



ANITA BORG INSTITUTE
FOR WOMEN AND TECHNOLOGY

OBSTACLES AND SOLUTIONS FOR UNDERREPRESENTED MINORITIES IN TECHNOLOGY



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About the Anita Borg Institute for Women and Technology

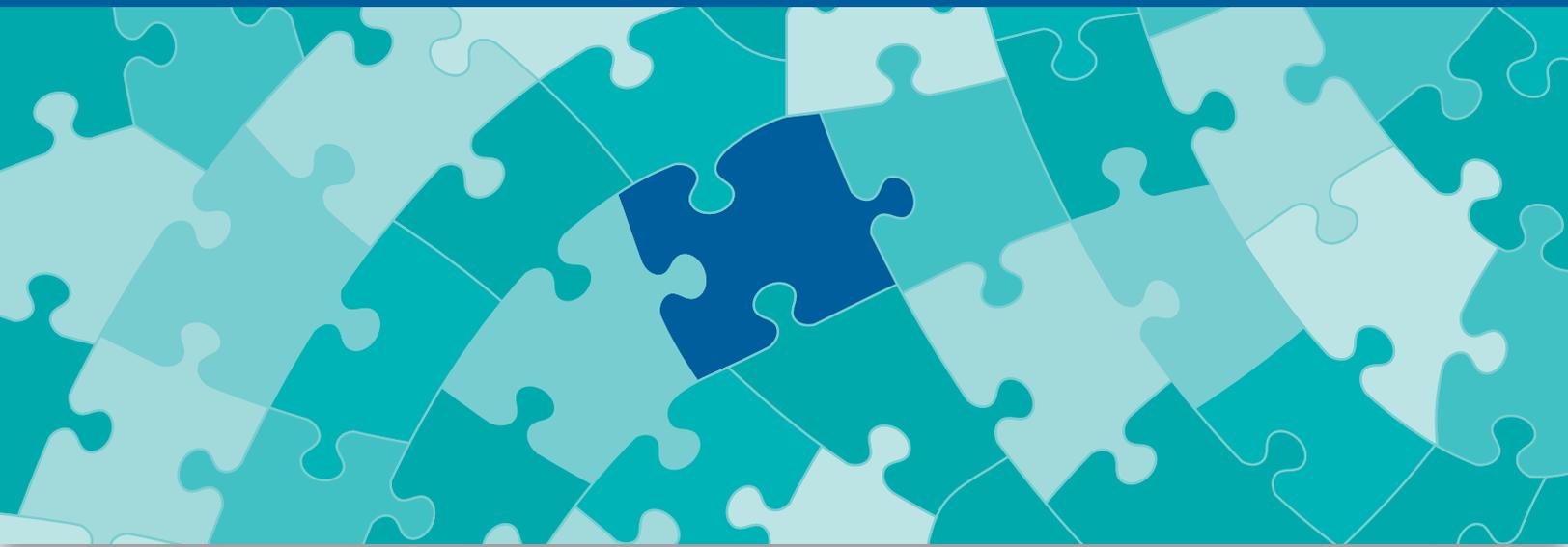
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Introduction

Leading high-technology companies need employee diversity to remain globally competitive and innovative. Diversity leads to better group decisions, creativity, and innovation, as people from different backgrounds bring different skills and ideas to teams and companies.¹ A diverse perspective creates enhanced market opportunities and better ideas.²

Gender and ethnic diversity

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.

– Technical man, interviewee³

Women and men from underrepresented minority (URM) backgrounds are notably few in computer science and engineering disciplines.⁴ The proportion of African-American PhD recipients in the US and Canada has remained unchanged since 1995 at around 1-2%, and Hispanic/Latino representation dropped from 3% to 2%.⁵ Indeed, the underrepresentation of women and ethnic minorities in science, technology, engineering and mathematics (STEM) in the US has been a concern of policy makers, academics, and industry leaders.⁶ The US Hispanic population will triple between today and 2050 and grow proportionally from 15% to 30% of the total US population.⁷ Yet, only 6.7% of Computer Science bachelors' degrees are earned by Hispanic/Latinos. Similarly, African Americans represent 13% of the US population, yet earn less than 5% of graduate degrees in computer science.

For women from underrepresented ethnic minority groups, the problem is even more serious. Since 1995, the representation of African-American and Hispanic/Latina women among computer science degree recipients has remained flat—Hispanic women earn less than 2% of computer science bachelor's degrees. Despite the growth of the Hispanic population in the US, only 0.03% of all female Hispanic freshmen planned to major in computer science in 2006, the lowest of all Science and Engineering disciplines.⁸ Native-American women earn less than 1% of computer science degrees.⁹ African-American women represent 4.8% of the graduate enrollment in computer science¹⁰, yet they represent 7% of the US population.¹

Previous research on barriers faced by underrepresented minorities in technology

Unequal access to technology and curriculum from early on creates ongoing disadvantage. Starting at the K-12 level, underrepresented students are more likely to be in school districts lacking the resources for a rigorous computer science curriculum.

Degrees Earned by Ethnicity and Gender (NSF, 2008)

2006 BACHELOR'S DEGREES

Computer Science

All African American/Black	10.78%
African-American Women	4.37%
All Hispanic/Latino	6.7%
Hispanic/Latina Women	1.61%
All Native American	.53%
Native-American Women	.15%
Total URM	18.03%
Total URM women	6.13%

Engineering

All African American/Black	4.68%
African-American Women	1.44%
All Hispanic/Latino	7.18%
Hispanic/Latina Women	1.71%
Native American	.52%
Native-American Women	.1%
Total URM	12.38%
Total URM women	3.25%

2006 MASTER'S DEGREES

Computer Science

All African American	4.62%
African-American Women	.96%
All Hispanic/Latino	2.89%
All Hispanic/Latino	3.36%
All Native American	.33%
Native-American Women	.08%
Total URM	7.84%
Total URM women	1.88%

Engineering

All African American	2.72%
African-American Women	.85%
Hispanic/Latina Women	.84%
Hispanic/Latina Women	.86%
All Native American	.52%
Native American Women	.06%
Total URM	6.6%
Total URM women	1.77%

2006 DOCTORAL DEGREES

Computer Science

All African American/Black	2.59%
African-American Women	.34%
All Hispanic/Latino	1.21%
Hispanic/Latina Women	.22%
Native American	.35%
Native-American Women	0%
Total URM	7.84%
Total URM women	.56%

Engineering

All African American/Black	4.14%
African-American Women	.58%
All Hispanic/Latino	4.51%
Hispanic/Latina Women	.46%
All Native American	.16%
Native-American Women	0%
Total URM	8.81%
Total URM women	1.04%

When schools in disadvantaged areas do have the equipment, they often lack the curriculum that will provide the technical skills necessary for college completion.¹²

Narrow perception of available career paths. Students of color are often discouraged from pursuing computer science and are especially likely to hold widespread misconceptions about computer science and engineering as a discipline and a career.¹³ The perception that computing is a “white male profession” discourages girls and minorities from entering the field.¹⁴ For women from underrepresented minorities, this image is even more problematic as it is both masculine and white.¹⁵

Bias and stereotyping starts early and continues throughout a career. Early on, societal stereotypes and unconscious bias reinforce the perception that girls and minorities are not as good as white boys at STEM disciplines. Due to often unconscious bias, parents and teachers are likely to discourage girls and minorities from pursuing computer-related activities.¹⁶ African Americans and Latinos are perceived as less academically competent than Caucasian students.¹⁷ For women of color, the double bias of gender and race puts them at a significant disadvantage when it comes to computer science and engineering. These biased expectations lead to

stereotype threat, whereby the groups subject to bias see their performance undermined and ultimately drop out of the activity.¹⁸ In the workplace, perceived unfairness due to bias and stereotyping has been demonstrated to significantly contribute to the turnover of employees of color, who are three times more likely to cite unfairness as the reason why they left their company.¹⁹

Tokenism — overly visible yet invisible. A manifestation of stereotyping, tokenism is experienced by minorities within a majority group. For example, the sole woman in a group of technical men, or the sole Hispanic employee becomes examined in terms of stereotypical assumptions — his or her actions become scrutinized and interpreted with a racial or gender lens. Research shows that minority employees experience greater stress and anxiety in the workplace due to tokenism.²⁰ Minority groups often feel like they have less room for mistakes and that they have to work harder than their colleagues, as they are given the message that their performance may determine future opportunities for members of their minority group.²¹ The minority employee is extremely visible and scrutinized, yet feels professionally invisible because his or her actions are interpreted through a race or gender lens as opposed to a professional lens. For women of color in technology, these pressures can be especially acute as they are a double minority.

Absence of role models. A scarcity of role models reinforces stereotypes of technology as a white field — students and employees of color see few role models in the higher echelons of the field, getting a message that they do not belong as a minority. There are especially few role models in computing fields for women of color.²²

Scarcity of mentors. Mentoring is a key determinant of retention of women and underrepresented minorities in computer science and engineering.²³ Yet the scarcity of role models leads to fewer mentoring opportunities for minority men and women, as mentors tend to seek protégés who resemble them in background, race, and gender.²⁴ At the high school level, teachers and school counselors also tend to reinforce stereotypical assumptions tied to race and gender, discouraging underrepresented students to enter technology fields.²⁵

Isolation. Because they are often “the only one,” isolation extracts a large toll on women and underrepresented minorities in computer science and engineering.²⁶ In small schools, universities, or companies, men and women of color are often the lone African-American, Hispanic, or Native American in their organization; in larger organizations, they are often one of just a handful in technology fields. In either case, they may feel isolated or left out, causing them to be less engaged and less motivated to continue studies or remain within their institutions. Women from underrepresented minority backgrounds are especially isolated.²⁷

Lack of access to influential social networks. Network ties, especially ties created by professional relationships, are critical to career opportunities and advancement because they create social capital,²⁸ a principle that has been shown to apply to high-technology fields.²⁹ However, minorities in the workplace experience exclusion from important social groups at work³⁰ — this is especially acute for women of color.³¹ Employees of color who break through barriers have been shown to counter this trend through strong mentoring relationships and strong networks.³²

Non-inclusive practices. School, universities, and companies tend to re-create social inequality through organizational practices that are non-inclusive.³³ At the university level, the computer science curriculum is often found non-inclusive to minority students.³⁴ In the workforce, there is a large body of literature on the ways in which workplaces are organized around and support white men’s work styles and life cycles, even those that appear to be meritocratic.³⁵ Biased hiring, promotion, evaluation practices and salary levels are common across organizations.³⁶ Organizations engage in “homosocial reproductions” and tend to evaluate people on the same criteria as the existing senior managers — thus minorities and women become evaluated in terms of “white upper-middle class men” criteria.³⁷ Similarly, the criteria used in hiring and retaining workers is heavily dependent on existing organizational composition.³⁸ Discrimination is often subtly built in organizations — for example, leadership and power are often construed in terms of one’s ability to direct other’s behavior, a trait that people usually associate with white men, as opposed to construing leadership in terms of one’s ability to achieve consensus or to listen, a trait that is most often associated with women and minorities. These

stereotypical assumptions become built in employee evaluation practices and set the conditions under which employees can advance, and disadvantages women and underrepresented minorities by re-enforcing power inequality in organizations.³⁹ Many hiring and evaluation practices based on “elite” networks and signals are used in corporations and disadvantage diverse candidates.⁴⁰ Newer so called “merit-based” evaluation practices reinforce gender and ethnicity bias in organizations over time, whereby different salary increases are given for equally performing individuals, along race and gender lines (where white and male employees receive higher compensation for equal work than women and minorities).⁴¹ Indeed, minority employees are significantly more likely to perceive that organizational values and practices are unfair.⁴² Non-inclusive organizational practices sends a message that diversity isn’t truly valued by an organization. The absence of well-managed diversity initiatives can lead to frustration and turnover for women and people of color.⁴³

About this report

The sample in this report consists of 1795 respondents from seven high-technology companies working in technical positions, across each companies’ technical job functions. Detailed methodology on sample selection, survey design and administration, and data analysis and statistical methods can be found in a previous publication, “Climbing the Technical Ladder”, where we document barriers and solutions for technical women.⁴⁴

For the purposes of this report, underrepresented minorities include those respondents who self-identified their ethnicity as: African-American/Black; Hispanic/Latino, Native American, or Native Hawaiian/Pacific Islander.⁴⁵ We include both single race and multi-ethnic respondents in our definition.

Race has been understudied in organizations, especially in the private sector. Very little is known about technical men and women of color in science and engineering positions in industry, the barriers they encounter, and more importantly what companies can do to retain and advance them. The goal of this report is to start painting a picture of underrepresented minority technical talent and propose solutions that can make a difference in their career success. It is our hope that this report will spur additional research on the topic and initiate a dialogue within companies about the practices that make a difference to diverse technical employees.

The report first describes the current state of representation of men and women of color in high-technology companies, then describes their work values and self-perceptions. Finally, we highlight the practices that they seek from companies and that are most important to their retention and advancement.

A Portrait of Technical Underrepresented Minorities in the High-tech Industry

Underrepresented minorities represent 27% of the US population,⁴⁶ 18% of Bachelor's degrees in computer science, and 12% of engineering degrees. However, these numbers do not translate into double digit representation in Silicon Valley high-technology companies.

In our sample, only 6.8% of technical employees are underrepresented minorities.⁴⁷ Furthermore, once we look at where these minority employees are along the technical career progression, we find very few in high-level positions.⁴⁸

Gender and underrepresentation on the technical track

6.1% of technical men and 8.2% of technical women in Silicon Valley high-tech companies are underrepresented minorities. Representation at the highest levels of the technical ladder is especially poor for women of color.

The proportion of African-American technical women goes from 4.6% at the entry level to 1.6% at the high level.

Chart 1a. Proportion of underrepresented minority employees in technical positions by rank level

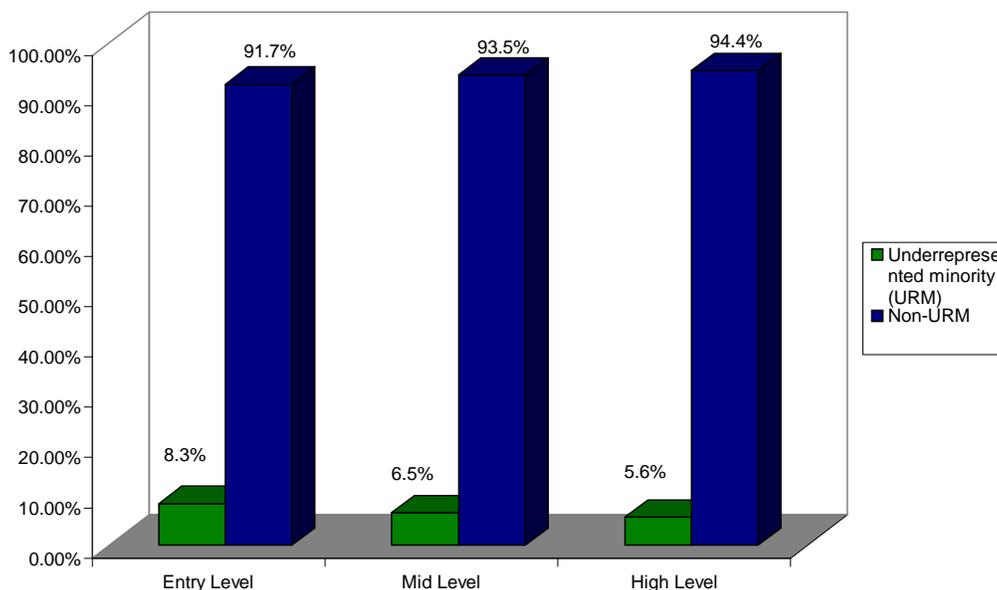


Chart 1b. Proportion of African-American/Black technical employees by gender and rank level

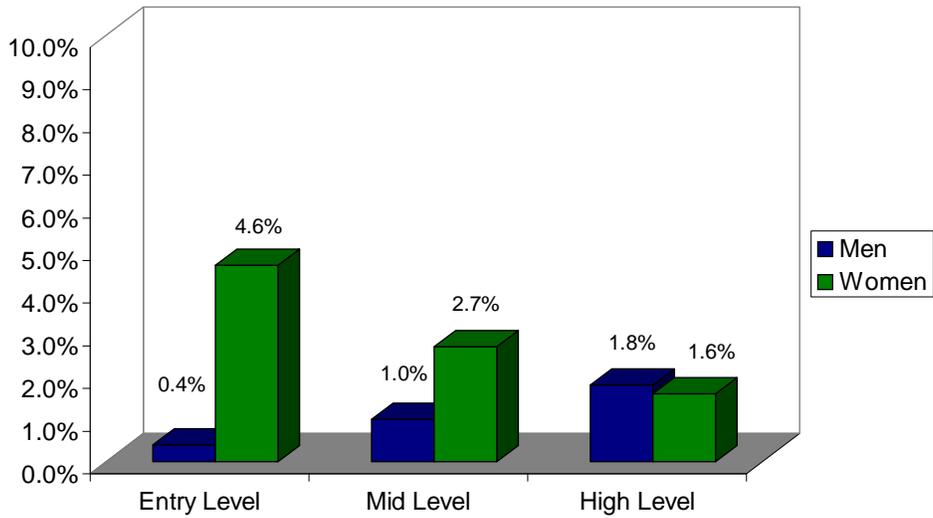
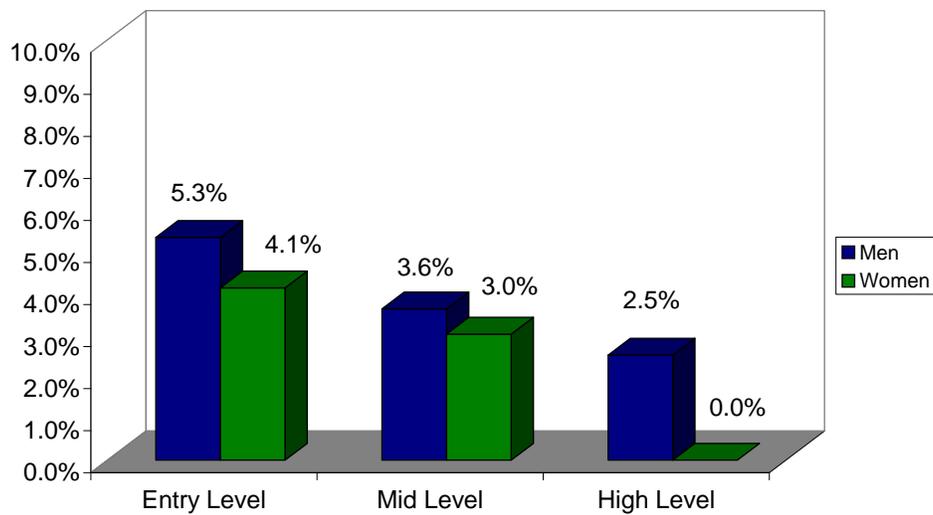


Chart 1c. Proportion of Hispanic/Latino/a technical employees by gender and rank level



The proportion of Latina/Hispanic women goes from 5% at the entry level to 0% at the high level.

The absence of underrepresented minority women in high-level technical positions is alarming for several reasons:

- Companies are losing on the benefits of gender and ethnic diversity in decision-making, as diverse teams tend to make better decisions and generate more innovation.
- Minority job candidates look for companies who model diversity at the top.⁴⁹ A lack of ethnic diversity at the top ranks of an organization leads to further difficulties in recruiting and retaining talent from ethnic minority backgrounds, further compounding the problem.
- A lack of role models is a critical factor in the career choice of young girls and early career women. For instance, given that the Hispanic population is projected to represent 30% of the US population by 2015, an absence of role models

Prior Research: Slower advancement tracks for underrepresented minorities

Organizational behavior scholars David Thomas and John Gabarro conducted an in-depth study of three large US corporations on the topic of minority advancement.³² They found that far from a color blind meritocracy, there is an implicit two-tier advancement system in companies whereby promising white talent is advanced at a much faster pace than minority talent. High-potential white employees move into middle management faster than high-potential underrepresented minority employees, who have to wait several more years to reach the midlevel. At the midlevel, minority employees catch up in experience, but typically have to wait another 15 years before they attain executive positions. This unequal playing field, fueled by unconscious bias and stereotyping, was identified as a critical cause for the loss of minority talent. The key to dampen the loss and keep minority talent engaged and advancing despite barriers: mentoring, which will be discussed further in Section 3.

is likely to perpetuate the problem of under-representation of Hispanic/Latina women in technology and cause a significant disconnect between those designing technology and those using it, further leading to lost opportunities for companies.

- US prominence in science and technology has been seriously undermined in recent years due to the decreasing enrollment of students in computer science. The US workforce as a whole cannot remain competitive unless it leverages the talent of women and under-represented minorities in STEM disciplines.

Age and Technical Experience

We find no difference between underrepresented minority and other employees in terms of age, years of experience, and number of years spent at the organization.

When looking at gender differences among underrepresented minorities, we find no statistically significant differences on the above variables, except for years of technical expertise, where underrepresented women report an average of 12.27 years, compared to underrepresented men’s 15.62 years. This is consistent with the findings of our previous research, where technical women had fewer years of experience on average than technical men — this finding is partly attributable to the fact that experienced technical women are leaving companies at a greater rate than men, thus decreasing the average years of experience of respondents.⁵⁰

Age and experience of technical employees by underrepresented minority status

	Underrepresented Minority	Others
Mean Age	40.6	41.4
Mean years since degree	14.1	15.2
Mean Years of technical expertise	14.4	15.8
Mean Years since Hire	9.05	8.06
Mean Years in position	4.01	4.07

Educational Background

Related to the dearth of underrepresented minorities in computer science and engineering academic fields, there are significant differences in educational background between underrepresented employees and other technical employees.

Non-minority technical employees are more likely to hold a PhD and a master's degree than underrepresented minority technical employees. These data are consistent with national trends. The educational gap for underrepresented minorities has been well documented, and women and men of color face significant barriers in accessing higher education. The disparity starts at the K-12 level. Minority youth are more likely to come from low-income households, and lack access to high quality education.⁵¹ This inequality is perpetuated through the educational system⁵² – at the higher education level, whites are 3 times more likely than Hispanics to have earned a bachelor's degree by the age of 29, and twice as likely as African Americans.⁵³

Technical employees in this sample have a significant level of human capital – this concentration of underrepresented minority human capital is important to note given the history

of unequal access to higher education for minorities in the US: **77% of underrepresented respondents working in these high-tech companies have a bachelor's degree or higher, while only 12.5% of Hispanics and 17.3% of African Americans earn a bachelor's degree or higher in the US, compared to 29% of whites and 50% of Asians.** Similarly, over 30% underrepresented respondents in our sample have a graduate degree, compared to only 3.9% of Hispanics and 5.9% of African Americans in the general US population.⁵⁴

Among underrepresented technical employees, we find no statistically significant difference between the educational attainment of men and women.

Field of highest degree

When looking at the field of highest degree, we find that 63.8% of underrepresented minority technical employees are from the more traditional technical fields computer science and engineering, compared to 72.3% of non-minority employees.⁵⁵

Among underrepresented employees, we find that this tendency to have a non-technical degree is more marked for women. That is, **technical women who are from under-**

Chart 1d. Highest degree of technical employees, by underrepresented status

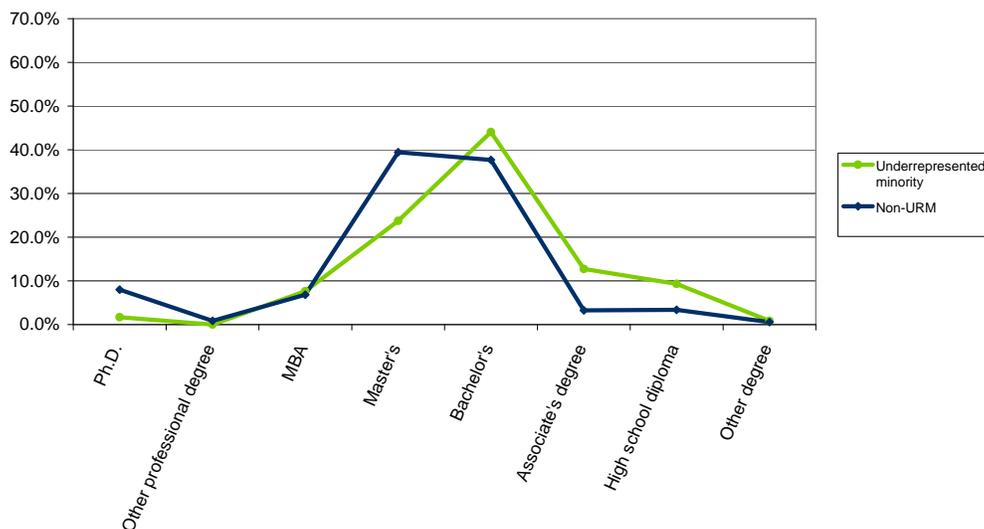
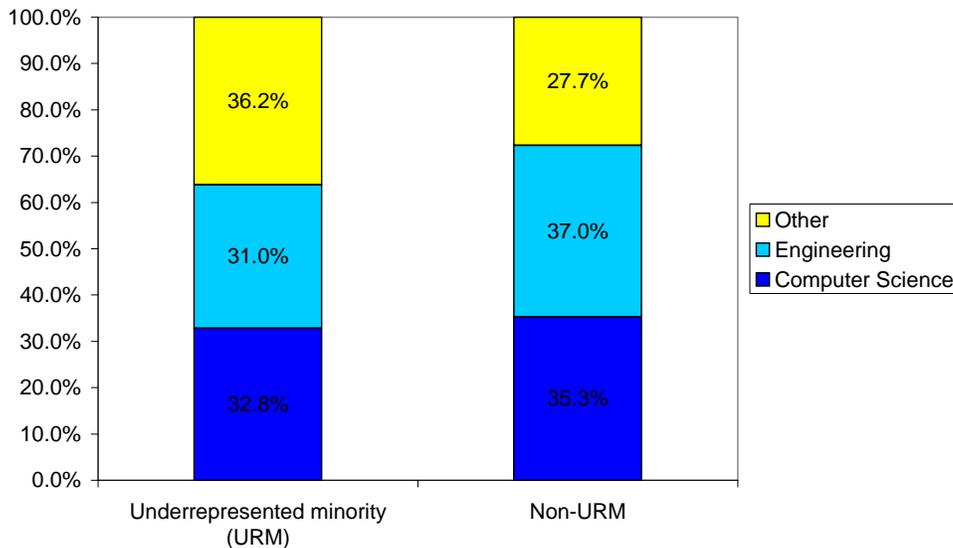


Chart 1e. Field of highest degree among technical workers by under-represented minority status



represented minority backgrounds are significantly more likely to have a degree from a discipline outside engineering and computer science (48.9%) than are underrepresented technical men (27.5%).

This finding confirms that women of color are more likely to come to technology careers through alternative fields. Given that women from underrepresented minority backgrounds represent 6% and 3% of computer science and engineering bachelor's degrees, respectively, the fact that they are likely to come to high-technology work through alternative educational pathways is not surprising. However, this finding holds a significant implication for high-tech companies: if companies require a technical degree for advancement, women of color are at a significant disadvantage. Companies that are concerned about the advancement of under-represented minority women need to account for diverse educational backgrounds in recruiting and evaluation practices.

Family

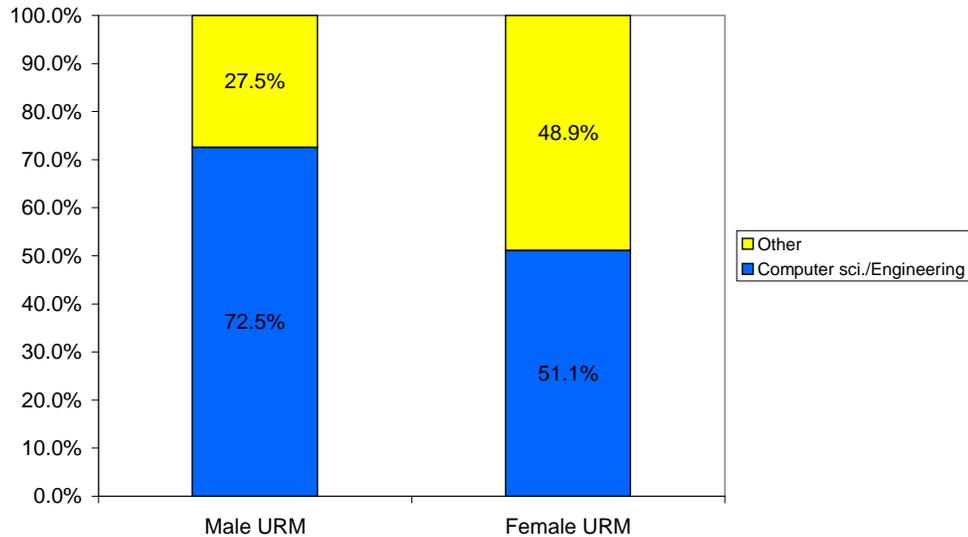
The family composition of technical women compared to their male peers has been shown to affect the retention and advancement of technical women.⁵⁶ How do family configurations affect men and women of color in high-technology? Here, we address the family configurations of women and men from underrepresented minorities.

- Under-represented technical employees have families in the same proportion as non-minority employees. 64.7% of technical women and men of color have children, compared to 67.2% of non-minority technical men and women. We find no difference in the ages of children.
- 59.6% of underrepresented minority technical women have children, compared to 68.1% of underrepresented minority men.⁵⁷

Partner status

- A vast majority of technical employees across race and gender are partnered. However, we find that technical men

Chart 1f. Field of highest degree among under-represented technical workers by gender



and women of color are significantly more likely to be single than their colleagues.

- **This difference is largely due to a significant gender difference in partnership status among underrepresented technical employees.**

Indeed, we find that underrepresented minority women are significantly more likely to be single (42.6%) than are underrepresented men (15.7%).⁵⁸

This finding is consistent with our previous research — technical women in general are more likely to be single than technical men.⁵⁹ However, this difference is even more marked for underrepresented minority technical employees ($p=.001$).

Partner characteristics

There is a significant discrepancy along gender lines among underrepresented minority employees when it comes to partner characteristics, consistent with our previous research.

Partnered women of color are 2.3 times as likely to have a partner who works full time as men of color do. Furthermore, underrepresented minority men are over 5 times more likely than underrepresented women to report that their partner has primary responsibility for the household and children. This difference has significant consequences for technical women of color in terms of work-life balance.

Companies concerned with the retention of technical women of color need to pay attention to their company culture in terms of inclusive practices for employees with different family configurations. Technical women of color are in dual-career couples — this reality should be acknowledged by companies through practices that support the family realities of technical women.

Chart 1g. Partner status of technical workers by underrepresented minority status

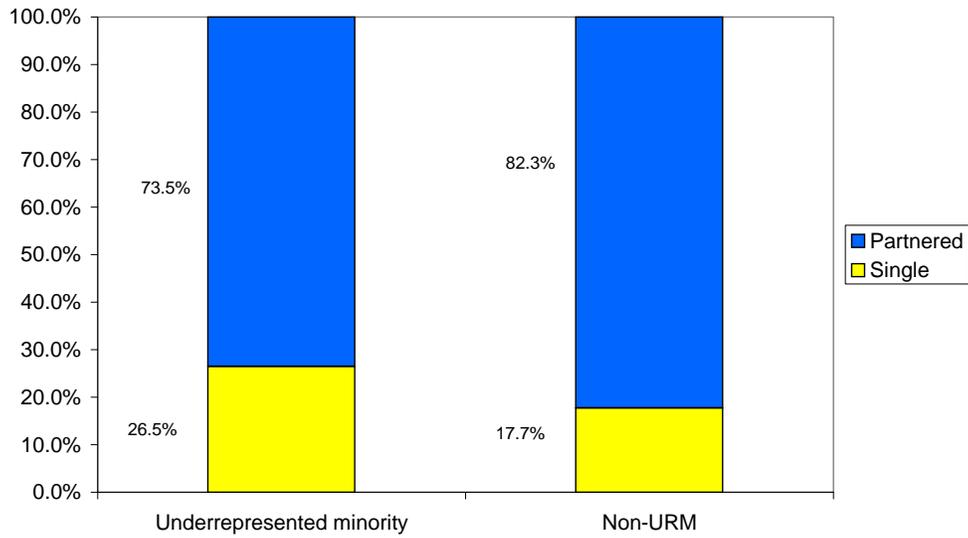


Chart 1h. Partnership status among underrepresented minority technical workers by gender

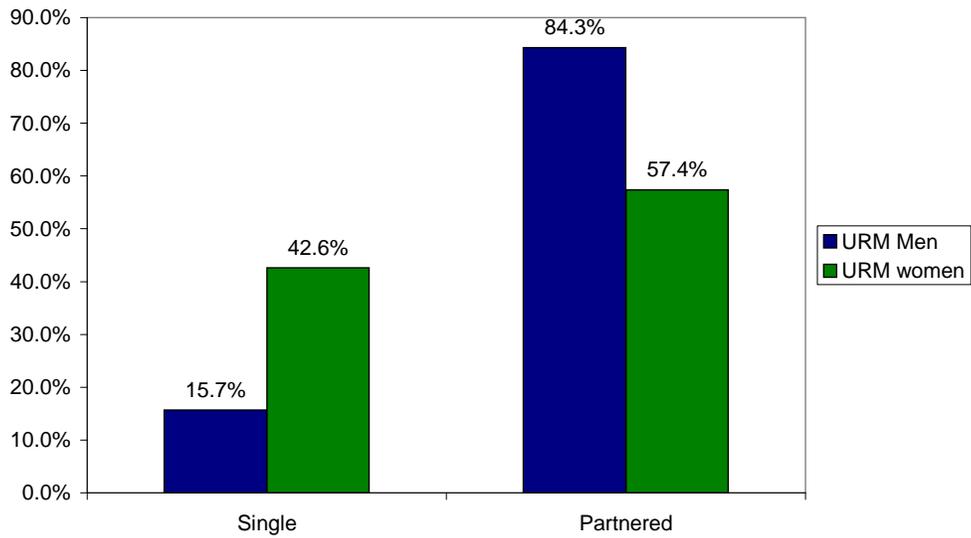
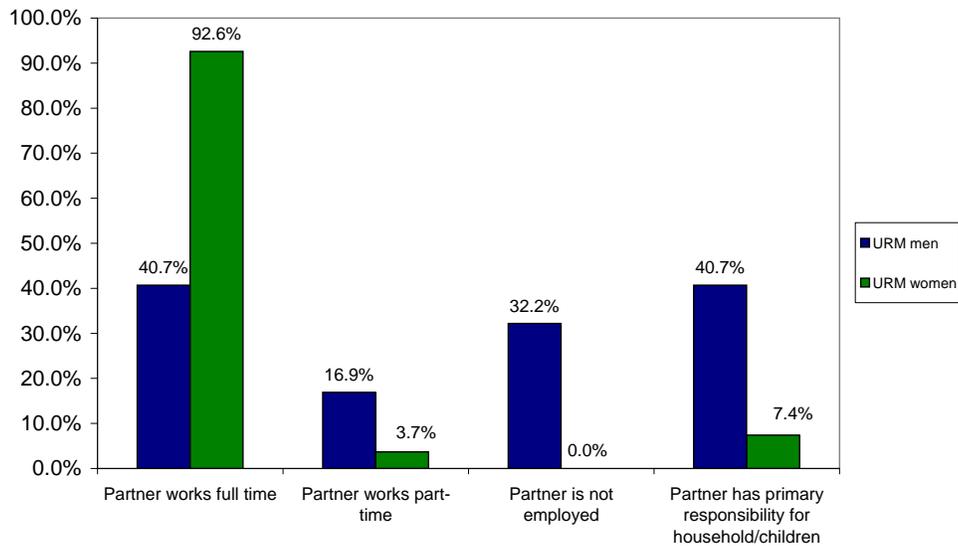


Chart 1i. Household characteristics of partnered underrepresented minority technical employees, by gender



Conclusion

- 1) **The level of under-representation of African-American/Black, Latino/Hispanic, and Native American/Native Hawaiians in technical positions in leading high-technology companies in Silicon Valley is alarming.** This is likely to limit companies' ability to innovate and create new products for a significant portion of the user population. Such low numbers suggest that underrepresented employees are likely to suffer from significant isolation and a lack of access to mentors.
- 2) **Women of color suffer from a double-dose of underrepresentation.** They represent less than 2% of high-level technical positions. Despite our sample being collected in California, a state with a significant Hispanic/Latino population, we found no Hispanic women in high-level technical positions.
- 3) **There is educational disparity between under-represented employees and majority employees.** Underrepresented technical employees boast significant levels of human capital with 77% holding a bachelor's degree or above. However, they are less likely to hold a graduate degree than non-minority technical employees.
- 4) **Women of color are significantly more likely to come to high-technology through degrees outside of computer science and engineering.** This finding has important implications for companies.
- 5) **A majority of technical employees are partnered** — however, underrepresented women are significantly more likely than underrepresented men to be single.
- 6) **Underrepresented technical men are 5 times more likely than underrepresented technical women to report that their partner has primary responsibility for the household and childcare. Women of color are more**

than twice as likely than underrepresented men to have a partner who works full time. These patterns have serious consequences for underrepresented women in terms of juggling work and family and meeting company expectations around face-to-face availability.

Recommendations

- 1) **Know your numbers.** Managers should be aware of the current proportion of underrepresented minorities in the organization, at different levels. Research has shown that women and minorities tend to be confined to lower paying jobs or roles that are viewed as less “valuable” in an organization.⁶⁰ In technology-centric organizations, the “value core” is often perceived as residing within the technical positions. If women and minorities are consistently underrepresented in technical positions and in higher level positions on the technical track, a strong message is sent to diverse talent about whether the organization truly values diversity.
- 2) **Be aware of the plight of the minority.** Research shows that being in a numerical minority in an organization or a group (under 15%) heightens that group’s visibility, thereby subjecting it to more stereotyping by the majority group.⁶¹ This leads to higher turnover for minorities. The greater the representation of the minority group, the less likely stereotyping is likely to occur.⁶² Being aware of the social dynamics that occur for minority groups in an organization is critical to address the negative effect of bias in the workplace.
- 3) **Diversify pathways for advancement.** A central focus for companies who wish to retain underrepresented minority technical talent is to examine the current pathways for advancement in technical positions. For example, can employees be promoted if they have accumulated industry experience and accomplishments but do not hold a graduate degree? If advancement is contingent on holding a graduate degree, underrepresented employees will be at a disadvantage for promotion. If after reviewing criteria for promotions, the company decides that a graduate degree is still required, invest in promising employees who do not hold such degrees by offering tuition reimbursement programs. Similarly, examine the prerequisite field of degree for advancement — if promotions are contingent on holding a computer science or engineering degree, women of color will be at a significant disadvantage. Consider diversifying the pathway for advancement based on technical expertise and experience, and invest in the technical development of promising employees.
- 4) **Diversify the executive and senior technical ranks.** One of the most powerful signaling mechanisms for companies who claim to celebrate diversity is the making of their executive and director ranks. Diversity has been shown to breed diversity in terms of advancement, as well as in recruitment.⁶³ Existing and prospective technical employees can see a company’s commitment to diversity by looking at their leadership ranks. An absence of diversity at the top sends the message that there is no path for advancement for underrepresented employees.
- 5) **Examine hiring and promotion practices for bias.** Formal hiring mechanisms are less likely to represent unconscious bias toward race and gender, whereas hiring mechanisms that rely solely on social networks tend to reproduce gender and race inequality⁶⁴ — people tend to refer others who are like them in race, gender and backgrounds.⁶⁵ Bias also comes into play when it comes to promotions. Consider using objective and blind measures for hiring and promotions.
- 6) **Diversify hiring teams.** In order to overcome potential bias in hiring, create diverse hiring teams. Research has shown that women and minorities on hiring teams help offset hiring inequality.⁶⁶
- 7) **Family configurations lead to significant work-life challenges.** Similar to the majority of technical women, women of color in technology face different family configurations from their male colleagues and are more likely to encounter work-life challenges.



These gender differences are even more marked for underrepresented minority employees. In order to recruit, retain, and advance underrepresented technical women, companies need to establish sound practices conducive to addressing family needs, such as flexibility, telecommuting, part-time work options, and parental leave.

Perceptions of Success and Work Values

Understanding the core values of the technical workforce is critical for organizational competitiveness; retention is contingent upon knowing what employees want, what their professional values are, and how they perceive themselves. In this section, we examine whether there are differences in the perceptions of success and work values of underrepresented minority employees compared to their peers.

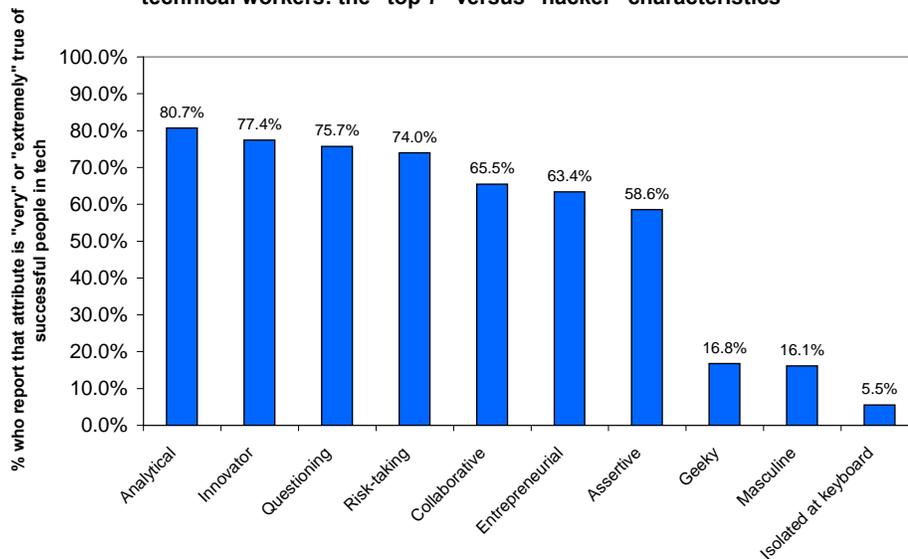
Our survey asked respondents to rate several attributes in terms of how important they are to being successful in a technical career. Our data present a picture of success that goes against the stereotypes of isolation and obsessiveness of the computer

and engineering worker. Rather, the top attributes of successful people in technology, according to respondents, are being analytical, innovator, questioning, risk-taking, collaborative, entrepreneurial, and assertive.⁶⁷

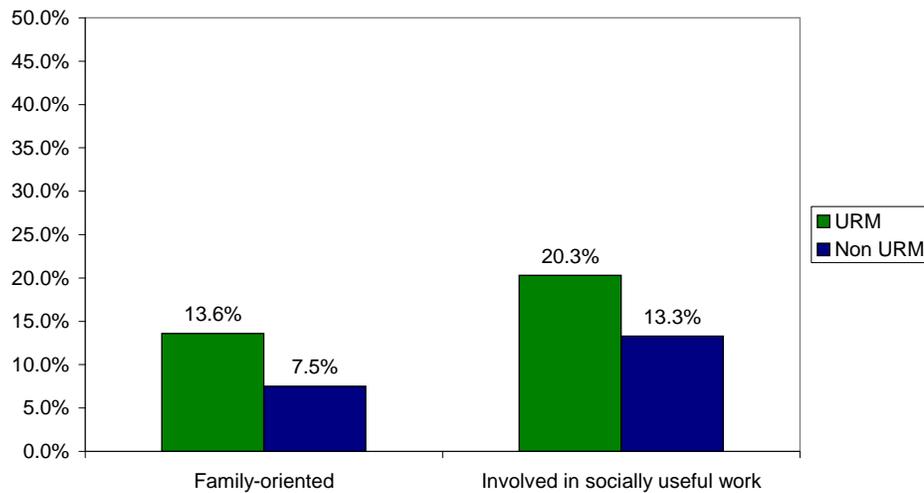
There is no overall difference in the perceived importance of these top attributes when comparing underrepresented technical employees to other employees. That is, all technical workers, regardless of ethnicity, perceive the above attributes as the important.

We find a statistically significant difference on two attributes of success: being family-oriented, and being involved in socially

Chart 2a. Attributes of successful people in technology according to all technical workers: the "top 7" versus "hacker" characteristics



**Chart 2b. Attributes of successful people in technology:
family-oriented and involved in socially useful work,
by underrepresented status**



useful work. Even if these attributes are not perceived as very true of successful people of technology by most respondents, **underrepresented minority respondents are significantly more likely to perceive that being family-oriented (13.6% vs 7.5%) and being involved in socially useful work (20.3% versus 13.3%) are attributes of success.**

The perspective of underrepresented minority technical talent is therefore a critical component of changing the image of computing as a profession which isn't compatible with family life and social impact, images that have been shown to deter women and underrepresented minorities from entering the field in the first place.⁶⁸ A greater proportion of underrepresented technical workers see success in technology as compatible with values of family and social impact.

When we look at how technical employees perceive themselves on such attributes, we find no difference by minority status for 4 of the top attributes — that is, **underrepresented minority technical employees are as equally likely to see themselves as being analytical, innovator, questioning, and collaborative as their peers.**

On other top attributes, however, self-perceptions differ for underrepresented minority employees. While all respondents tend to score themselves lower than the ideal of success on these top attributes, **underrepresented minority respondents are significantly more likely to perceive themselves as being assertive, risk-taking, entrepreneurial, and working long hours than are non-minority respondents. They are also more likely to perceive that they are involved in socially useful work as technical employees.**

Although previous research found that technical women in general were less likely than technical men to perceive themselves as entrepreneurial,⁶⁹ we find no such significant difference between underrepresented minority men and women.

The picture emanating from these data is one of self-confidence. Underrepresented men and women in technology are likely to have faced significant barriers on the road to industry positions and see themselves as possessing the attributes they deem are critical for advancement.

Chart 2c. Self-perception of technical workers by minority status, select top attributes

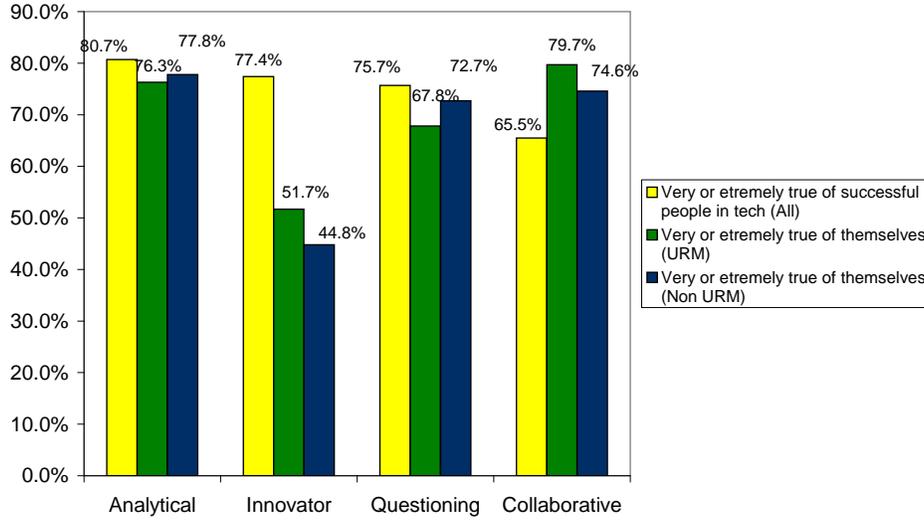
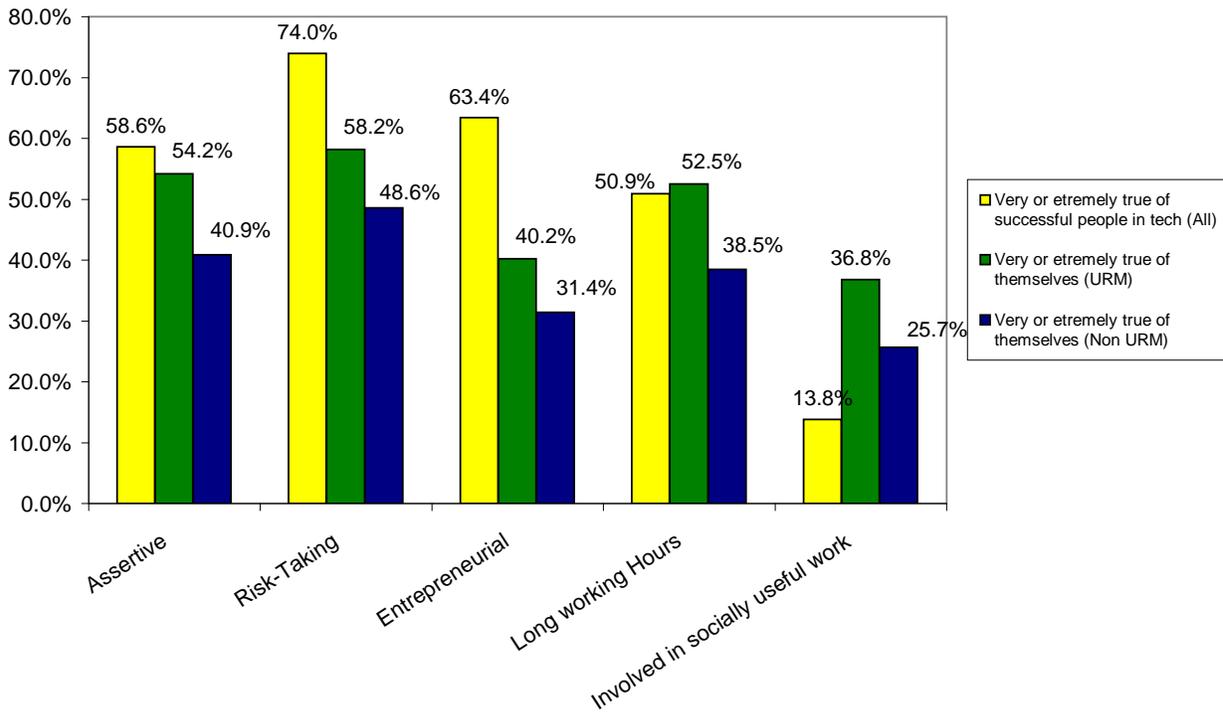


Chart 2d. Self-perceptions of technical employees on select attributes by underrepresented status



The Importance of Confidence

Our data show that underrepresented minorities in technical positions perceive that they possess the attributes necessary for success. Previous research has shown that this self-perception is critical to minority success:

“Confidence, or self-confidence, may be the most important... Confidence includes belief in one’s own past achievements, current competence, and future ability to succeed ... Confidence is experienced as a sense of internal security that bolsters one’s capacity to ward off doubts, to withstand attacks on one’s credibility, and to maintain a self-concept that is relatively immune to the self-fulfilling effects of stereotype. Minorities typically need an extremely high level of confidence to rise all the way to the executive level”

– Thomas and Gabarro, 2001, p.116 ³²

However, while they feel like they possess the attributes of success, underrepresented employees are clearly absent from leadership positions in technology, and as will be discussed in the next section, are disproportionately looking to leave their employers.

Research has shown that minority employees are likely to feel stuck and passed up for advancement, leading to turnover.⁷⁰ This is echoed by the practices our respondents point as most important to them in the next section — practices that are squarely focused on advancement.

Work Values

Regardless of race and ethnicity, technical employees most value innovation, team work, working with cutting-edge technology, and being valued for their technical expertise.

At the top of the list of work values is the opportunities to upgrade technical skills — we find that this value is significantly higher for underrepresented technical employees,

although it is among the top values for majority employees as well (93.2% versus 84.3%).

We find no other statistically significant difference in the work values of technical employees along race and ethnicity and no gender differences among underrepresented minority respondents.⁷¹

Respondents were also asked to rate the importance of various priorities at this point in their careers — we find that the dual priority of work (financial rewards, challenging work, updating technical skills, and career development) and family (family, marriage/partnership) are prevalent across race and ethnicity; however, underrepresented respondents were significantly more likely to focus on the following priorities:

- **Employees of color are significantly more likely to report that earning money is an important priority than were non-underrepresented minority respondents (94.8% versus 86.5%).**
- **Career development and challenging work are more likely to be important to underrepresented minority respondents than non-minority respondents (81.2% versus 69.4%).**
- **Job security is more likely to be marked as important to underrepresented technical employees (60.7% versus 55.8%).**

In the absence of opportunities for advancement, technical men and women of color are likely to leave their organizations.

Underrepresented Women

The above career priorities are generally similar for underrepresented men and women in our sample; we find the following point of difference: underrepresented men are significantly more likely to report that marriage/partnership is important to them (87.1%) at this time in their career than are underrepresented minority women (68.1%). This is consistent with the finding that women of color were significantly more likely to be single.

PART 2: PERCEPTIONS OF SUCCESS AND WORK VALUES

Chart 2e. Work values of technical employees by underrepresented status

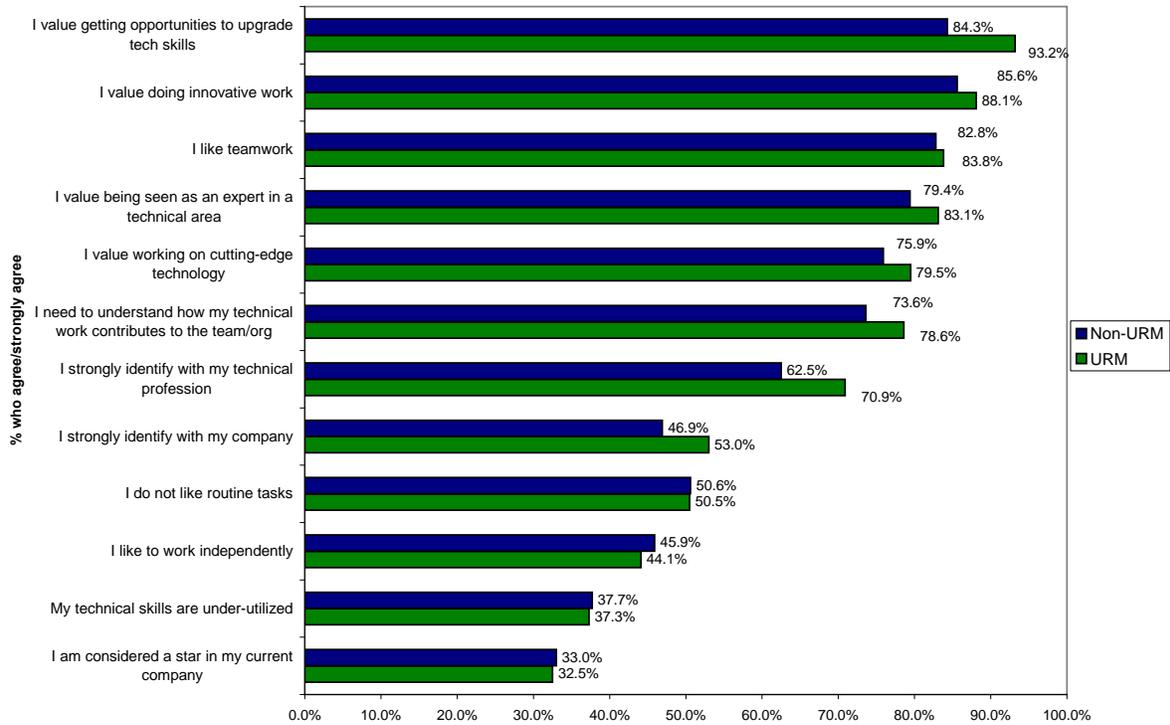


Chart 2f. Priorities: at this point in your career, how important is... by underrepresented status

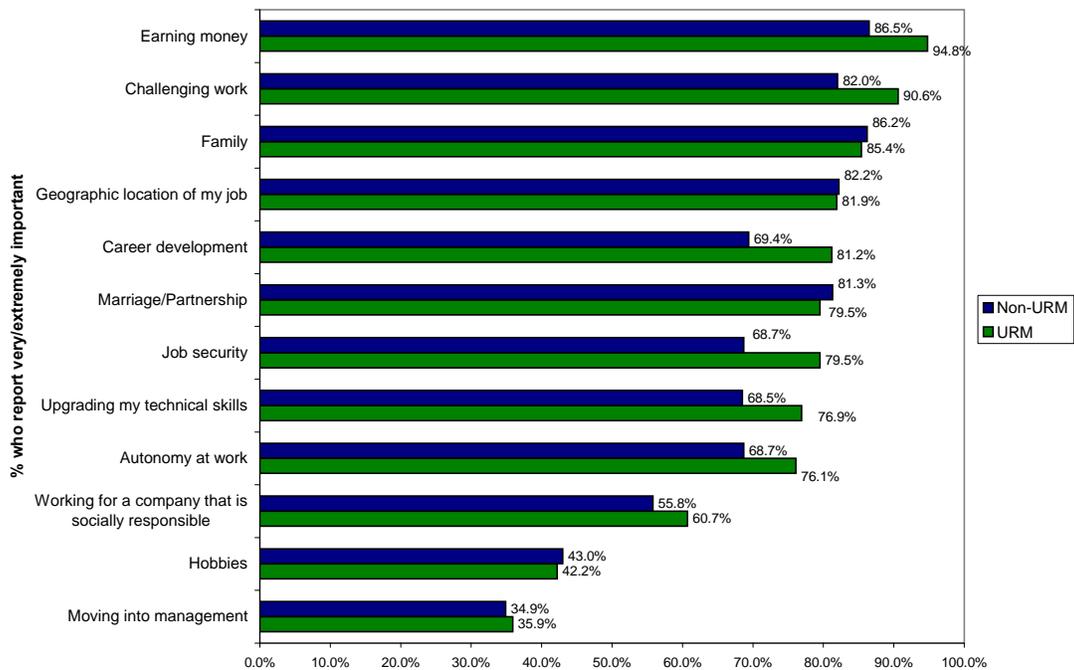
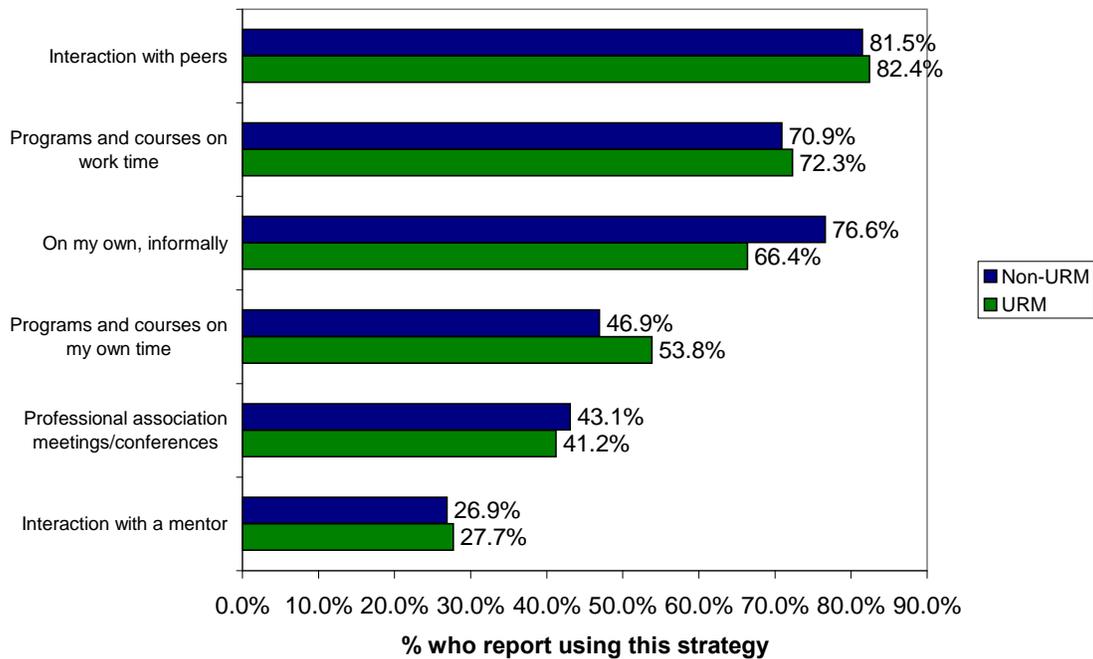


Chart 2g. Strategies to update technical skills, by under-represented status



A Critical Priority: Updating Technical Skills

In previous research, we documented the prime importance that technical women and men place on opportunities to update their technical skills. We find here that it is an even more significant concern to underrepresented employees. When asked how they update their technical skills, we find that most employees update their skills through interaction with peers, programs and courses on work time, and informally on their own. We find, however, that **non-minority technical employees are significantly more likely to update their skills “on their own”**. **When investigating this further, we find that this is directly attributable to a gender difference among underrepresented employees.**

Indeed, underrepresented men and women differ in how they update their technical skills on one dimension — how likely they are to report updating their technical skills on their own time. This finding is consistent with our previous research where this difference was shown between technical men and women.⁷²

This finding is suggestive of the gender imbalance in family configurations depicted in chapter 1 — technical women are significantly less likely to have a partner who takes care of the family and household and 92% of under-represented women are in a dual-career couple, compared to only 40% of underrepresented men.

Therefore, companies can especially benefit in the areas of retention and advancement of employees of color from opportunities to update technical skills — these opportunities are likely to benefit all technical employees, but will make an especially important impact on women of color since they are less likely to have a technical degree and are more likely to suffer from dual-career challenges.

Challenges to Updating Technical Skills

The biggest challenge cited by technical employees in updating their technical skills is a lack of time, due to work and family commitments.

Chart 2h. Strategies to update technical skills among underrepresented minority respondents by gender

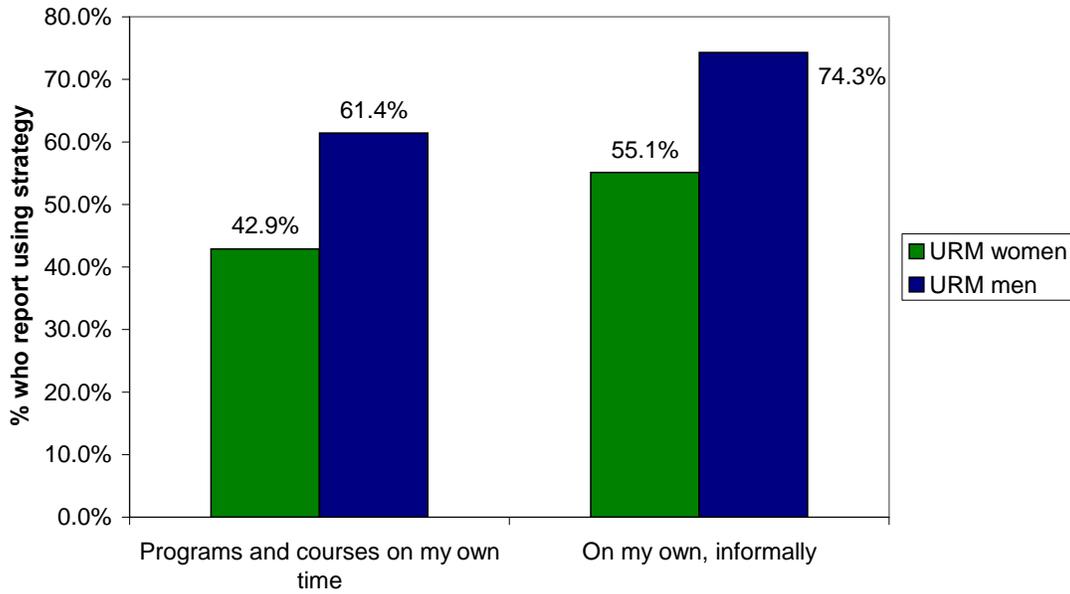
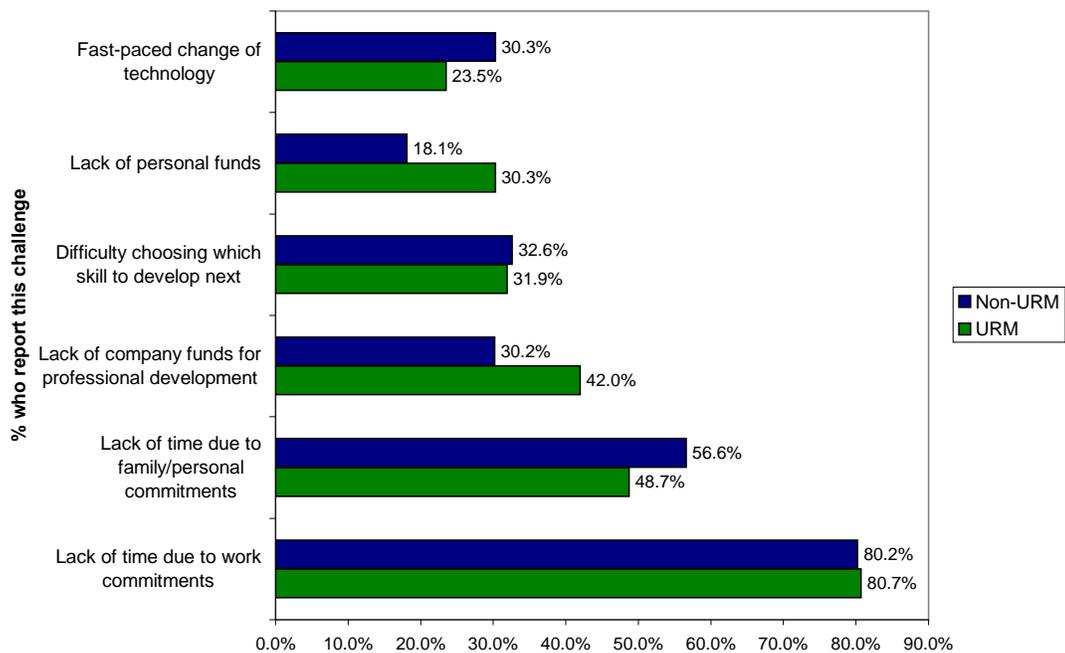


Chart 2i. Challenges to updating technical skills, by minority status



Employees of color are significantly more likely to cite lack of funds as a barrier to updating their technical skills — indeed, they are more likely to cite a lack of company funds (42% versus 30.2%) and lack of personal funds (30.3% versus 18.1%). Companies investing in their technical workforce are likely to experience significant retention and advancement benefits.

Opportunities to develop technical skills — why cutting development doesn't make sense in economic downturns

The data in this report and in *Climbing the Technical Ladder* have shown that technical employees are squarely concerned with updating their technical skills.

In “The Human Equation,” Stanford Business Professor Jeffrey Pfeffer shows how cost cutting in human capital assets, including training cuts and layoffs, leads to a downward spiral of organizational performance, where the best talent leaves and the organization is forced to further cut costs: “training is often seen as a frill in many US organizations, something to be reduced to make profit goals in times of economic contingency” (p.86). Pfeffer identifies extensive training as a central part of high commitment management practices, which have been demonstrated to significantly increase shareholder return.⁷³ In economic downturns, cutting back on opportunities to update technical skills can lead to serious consequences for organizations’ abilities to retain diverse technical talent.

Conclusion

- 1) **The top attributes of successful people in technology, according to respondents, were being analytical, innovator, questioning, risk-taking, collaborative, entrepreneurial, and assertive.** We find no difference by minority status for four of the top attributes — that is, technical employees who are underrepresented are equally likely to see themselves as being analytical, innovator, questioning, and collaborative as their non-underrepresented peers.
- 2) **Being family-oriented and engaged in socially useful work are not generally seen as critical factors of success.** This disconnect is likely to discourage women and member of underrepresented minorities from pursuing leadership positions. **However, underrepresented minority technical employees are more likely to see those attributes as factors of success than are non-minority technical employees.** Underrepresented minority perceptions on attributes of success are important to re-shaping a dialogue of how success is defined and perceived in high-technology.
- 3) **Underrepresented technical employees are more likely to perceive themselves as possessing the key attributes of success when it comes to being assertive, entrepreneurial, risk-taking, and working long hours.**
- 4) **Although it is a top priority for all technical workers, opportunities for updating technical skills is the top value of underrepresented minority technical employees.** Innovation and teamwork also rank high for all respondents.
- 5) **Women of color are significantly less likely to report that they update their skills on their “own time”,** consistent with the differences in family configurations whereby they are less likely to have a partner who shares primary responsibility for the household and the children.

- 6) **The top barriers to updating technical skills are lack of time due to work and family commitment,** regardless of race and ethnicity. However, employees of color are more likely to cite a lack of company or personal funds as significant barriers to updating their technical skills.
- 7) **Employees of color are significantly more likely to report that earning money, career development, challenging work, and job security are an important priority.**

Recommendations

- 1) **Create a culture of employee development.** Underrepresented technical employees see themselves as possessing the critical qualities for success at a greater rate than non-minority employees, and yet they are almost absent from higher level positions on the technical track. Providing clear pathways to advancement as well as ongoing opportunities for mentoring and technical skill development is critical. As discussed in Chapter 1, underrepresented minorities come in at an educational human capital disadvantage on the technical ladder, and companies' investing in their ongoing education and technical development is critical to their advancement.
- 2) **Ensure that funds for technical development are equitably distributed.** A lack of funds was more likely to be cited by employees of color for updating technical skills. In a context where these underrepresented employees place the highest value on opportunities to update their skills, companies can ensure that the funds available for such development are distributed equitably and reaching all the eligible employees.
- 3) **Provide opportunities to develop technical skills on company time.** Technical women, regardless of race, are less likely to report developing technical skills on "their own time". A majority of technical women are in dual-career households and are significantly less likely than are men to report that their spouse has main responsibility for the household and children.
- 4) **Invest in practices for advancement.** Underrepresented minority talent is significantly more concerned with career development, obtaining challenging work assignments, and job security. Companies that take the long-view in developing and advancing minority employees, and invest in the practices discussed in the following section, are likely to benefit from enhanced diversity.



Retaining and Advancing Underrepresented Minority Men and Women

As we argued in previous research, high-technology companies can significantly increase retention and advancement by investing in the right practices. High-tech companies are known for extensive benefits and “perks” such as morale and leisure activities and free meals. While these are undoubtedly appreciated by high-tech employees, **the practices that matter most to technical men and women of color pertain to advancement.**

Top company policies for underrepresented minority technical employees

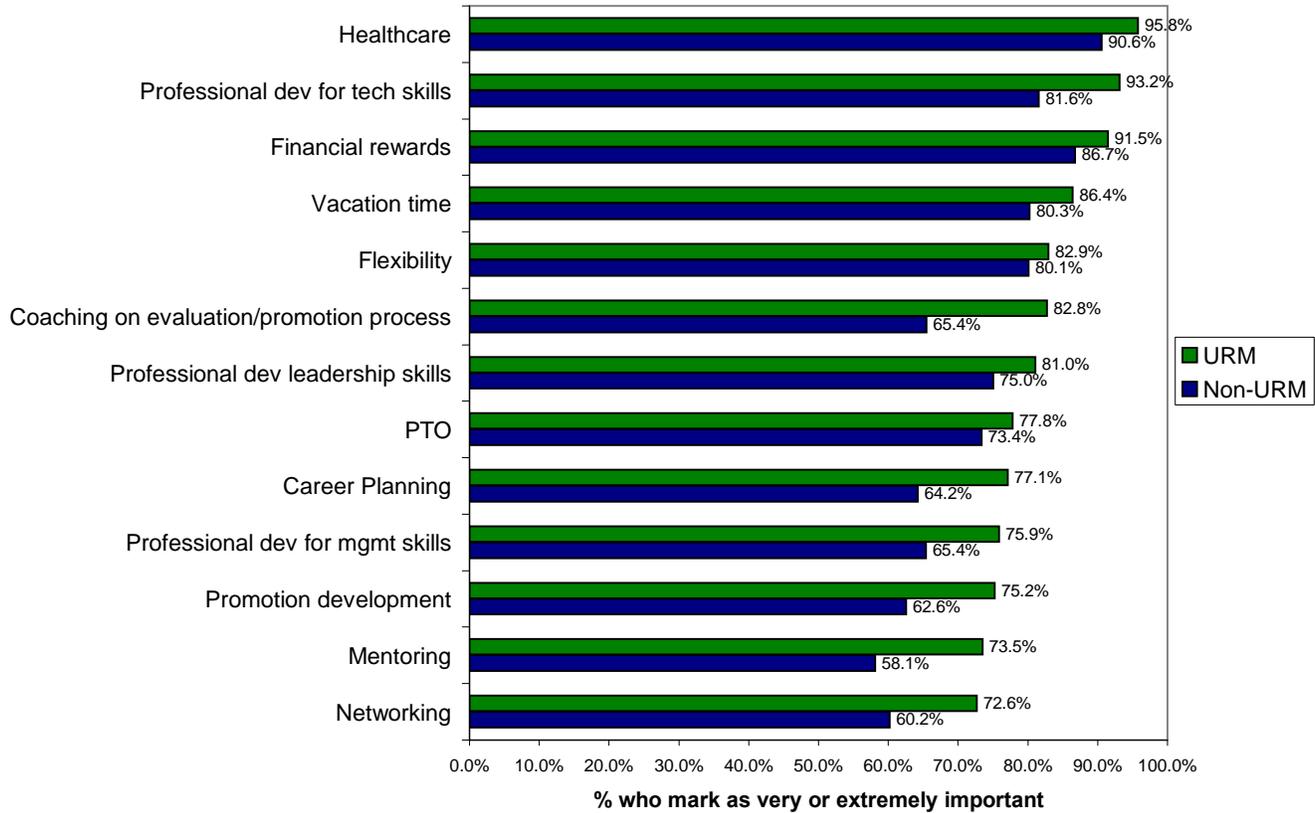
We find that underrepresented minority employees place a higher value on almost all company practices when compared to non-minority employees. Minority employees are looking to their organizations for support and investment in a variety of areas. Specifically, we find that those **practices that pertain to employee development and advancement are significantly more valued by underrepresented minority technical employees.**

- Flexibility, financial rewards, and vacation time rank equally high for technical talent, regardless of race and ethnicity. Indeed, flexibility has been shown by previous research to contribute to employee satisfaction.⁷⁴
- Second only to healthcare in terms of importance to underrepresented technical talent is **professional develop-**

ment for technical skills. While this practice is among the most important to all technical workers, **underrepresented minority employees are significantly more likely to rate it as important than are non-minority employees (93.2% versus 81.6%).** Investing in technical development is likely to significantly affect retention and advancement rates, especially considering that underrepresented employees are less likely to come in with advanced degrees. **Companies’ investment in their ongoing technical development is critical to retention and advancement.**

- **Professional development for leadership skills is also among the top 10 most important practices for respondents regardless of race.** Underrepresented respondents are significantly more likely to perceive professional development for management skills is as important.
- Again focusing on advancement, we find that **underrepresented minority respondents are more likely than non-minority respondents to rate career planning (77.1% vs 64.2%), coaching on evaluation and promotion process (82.8% versus 65.4%) and promotion development (75.2% vs 62.6%) as important.**
- Similarly, **mentoring (73.5% vs 58.1%) and networking opportunities (72.6% vs 60.2%), two elements that have been shown by prior research to be critical to advancement,** are more likely to be perceived as important by underrepresented minority employees.

Chart 3a. High importance company practices, top list, by underrepresented status



Underrepresented women

We find no statistical differences between underrepresented men and women in perceived importance of most practices.⁷⁵

However, we find a significant difference in the perceived importance of practices between underrepresented men and women on three practices: **underrepresented women are significantly more likely than men to rate career planning (89.6% vs 68.6%), leave of absence programs (69.6% vs. 40.9%), and sexual harassment training (50% vs 24.6%) as important.**

By highlighting career planning, technical women of color are looking for a long term commitment from their organization, one focused on long-term advancement.

Policy ratings

When evaluating how satisfied employees are with the practices at their companies, we find that employees are most satisfied with their company policies around flexibility, vacation, healthcare, personal time, telecommuting, and sexual harassment training. The top 6 list in terms of satisfaction is similar for underrepresented minorities to what we found for technical women in our previous research.

Flexibility practices are critical to underrepresented women

Flexibility practices are critical to underrepresented women

- Flexibility is seen as important to all technical employees, regardless of race, and has been shown to be especially important to technical women. Women of color, who are significantly more likely to be in dual-career couples than men of color, need flexibility for success.
- Underrepresented employees place a higher value on telecommuting than non-minority employees (69.5% versus 57%). Flexibility is a business imperative that has been demonstrated to positively impact the bottom line.

Recruitment and Retention benefits

Our data show that 78% of technical men and 83% of technical women overall rate flexibility as very or highly important to them, second only to the basics of healthcare and financial rewards. Companies that take flexibility seriously will thus be able to attract and retain technical talent.

Other case studies have shown that flexibility increases retention — IBM, in a global survey of 42,000 employees, found that flexibility is a top contributor to retention. Difficulties around work-life balance were found to be the second top reason for intending to leave the company (again, only second to dissatisfaction around financial rewards).⁹²

Reduced absenteeism

A study of flexible work practices by researchers found that the introduction of flexible schedules led to higher employee satisfaction and reduced absenteeism. When the organization removed the flexibility schedules, absenteeism and satisfaction rates went back to what they were before.⁷²

Flexibility is a two-way street: global human capital management

Globalization is putting increased demands on today's workforce for shifting and unpredictable schedules, and an appropriate implementation of flexible practices is critical to companies' ability to meet these new demands. In The Global Human Capital Study, CEOs defined "adaptability" as a critical feature of the new human capital model.⁹³ Companies that can quickly deploy talent with the right skills to specific problems need workers who are adaptable and flexible — and this flexibility mindset needs to be reflected in organizational practices.

While flexibility practices take many forms, such as part-time options, compressed work weeks, telecommuting, or the newer on-ramps and offramps, a company doesn't need to implement complex changes to experience the wins of flexibility. Incorporating a flexibility culture can be very effective even if informally. Some critical components of fostering a flexibility mindset include:

- Integrate flexibility with business strategy — consider which projects, times, or tasks are conducive to flexibility.
- Understanding how flexibility is valued by your employees — understanding employee needs around flexibility is critical to implementing the right solution.
- Executive buy-in and modeling — in order to send a signal that formal or informal flexibility is an accepted business practice, executives need to engage in it where possible.
- Making sure evaluation and promotion practices are aligned with flexibility mindset — this requires ensuring that there is no evaluation penalty associated with flexibility.

Making Mentoring Matter

Mentoring has been shown by research to be positively associated with higher job satisfaction, higher promotion rates, higher future income, increased work success, and higher retention rates.⁷⁶ Because women and underrepresented minority employees are so few in technical positions, they are less likely to have access to mentors and role models.⁷⁷

In an analysis of 830 companies over 30 years, researchers have found that while mentoring is not as popular as a diversity initiative as other practices, it had the strongest effect on the advancement of women and minorities.⁷⁸

Establishing a mentoring culture is therefore a critical function of talent management focusing on diversity. While many of the companies we studied have mentoring programs, we found a fundamental disconnect between the policy and the practice levels — that is, mentoring is not perceived as a rewarded behavior in the companies we surveyed — it is not seen as a part of the culture.

Elements of a successful mentoring culture includes:

- Leadership engagement.⁷⁹
- Making someone responsible in the form of an executive diversity position or taskforces.⁸⁰
- Broad participation, across gender and race.⁸¹
- Making mentoring participation part of the evaluation and promotion process.
- Commitment and partnership of Engineering and Human Resources.⁸²
- Multiple mentors for multiple skills — one of the key barriers to finding a mentor to women and minorities in technology is finding a single mentor that is of the same minority background, in a high level position, and embodying the specific scope of skills and attainment that the mentee seeks to attain. Having several mentors engaged with one employee also increases their network.⁸³
- Mentors who acknowledge race as a potential barrier for their protégés are more effective in mentoring underrepresented employees.⁸⁴
- Mentors who actively focus on building a wide network of connections for protégés are most effective: the network should include racial and gender diversity, functional diversity within and outside the organization, and job level diversity (peers and sponsors).⁸⁵

We find statistical significance according to underrepresented status for two of the practices. **Underrepresented minority technical employees are significantly more likely to rate their companies' vacation and personal time policies are good or excellent, indicating high levels of satisfaction in these domains.**

Technical employees are dissatisfied with company policies in the following areas.

Greatest disconnects: advancement and development practices

- Regardless of underrepresented status, **technical employees see a disconnect between the value they place on professional development for technical skills and how they rate company initiatives in this domain.**
- **Similarly, professional development for management skills, leadership skills, career planning, mentoring, and networking, which were more likely to be perceived as**

important by underrepresented respondents, receive low marks from respondents in terms of current company initiatives.

- **Mentoring and networking are critical to the retention and advancement of men and women of color mentoring and networking opportunities are more likely to be perceived as important by women and underrepresented minorities in our data, and yet few respondents are satisfied with their company’s existing practices in these domains.** Mentoring has been identified as the most important predictor of advancement for women and other minorities.⁸⁶ We also find below that mentoring and the availability of mentors is significantly more likely to be identified as a critical retention strategy by underrepresented minority employees.

Retention strategies

Opportunities for advancement, fair monetary compensation, and a positive work culture are top concerns for technical employees.

- Underrepresented respondents are significantly more likely to see opportunities to advance as critical to retention. This is the main takeaway of this paper — **underrepresented technical employees are feeling poised for advancement and are dissatisfied with their companies’ practices pertaining to advancement.** Companies serious about retaining employees of color need to invest in practices that will make a difference to advancement. Barring this investment, companies will lose critical diverse talent.
- **Technical men and women of color are more likely to point to professional development opportunities as critical to retention.**
- **Underrepresented employees are also more likely to see mentoring and the availability of mentors as critical to retention.** Indeed, mentoring has been shown by prior research to dampen the loss of minorities given the significant additional barriers they faced in advancement. Besides mentoring practices, developing a *mentoring culture* is critical, as our previous research showed that mentoring wasn’t perceived as part of company culture in high-technology.
- **Men and women of color want to see diversity in the leadership ranks.** Indeed, they are more likely to point to diversity in leadership as being important to retention.

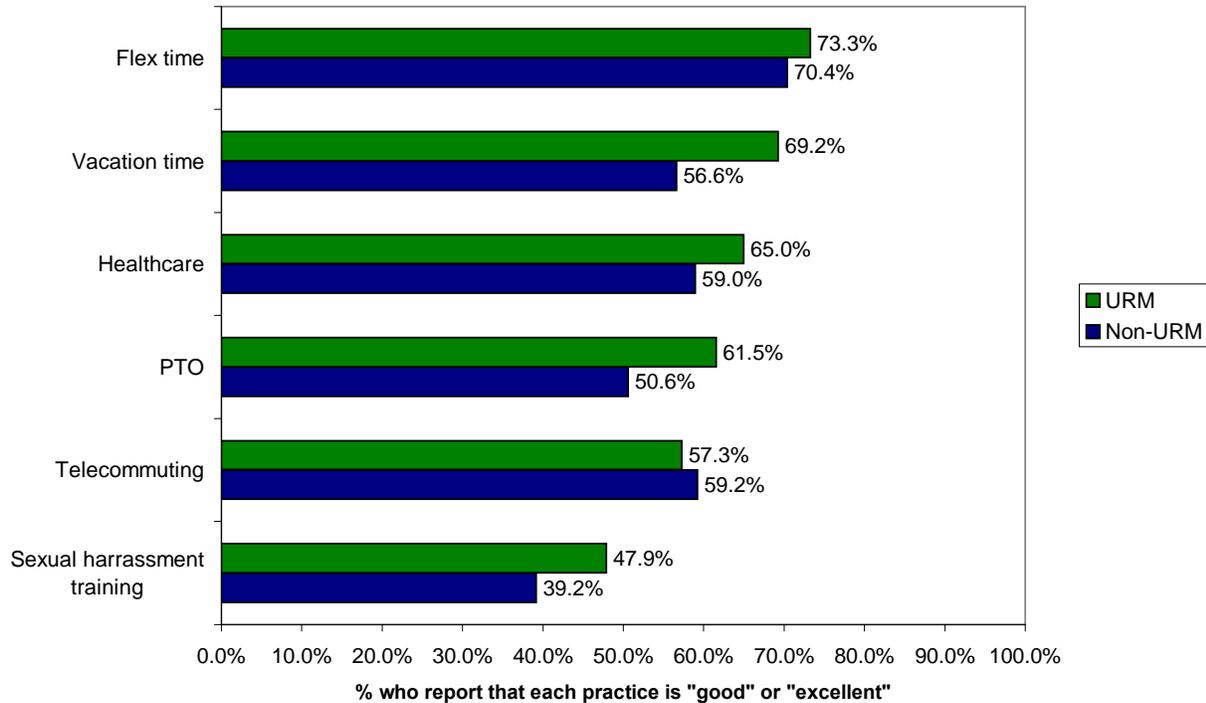
The Myth of Meritocracy

Most modern corporations pride themselves on being a meritocracy, where achievement is rewarded over social connections, seniority, or individual characteristics — this notion is deeply rooted in the ideals of the American culture. The belief that it has already been achieved in corporations is a potential barrier to women and minorities as this belief justifies the presence of inequality, by assuming that disadvantaged minorities “created their own fate”⁸⁷ and disregarding organizational factors. Recent research shows that even with a performance system built on the principles of meritocracy (linking reward to performance), women and underrepresented minorities experience lower reward (pay) for equivalent accomplishment — the reward system thus undervalues the work of women and underrepresented minorities compared to their white male counterparts.⁸⁸ The author points to accountability of the evaluating managers and transparency in rewards (overtly articulating how financial rewards are given for performance) as solutions.

“The system is biased ... The system is nothing more than a microcosm of the US. The microcosm of the US has racial biases, it has power-based biases, it has enough biases in there for a black person not to get through without having power bases”

– Interviewee in Thomas and Gabarro, 1999.

Chart 3b. Evaluation of company practices by technical employees by underrepresented status : The top 6



- This is of particular importance to women of color — 51% of women of color point to a diverse leadership team as a factor for retention.

Plans for the future

Indeed, the most disturbing finding of this paper is that high-tech companies are at clear risk of losing underrepresented minority technical talent.

We find that **underrepresented technical employees are significantly more likely to report that they will look for a new opportunity outside their company. 40.9% of employees of color say they intend to look for a new job, compared to 28.7% of non-minority respondents.** Similarly, underrepresented minority respondents are significantly more likely to plan on looking for a new opportunity within their existing companies, and more likely to report that they plan to pursue higher education.

In the absence of advancement opportunities, underrepresented minority talent is likely to leave the corporations, creating a loss for companies in terms of their ability to capitalize on the benefits of diversity for innovation.

This trend is especially salient and alarming for underrepresented technical women. When we compare underrepresented women with underrepresented men, **we see that women of color are significantly more likely to intend on looking for a new opportunity and plan on switching fields. Over half of technical women of color intend on looking for an opportunity outside their company.**

This state of affairs is alarming. In a condition of scarcity of underrepresented minority women in technical positions, their departure from the field will significantly affect the likelihood of young underrepresented women entering the field, fueled by a worsening availability of role models.

Chart 3c. Evaluation of company practices by technical employees by under-represented status: disconnects

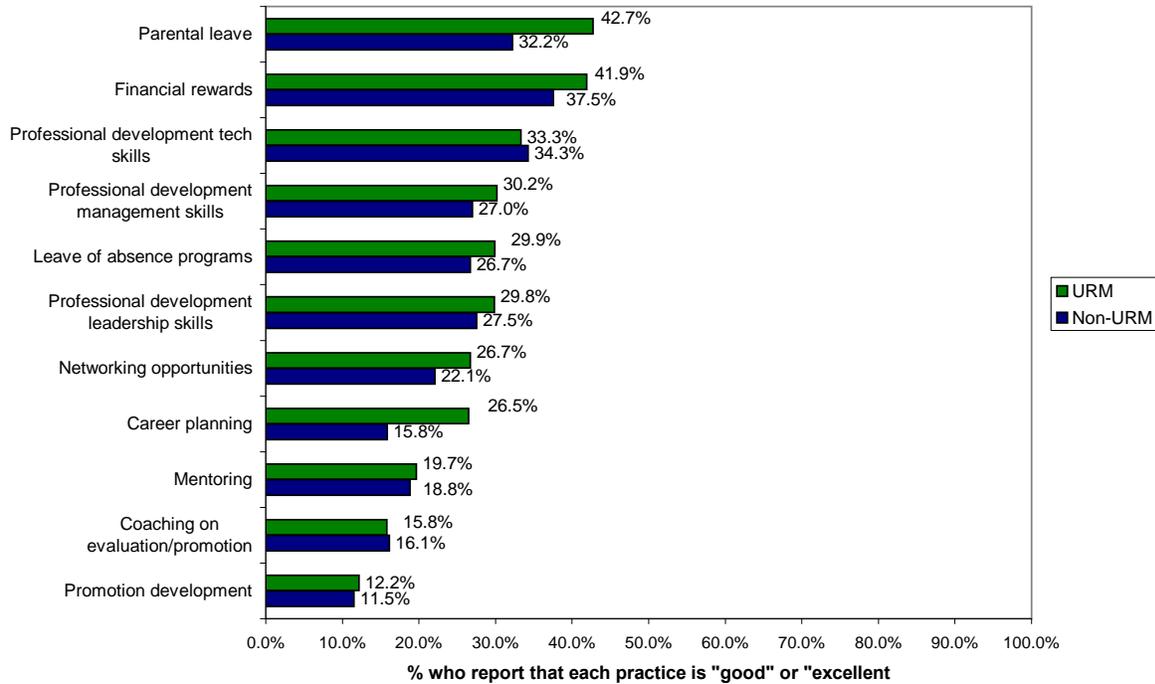


Chart 3d. Ways to improve retention by underrepresented status

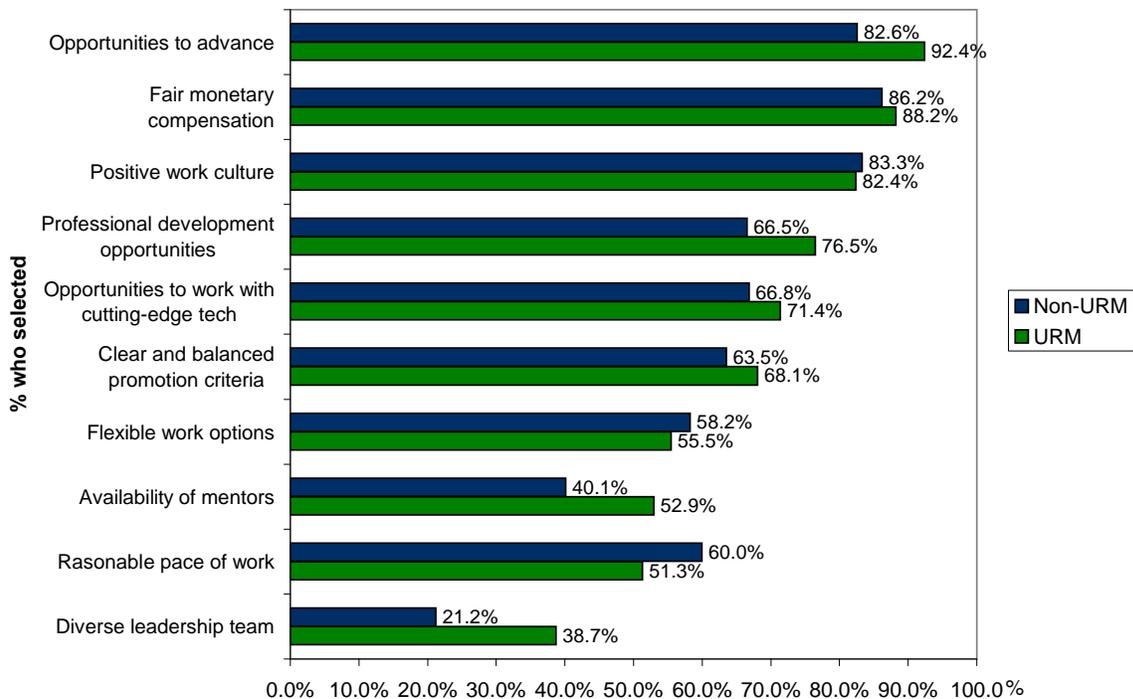


Chart 3e. Plans for the next 12 months from technical employees by underrepresented minority status

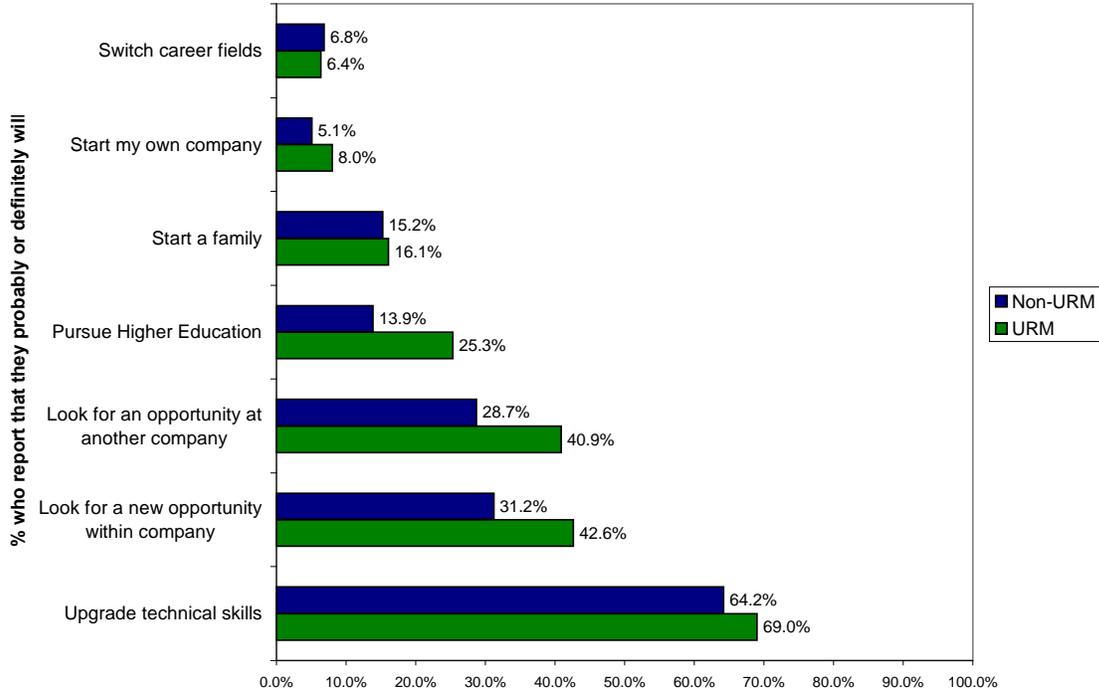


Chart 3f. Plans for the 12 months by gender among underrepresented minority technical employees by gender

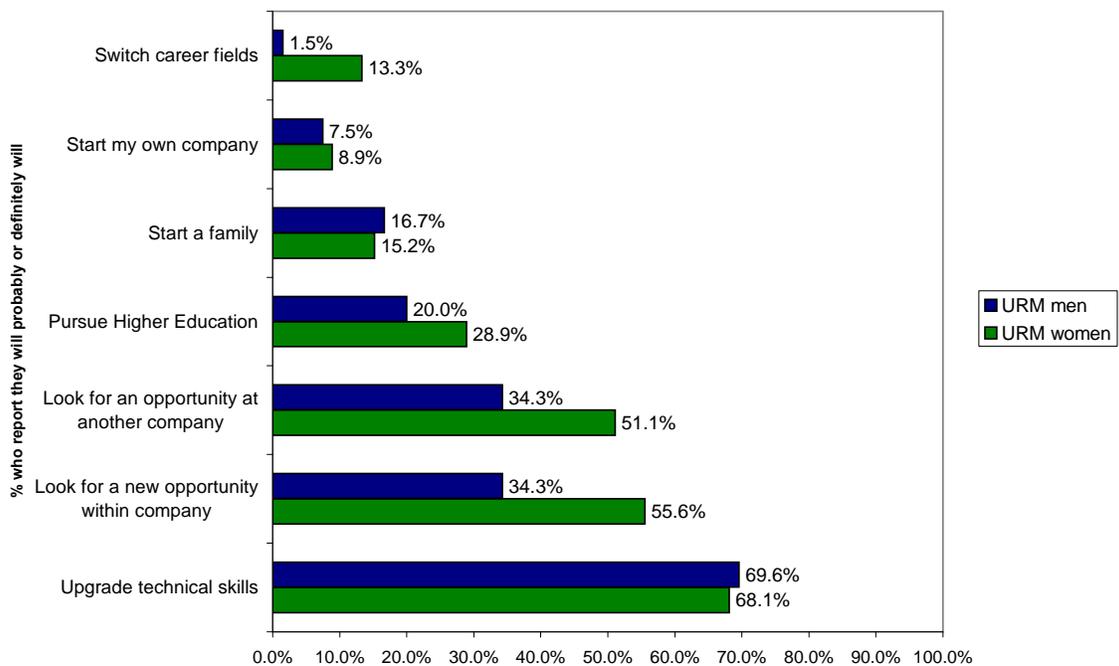
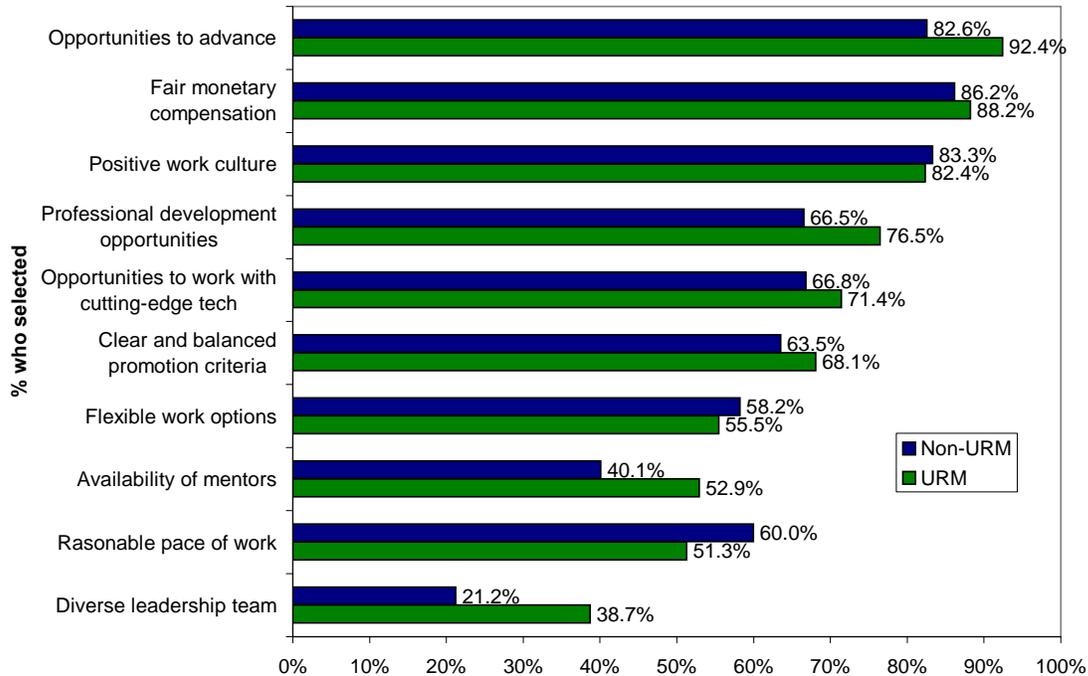


Chart 3g. Ways to improve retention by underrepresented status



Conclusions

- 1) The overall theme of this report is that **technical employees from underrepresented minority backgrounds are most concerned about advancement. Practices that pertain to employee development and advancement are significantly more valued by underrepresented minority technical employees.**
- 2) At the top of important practices **professional development for technical skills**. While this practice is among the most importance to all technical workers, **underrepresented minority employees are significantly more likely to rate it as important than are non-minority employees (93.2% versus 81.6%).**
- 3) **Professional development for leadership skills is also among the top 10 for respondents regardless of race.** Underrepresented respondents are

significantly more likely to perceive other practices for advancement as important: **professional development for management skills, career planning, coaching on evaluation and promotion process, promotion development, mentoring, and networking opportunities.**

- 4) **There is a disconnect between the importance technical employees place on these practices and how they rate their organizations' current policies in these areas.**
- 5) **40.9% of employees of color say they intend to look for a new job, compared to 28.7% of non-minority respondents. Similarly, over half of technical women of color intend on looking for an opportunity outside their company.**

Recommendations

1) Invest in practices that impact advancement.

A unifying theme for this report is that technical employees of color are most concerned with opportunities and practices that will support advancement. **Such practices of importance include opportunities to develop technical skills and mentoring.**

2) Provide opportunities to update technical skills.

Companies wishing to boost retention and advancement of all technical talent in a relatively simple way should increase opportunities for technical development. Such opportunities are highly valued by all respondents, and especially by underrepresented technical workers. Yet, employee ratings of their company's provision for technical development fall short of expectations, and such opportunities are often the first initiatives to be cut in an economic downturn. However, companies that focus on such technical training will not only retain top talent, but be more appealing to prospective employees when better economic times return.

3) **Develop a mentoring culture.** Developing a mentoring culture is critical for technical women and underrepresented minorities. Mentoring has been shown to have the most impact on minority advancement, and yet is not seen as being rewarded by corporate culture in high technology. Such a mentoring culture includes not only the widespread establishment of mentoring relationships across organizational levels, but career planning and coaching on evaluation and promotion becoming ubiquitous in manager-employee relationships.

4) **Flexibility is critical to women of color.** Flexibility is important to all technical employees, and even more critical to the retention of women of color, who are facing significant work-life challenges.

5) **Review recruitment, compensation, and evaluation practices for inequity.** Even companies that pride themselves on being meritocratic show biases in the value they place on the work of minorities, for instance paying women and underrepresented employees a lower salary regardless of equal accomplishments⁸⁹, and promoting minority employees at a lower rate or according to a different set of criteria.⁹⁰ Accountability for equity and transparency in evaluation and compensation processes are critical to prevent inequality from occurring.⁹¹

6) **Diversity is modeled at the top.** Women and men of color in technology expect to see companies' commitment to diversity reflected in the executive leadership ranks. Women of color in particular, perceive diverse leadership as critical to retention. Previous research shows that diversity breeds diversity, and that leadership diversity increases the representation of minorities at all levels of the pipeline.

Barring opportunities for advancement, underrepresented technical talent will leave high-tech companies. Considering how many barriers they are likely to have encountered and overcome on their way to employment in top technology companies, this loss is unacceptable for companies and for US competitiveness.

Endnotes

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