need of a complete overhaul, a major reorganization, and new strategic plans. While one way to view the scenario is that of the "glass cliff", it is difficult to imagine Bartz worrying about falling off the cliff.

Bartz, 60-years-old, grew up living on a farm in Wisconsin and was raised by her grandmother when her mother died. She was the homecoming queen in high school. She worked her way through college as a cocktail waitress and received an honors degree in Computer Science from the University of

Wisconsin in 1971.[1] Today she is married with 3 children and still manages to find time to golf and garden.

Her first job after college was at 3M, one of America's blue-chip companies at the time. When Bartz requested to be transferred to 3M headquarters in the 1970s she was told that "Women don't do these jobs."[2] From 3M, she went on to work for Digital Equipment Corporation and Sun Microsystems. Her move to the computer industry eventually brought her to Autodesk. She worked at Sun Microsystems for nine years before starting her stint at Autodesk.

While at Autodesk, she actively promoted a culture that ran counter to a fear of failure so prevalent in many established organizations. And even more poignant for women The slogan for it was 3Fs, which stands for Fail-Forward-Fast. With risk-taking as a crucial dimension of innovation, the 3Fs was meant to establish a culture of tolerance within Autodesk that viewed failure as not only acceptable but also desirable, as long as the experience yielded lessons and therefore results.

Hurricane Carol

Her tenure as the CEO of Autodesk from 1992-2006 was widely regarded as a successful one. Sentiments like this one documented by Forbes were common, "Since 1992, Bartz, 56, has transformed Autodesk from an aimless maker of PC software into a leader of computer-aided design software, targeting architects and builders."[2]

Bartz was able to increase Autodesk's annual revenue from $285 million to $2.2 billion. Autodesk's stock price rose by an annual average of almost 20%. She accomplished this even though she was diagnosed with breast cancer soon after taking on the role of CEO at Autodesk. After surgery, she came back to work full-time in a month and continued to have chemotherapy for several months after that. She conquered cancer and presided over Autodesks "astonishing growth."[3]

Her steely determination will definitely be an advantage as she steers Yahoo through this turning point in the company's history which some have described as "huge" and "floundering"[4]. A commanding presence, Bartz's first few months at Yahoo have been a whirlwind of activities and meetings. As Kara Swisher, a journalist who covers Yahoo, wrote "Bartz has let loose with a lot of questions. 'She is asking the right ones, although the tone is much more tough than employees are used to,' said one Yahoo exec."[5] She will no doubt leave an impact on Yahoo, judging by the nickname admiring employees have given her – "Hurricane Carol."[6]

The challenges in Bartz's life have, in a way, catapulted her career. Indeed, Yahoo's board could not ignore that "Bartz has been tested in life as few people in Silicon Valley have. Her trials have turned her into a hardened, disciplined, occasionally ruthless, but often inspiring boss—exactly the sort of leader, it could be argued, that Yahoo! now desperately needs."[7]

Padmasree Warrior – CTO at CISCO SYSTEMS

http://www.flickr.com/photos/ciscolive/2612705045/

Woman Warrior

From Fortune Magazine to the Economic Times to Working Woman Magazine, Padmasree Warrior has garnered much recognition for her work at Motorola and now at Cisco Systems. In 2004 she was honored with the National Medal of Technology by President George W. Bush.[8] In 2009, the 47-year-old Warrior was also under consideration for the President Obama's new administration post of CTO for the country.

Warrior received her bachelor's degree in chemical engineering from the Indian Institute of Technology in Delhi and her master's degree, also in chemical engineering, from Cornell University. Warrior's first job involved wafer process development in one Motorola's semiconductor factories in Arizona. In an interview, she acknowledged how challenging it was in hindsight:

I was hired as a recent graduate to develop a new reactive ion etch process for dielectrics. At that time, my project had to be done in a large manufacturing fab due to short lead times to meet the market window. It was a tremendous challenge because it was my first exposure to the industry, I was the new kid on the block (the only female engineer in the entire factory) and I was under the gun to get the process ramped into manufacturing. I learned a lot on my first job both technically and socially, having to overcome gender and culture barriers. I formed many deep friendships which continue to this day. I would say my first job was the toughest but also the most rewarding.[9]

Warrior spent 23 years at Motorola progressing from many positions and culminating with her appointment as CTO in 2003 and Executive Vice President in 2005.[10] While in these positions at

Motorola, Warrior oversaw a research and development budget of $3.7 billion and a staff of 25,000 engineers worldwide.[11]

Long commutes in Silicon Valley are fairly common, making life a difficult balancing act, especially for working mothers who also want to devote a significant amount of time for both their personal and professional lives. Warrior's commute is a long one, even by Silicon Valley standards.[12] She commutes on a weekly basis to Silicon Valley from her home in Chicago, where her former employer, Motorola is headquartered. However, the sacrifice of being away from her husband and son might be offset by the huge opportunity Cisco represents.

While many companies are floundering, Cisco seems poised to weather the current economic downturn with nearly $30 billion in the bank. Warrior was attracted to Cisco's entreprenurial and open-minded culture where it has integrated many of its past acquisitions. Though Warrior's role as CTO at Cisco is defined broadly, her focus is very customer-centric.

I spend a lot of my time with customers understanding what their future needs are going to be, where they see the future heading, sharing with them our view of the future, how things are going to transition and then translating that back into what our strategy should be. The other thing I do is taking the message of Cisco's innovation and our strategy to various stakeholders beyond customers — like industry analysts, financial analysts and the media. The second area of focus is to really drive technology-driven market transitions, and Cisco's strategies around that, such as cloud computing.[13]

In her role as Chief Technology Officer for Cisco Systems, Padmasree Warrior is responsible for not only technological strategy and innovation, but also Cisco's new business models. Outside of work her responsibilities also encompass being a role model and giving back to the community. She has received many accolades as a role model of a successful woman in the technology field and has translated this recognition to her commitments to many organizations including Chicago's Joffrey Ballet, the National Science Foundation, and Chicago's Museum of Science and Industry.[14]

In an interview, Warrior was asked "What lessons have you learned that would be valuable to women beginning their careers in technology?"

Be an expert in your field, know your stuff! Develop a clear, concise and distinctive communication style. Surround yourself with giants - don't be intimidated by brilliance from others, leverage it. Lead with femininity and grace - you don't have to be "one of the boys" to be recognized as a strong leader. Be professional and always treat people with respect. Be well organized in how you deliver and be thorough in what you do. Take charge of your career. Don't wait for the perfect opportunity to land in your lap--search for it with passion and daring. A lesson I learned from Bob Galvin is "Leadership is the ability to take people elsewhere. Lead with humility. Humility does not mean that one thinks less of oneself, it means that one thinks of oneself less". This is a nugget I will always carry with me.[15]

Marissa Mayer – Vice-President at Google

http://www.flickr.com/photos/burda/370657328/

Mayer May I?

Famously known as the first female engineer at Google and Google Employee #20, Marissa Mayer, the 34-year-old, Vice-President of Search Products and User Experience, oversees the product development process. Mayer received her B.S. in Symbolic Systems and her M.S. in Computer Science at Stanford University, specializing in Artificial Intelligence. Many patents have been filed under her name for work in artificial intelligence and interface design. Before joining Google, Mayer also worked the UBS research lab (Ubilab) in Zurich, Switzerland and at SRI International in Menlo Park, California.

In addition to her full-time work at Google, Mayer has also managed to squeeze in teaching gigs at Stanford. Over the years, she has over 3,000 students in her introductory computer programming classes and was recognized her educational contributions with the Stanford Centennial Teaching Award and the Forsythe Award.

Geek Chic

In her tenure at Google, Mayer has introduced over 100 products and features, including Google News, Image Search, and GMail. In all these achievements, both her engineering chops and design sensibility are in clear view. Indeed, it was both her ability to code and understand the importance of design that allowed her to deliver effective and compelling user interfaces, which in turn made her standout from the rest of the engineers during the early days of Google. Her own formative memories stem from a home in Wausau, Wisconsin decorated with Scandinavian Marimekko prints, known for

their deliberate use of bright color on white backgrounds. A recent New York Times profile of Mayer noted that her current San Francisco penthouse is a modernized version of her childhood home.[16] The authors also did not fail to notice it's striking similarity elsewhere: "Google's home page — spartan white embroidered with splashes of blue, red, yellow and green — mirrors her Wausau home and her penthouse."

In Mayer's case, "the glass ceiling" is one of her own making. As the gatekeeper of all things design and user interface-related, Mayer protects the spartan look of Google. And clearly her personal tastes have an influence.

"It used to be people would come over to my apartment and say, 'Does your apartment look like Google or does Google look like your apartment? . . .I can't articulate it anymore. I really love color. I'm not very knick-knacky or cluttery. My place has very clean, simple lines. There are some elements of fun and whimsy. That has always appealed to me."[17]

Though at first glance, Mayer's input could easily be dismissed as frivolous, it is pivotal and deeply engineering, quantitative and test-driven.[18] Little at Google, from design decisions around colors to text, reaches the general public without her approval. In March 2009, complaint's about the iron grip of Mayer's engineering, data-driven background have come to light in a more public arena, dubbing it a "glass ceiling."[19] One visual design lead who left Google recently complained of the meticulous testing under Mayer's watch:

Yes, it's true that a team at Google couldn't decide between two blues, so they're testing 41 shades between each blue to see which one performs better. I had a recent debate over whether a border should be 3, 4 or 5 pixels wide, and was asked to prove my case.[20]

In her own personal life, Mayer is equally obsessive. One of her nicknames is Cupcake Princess. In her drive to make the best cupcake, she culled through numerous cookbooks, created a spreadsheet of ingredients, tested each recipe, and then made her own version. Apparently, she did the same for the frosting.[21] Her other obsessions include entertaining, baking, fashion, and art. Always one to maximize efficiency Mayers remarked "My hobbies actually make me better at work. They help me come up with new and innovative ways of looking at things."[22]

Glass Ceiling

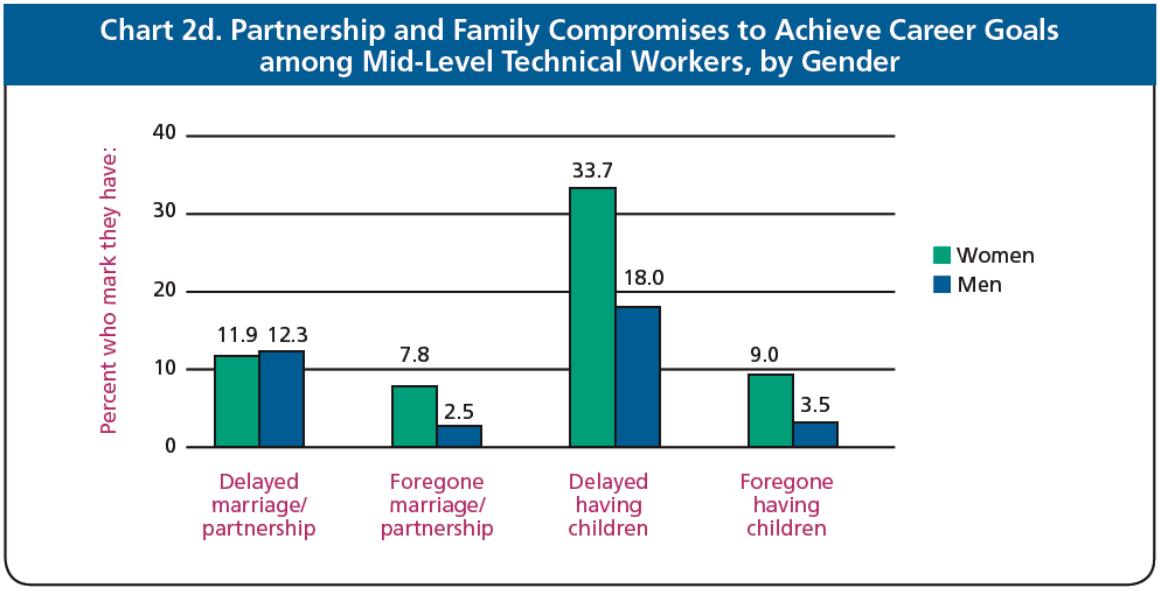
As this report has documented, the underrepresentation of women in the STEM fields both in education and in professional careers are well-known. The dearth of women in technology & science must also be understood within the context of the glass ceiling phenomenon. According to Wikipedia, the first use of the term "glass ceiling" is often cited as March 24, 1986 in a Wall Street Journal article by Carol Hymowitz and Timothy Shcellhardt examining the career evolution of women and the invisible barriers that impede their advancement in the American workforce. In fact, there were two earlier uses of the term: in a March 1984 article in Adweek by Gay Briant and at Hewlett-Packard in 1979 by Katherine Lawrence and Marianne Schreiber "to describe how while on the surface there seemed to be a clear path of promotion, but, in actuality, women seemed to hit a point where they seemed unable to progress beyond."

Years later, Carly Fiorina became first woman to be CEO of a Fortune 50 company. Upon taking the realms of Hewlett-Packard, Fiorina declared that "the glass ceiling doesn't exist." In hindsight, after her very public battle with the board, Fiorina admitted in her memoir *Tough Choices* that it was a "dumb thing to say".

Work/Life Balance

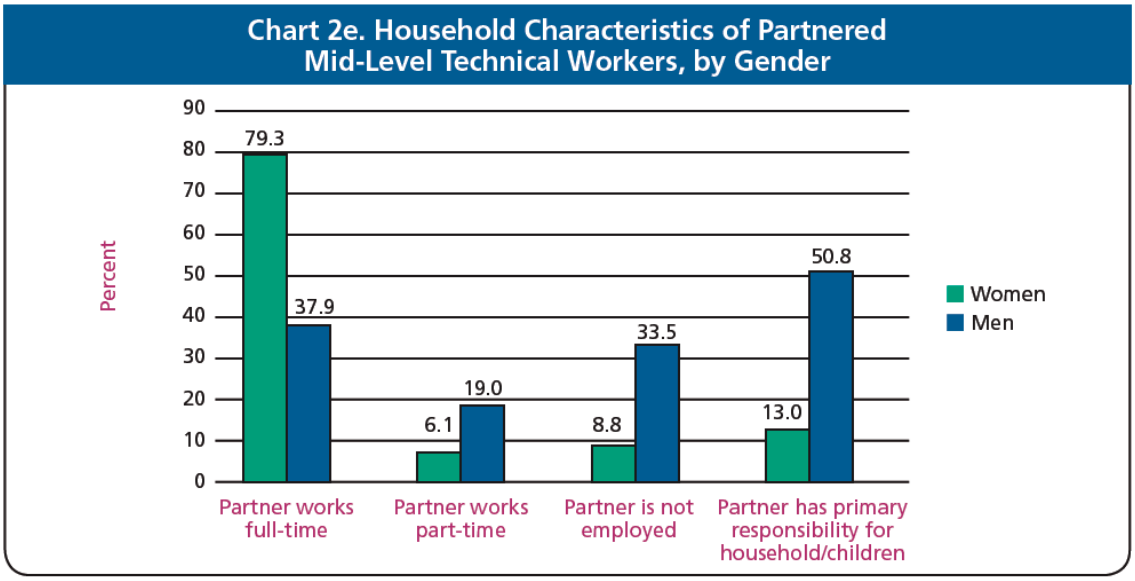
In the workplace today, three generations of women are converging. No longer is it enough to accommodate Women (with a capital W) to address the needs for this particular segment of the workforce. Companies need to understand the complex culture in which they operate. Managing a diverse workforce now also includes addressing women at different lifestages. As the previous profiles have shown, the issue of having children at college, children at home, or having no children impacts how women work. And increasingly their personal lives have become intertwined with work especially with the advent of social media. That said, as the personal impacts the professional, and vice versa, women (including those profiled earlier), find ways to further careers and maintain their personal lives as well. As in the case of Mayer, who believes that her personal hobbies actually make her more effective at work.

While we have presented profiles of highly successful women in Silicon Valley, research shows that in order to increase the numbers of women working in STEM-related fields, the issues they face at the mid-point of their careers must be resolved. Recent studies have shown that women are most vulnerable to work-family issues at the mid-level of the career curve. "For many women, building a career, partnering, and raising a family are not simultaneous life events."[23] The mid-level stage of women who work in the technology sector also coincides with the time when the greatest proportion of them would be considering having children. Highlighting the gendered realities of work, a 2008 report from Stanford University and The Anita Borg Institute found that, amongst mid-level technical workers, women delayed having children at the rate almost double that of their male counterparts and have foregone having children at an even higher rate of almost triple that of men.[24]



www.stanford.edu/group/gender/ResearchPrograms/TopTech/Climbing_the_Technical_Ladder.pdf

These decisions are not surprising given the household characteristics working women have to contend with. Partnered mid-level women are over twice as likely as partnered mid-level men to have a spouse 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. [25] These statistics convey the pressures women feel regarding societal and work expectations.



Ibid

According to Bartz, these pressures often manifest themselves in the form of useless guilt. In fact, she has said on numerous occasions that work/life balance is "myth" and is counterproductive. In an interview with *More* magazine, Bartz said condemned the "myth of the balanced life . . . Women put all this crap on themselves," she says. "They think, 'I'm going to cook a great breakfast, wash up the dishes before I leave, take the kids to school, call my college roommate on my way in to work, be a CEO all day, volunteer on the way home, do a little exercising, cook a wonderful dinner, help with homework, have sex.'" Bartz pauses, grins widely and shakes her hair. "I don't think so."[26] Believing that daily balance is an impossible thing to achieve, she advocates a more long-term view and proposes that women focus on doing one thing at a time and doing it well, instead of trying to juggle too many things at once.

While commuting between her home in Dallas and Sun Microsystems headquarters in California when her daughter, Layne, was an infant, Bartz spent four days at work fully-focused on her career and three days a week devoted herself to her family.[27] .

During her time at Autodesk, Bartz tried to build a more supportive culture for busy people in general and created a more family-friendly atmosphere, including shutting the company down for one week every winter. To this day, Bartz's legacy is evident. Autodesk is regarded as a good place to work with flexible schedules and telecommuting options for workers.

The constraints that women in tech feel, be it butting up against the glass ceiling or delicately balancing work and family, are challenges that women might feel disproportionately. However, the creative solutions, such as job sharing or flex time, that women and companies like Autodesk have developed benefit everyone in the company. By addressing the needs of its workforce, companies make their employer brand that much more appealing to a broad spectrum of potential employees and not just women. And this goes a long way in addressing the problem of monoculture that often stymies innovation. Meeting the needs of women inevitably promotes diversity in the workforce which in turn leads to a more viable and sustainable enterprise.[28]

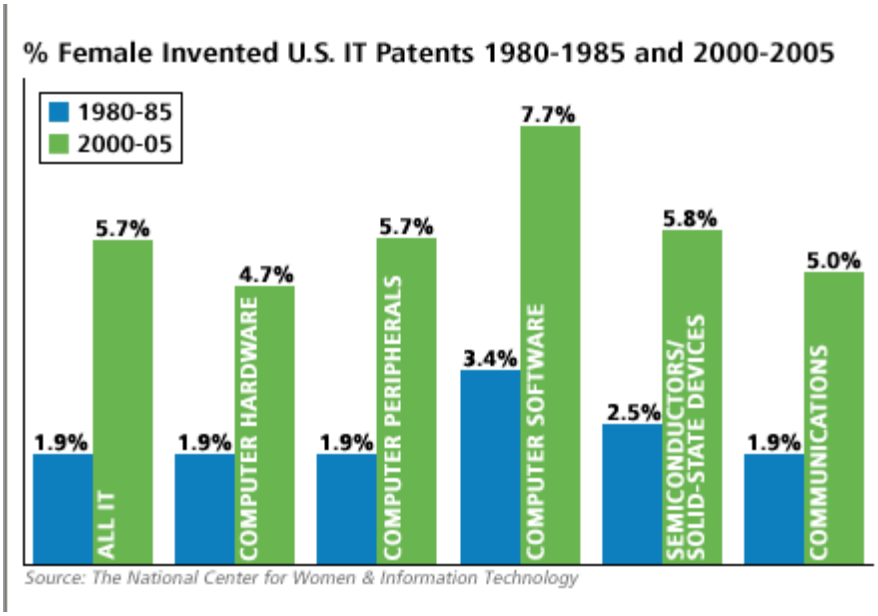
Yet the need for change cuts both ways, not just to the employer. In one of the more troubling findings of the Orange Labs research, we found signs that the monoculture of male engineering – both

technical and financial – had to some extent been internalized. As author and business reporter Sarah Lacy explains it: " I think women much more feel like they're a fraud and undercount their own abilities than men do."10 As Kaliya Hamlin notes in our video: "Women believe they are performing here (low), and they are actually performing here (high). "

Patent Diversity

A Forbes magazine article noted "If you want to create a really useful invention, make sure you have both women and men on your development team."[29] Based on a study conducted by the National Center for Women and Information Technology (NCWIT), the magazine explained that gender diversity was of great consequence to the success of companies if one criteria used was "measured by the number of subsequent patents that cite a patent."[30] When compared with single-gendered teams, mixed-gendered teams received up to 42% more citations.[31]

The NCWIT study attributes this difference to "functional-diversity" which has to do with the approach people have to problems. This approach is largely governed by life experiences. The higher the diversity within a team, the higher and richer the functional diveristy . "Less diverse teams use similar problem-solving methods, missing solutions that diverse teams discover."[32] That said, while the numbers of women's names on information technology patents have been increasing over the years, as the chart below indicates, they still remain a small minority on the number of patents filed.



http://www.forbes.com/2007/09/13/women-patents-study-tech-science-cz_cm_0913techwomen.html

Companies can make a significant impact in increasing the number of women filing patents. In addition to developing more gender-balanced teams, NCWIT recommends educating employees about the benefits of diversity and demystifying the patent process. They also suggest incorporating innovation information and patenting education into mentoring programs. [33] Today, companies are beginning to realize that the case for gender diversity can also be extended from the engineering floor to the boardroom and that the effects of diversity could also be beneficial to the decision-making process at the management level. Padmasree Warrior's company Cisco, which only has 16% of its employees as

[10] From video.

women, has established an aggressive initiative called the Executive Talent Insertion Program to add a dozen senior women executives to its management within an 18-month period.[34]

As companies strive to close the gender gap amongst its employee ranks, women of three generations -- the Boomers, GenX, and GenY -- will inevitably cross paths, sharing and leveraging their experiences in the workplace, on the factory floor, in the boardroom, at networking events and across new social media platforms built by a succeeding generation of younger women.

Chapter 3: The New Network

Silicon Valley is famous for its endless and always-on networking activity, yet the the male-female ratio remains incredibly low. As an area famous for its "think different" mentality, it is not really surprising that more than a few individuals have decided to change this alarming ratio.

Networking events specifically targeting women have recently become more popular. The goal of these events is clear: women are being encouraged to break the stereotype of the geek with thick glasses and a pocket protector. In Silicon Valley as well as elsewhere, several organizations are trying to promote women in technology, encourage them to join the world of entrepreneurship and provide a support network to build the confidence needed to maintain a long tech career. This chapter discusses offline and online networking activities and events, much of them occurring within the past 36 months.

Adriana Gascoigne, founder of Girls in Tech

Girls in Tech aims to bring more women into the tech industry through women-only networking, roundtables, conferences, entrepreneurial workshops, and recruiting events. By providing comfortable venues for exchange and engagement, Girls in Tech hopes to generate ideas about successful career practices and business concepts related to technology.

"When women get together we can connect on a deeper level than if men are around," says Adriana Gascoigne, founder of Girls in Tech. "It helps to build confidence and it helps to create stronger relationships." A lot of women in tech tend to try to blend in, they dress in a similar manner to the men, and they behave in a similar way but this is a mistake she says.

“It is important to embrace femininity, to embrace girliness,” says Adriana. “Too many women think they need to be more like men to succeed. You don’t.”

She's Geeky is an (un)-conference also targeting the female tech market. With 5 instances since the 1st event in October 2007, She's geeky gathers the diverse range of women who identify as "geeky" with the opportunity to spend time together and learn from one another.
"When we called the first conference in the summer of 2007, there was a lot of conversation about the role of women in the industry and the lack of acknowledgment and paths for advancement, particularly outside the formal corporate sector in Web 2.0 and Open Source. We wanted to create a safe (women only) space to talk about the issues, strategize around cultural change and, if needed, find personal support," noted organizer Kaliya Hamlin.

Wall Agenda at the She's geeky conference in Mountain View - January 09

She's Geeky is built on the "un-conference" format: open to everybody and without a formal agenda but rather a wall agenda with ad hoc sessions. Participants become the speaker, moderator or facilitator of a session by posting a description of the topic they want to address.
Sessions titled "Getting more women involved in the Mozilla and Open Source community", "How to ask for help without sounding desperate" or "Women: Leadership, Role Models, Mentors" took place at the She's geeky conference in the Bay Area in January 09

She's Geeky take a more general approach and celebrates any woman interested in technology:

Judging panel ready to hear the pitches from the five finalists of the 2008 Women 2.0 Business Plan Competition on Stanford Campus

developer, designer, user experience expert or architect. Other initiatives take a more specific approach.

Women 2.0 co- founded by Shaherose Charania in April 2006 is committed to increasing the number of women entrepreneurs by providing the resources, network, and knowledge for the launch and growth of their company.

They put together networking events and conferences throughout the year like Jumpstart your startup workshop series helping women bringing their business idea to reality. They are trying to be a catalyst for change, mobilizing a global community of ambitious women entrepreneurs seeking to advance the world through technology.
The third-annual *Women 2.0 Pitch 2009: Startup Competition* was open to applications from early-stage ventures around the world, subject to the two conditions that: 1) companies must be in beta-stage and have not received significant funding and 2) Teams must have at least ONE FEMALE in the founding team.

The attempts to bring more women in technology are not completely new. Anita Borg was part of a relatively small group of female computer scientists at the Ph.D. level in 1981. She is one of the first women to create a network of support for women in technology: Systers online community in 1987, well before the concept of an online community was a part of the mainstream. In 1994, she also co-founded the Grace Hopper Celebration of Women in Computing, inspired by the legacy of Navy Rear Admiral Grace Murray Hopper previously mentioned.
In 1997 she founded the Institute for Women and Technology which encompassed her earlier endeavors and began new programs, partnerships, and initiatives to include women in all aspects of technology.


Anita Borg

The Grace Hopper Celebration (GHC) is still alive today and keeps inspiring thousands of girls to bring the research and career interests of women in computing to the forefront. The GHC Conference is the world's largest gathering of technical women in computing. Over the last decade and eight GHC Conferences more than 7400 women have attended and nearly 1300 scholarships have been awarded to students. Presented with Association on Computing Machinery (ACM) the GHC Conferences offer opportunities for mentoring, motivation, networking, technical and career development[11].

The BlogHer Business Conference is an annual conference on best practices for reaching women online in the media world. It basically tries to help female bloggers get exposure.

Is Coverage of the Online Glass Ceiling Just Reinforcing It?

[11] The 2009 Grace Hopper Celebration will be held September 30 - October 3 in Tucson, Arizona.

The next BlogHer '09 conference will take place in Chicago July 23rd, Topics announced in the agenda include "Identity and Passions", "the Business of You", "Politics and Activism", "MommyBlogging" and "Geek Lab – the Tech Track."

"One of the number one reasons we all attend BlogHer every year, whether coming for the first time or as an old-timer, is to meet our online community "in real life". So after five years we think it's a great time to celebrate the fact that our blogging, whether personal, professional or political, has brought us real work, real friends, real satisfaction and is most definitely a significant part of our real life!" says one of the organizers.

Lesson #1: Avoid Extra Pink

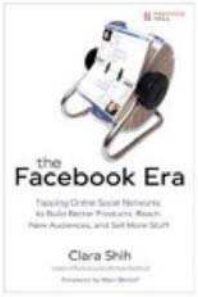
Media coverage of the BlogHer conference has not always been positive, garnering negative remarks even from women reporters. After the BlogHer 08 last July critical pieces like this were published: *"But in the tortured circular hell of who's to blame for gendered imparity, it's only fair to point out that the Netroots [political event held the same day] convention probably didn't have the "You are perfect" notes hanging on the stalls. It's crap like this that gives the extra-pink tint to the already gendered lens through which the media sees conferences like BlogHer,"* wrote Rebecca Traister in Salon.com. In addition, the New York Times coverage (by a woman) of the event was highly criticized by female bloggers because of its focus on specific details like the bathroom setup, the lactation room, child care. It also triggered articles like "Is Coverage of the Online Glass Ceiling Just Reinforcing It?" in the FishBowlNY blog

Some women are very attached to the idea of a meritocracy, and reject the issue of gender as an important factor in their success. They think that focusing on the female gender of the entrepreneur is not only distracting but sometimes actually counterproductive.

"The people who fuel that "conversation" are nothing but well-intentioned, I'm sure. But far more often than not, their good intentions get turned around, twisted, and come out all wrong. I think most mean to ask themselves deep questions such as, "Why is our industry dysfunctional?," "Why does my life kinda suck?" but end up, with something smaller, something that few would challenge: Where are all the women?" says Amy Hoy in the "Women and Technology" section of the O'Reilly blog.

This fear of the "extra pink tint" is to be kept in mind while organizing events aiming at supporting women. Fortunately, recent initiatives managed to avoid the pink trap like the Lovelace Day. Because of the many publishing platforms now available and wide distribution, leveraging social media tools could be one of the best way to inform about women achievements, increase awareness about existing stories, trigger passions and foster entrepreneurship among the female market.

Recent studies show that 55% of users on Facebook are women. They tend to be more active in gathering and posting pictures, keeping in touch with acquaintances and classmates, sharing their daily life with friends and family. As mentioned by Clara Shih, author of The Facebook Era, the "effort" to keep in touch with friend has been minimized by social networks like Facebook, making it easy to "keep in touch" with as many people as possible. *"Such behavior has a high potential of serendipity. Your classmate in 10th grade could become an HR executive at a company you may apply to. You never know what will happen,"* asserted Clara Shih in an interview with Orange Labs San Francisco



Lesson #2: Leverage Social Media