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Women in Technology:

Maximizing Talent, Minimizing Barriers

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Women in Technology: Maximizing Talent, Minimizing Barriers

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FOREWORD

In 2003, Catalyst released *Bit by Bit: Catalyst's Guide to Advancing Women in High Tech Companies,* which revealed a number of barriers facing women in the high-technology industry. In particular, women and men participating in the study discussed the failure of high-tech companies to identify and develop women's talent. Fueled by this finding, in 2005, Catalyst partnered with ISR (subsequently Towers Perrin-ISR), a global survey company, to undertake a study to more fully address and understand women's talent management within technology companies. Catalyst also fielded a subsequent study to examine drivers of satisfaction, retention, and advancement.

The study's first phase focused on talent management among women and men in high-tech companies. The second phase surveyed women working in technical roles at non-tech companies and women working in any role at high-tech companies. The purpose of this second phase was to hear directly from women about their careers and how their work experiences related to job satisfaction, talent management, and advancement. This phase yielded data on actionable steps organizations can take to more fully involve, satisfy, develop, and advance women employees.

This report furthers Catalyst's previous research on women in the high-tech industry by summarizing the findings from both phases of this project. It sheds light on important issues facing companies by providing data related to women's perception of:

- Supervisory relationships.
- Fairness and voice within their companies.
- Development and training opportunities, as well as career planning.
- Barriers to career advancement.
- Generational differences among women in the technology workforce.
- Equal opportunity and diversity.
- Opportunities within their companies related to the type of company in which they work.

By examining these topics, Catalyst gauged women's overall satisfaction and engagement with their jobs and their companies.

This study comes at a critical time for all companies seeking to attract and retain top-quality talent. As the job market in technology has become increasingly competitive, companies must provide a work environment where women can flourish and succeed. This report helps companies identify areas where they should increase focus and attention and gives them the feedback necessary to make change for women within their organizations.

CHAPTER 1: INTRODUCTION

The high-technology field has long been pegged as one that is inhospitable to women because it has been—and continues to be—dominated numerically by men. Common wisdom and previous research suggested that the barriers to advancement that women in technology companies faced and the experiences that they had as a result of the male dominance and pervasively masculine culture of the field led to dissatisfaction among women employees. Moreover, among women in technical jobs, dissatisfaction and disenchantment were found to be especially acute. In recent years, however, the climate for women in technology companies has begun to change. With a very robust market for jobs in information technology, companies have had to respond to employees' demands for better working environments. Indeed, companies have found themselves in competition to attract and retain highly qualified talent—including women and men.

Since the dot-com bust at the beginning of the decade, the demand for technology jobs has improved dramatically. Indeed, as the National Center for Women and Information Technology (NCWIT) reports, "There are now more IT jobs in the United States than there were at the height of the dot-com boom."[1] Because of this increased demand for technical employees, as well as the context of increased corporate competitiveness, highly qualified women within technical fields have had significant opportunities available to them. Moreover, at least one study reported that women in the field are largely satisfied with the work they do and generally satisfied with their employers.[2]

Despite the increased opportunities and relative satisfaction among technical women, recent employment trends indicate that the percentages of women in specific technical fields have remained flat or declined since the dot-com bust.[3] That is, while women in technical jobs appear to enjoy the work they do, there are fewer women in these jobs than there used to be. There are likely many reasons for this decline, and prior research by Catalyst and others has shed light on challenges that women in technology face. Factors that drove women away from high-tech companies early in the decade included:

- An exclusionary culture that did not support women's advancement.
- Inflexible workplaces that were not conducive to work-life effectiveness.
- Isolation of women because of a lack of role models, networks, and mentors.
- The failure of companies in the high-tech sector to strategically and objectively identify and develop talent.[4]

There are many reasons to suggest that companies have made measurable progress for women in technology in recent years. Barriers for women in technology were well-documented by Catalyst's *Bit by Bit* study and

[1] NCWIT, *NCWIT Scorecard 2007: A Report on the Status of Women in Information Technology* (2007): p. 19.
[2] Patricia Shafer and Barbara Trautlein, "Women in Technology: 2007 Report," *WITI SAVVY* (2007): p. 19-23.
[3] Carmen Nobel, "Why Are Women Exiting IT?," *Infoworld* (January 29, 2007): p. 34.
[4] Catalyst, *Bit by Bit: Catalyst's Guide to Advancing Women in High Tech Companies* (2003). Kay Bartol and William Aspray, "The Transition of Women From the Academic World to the IT Workplace: A Review of Relevant Research" in J. McGrath Cohoon and William Aspray, eds., *Women and Information Technology: Research on Underrepresentation* (Cambridge, MA: MIT Press, 2006): p. 377-420. Sharon Gaudin, "The Critical Shortage of Women in IT: Reversing Downward Spiral in Ranks of Female IT Workers is Critical to Solving Technology Worker Shortage," *Network World* (November 11, 1999). Andy Vuong, "Women Facing High-Tech Hurdles," *Chicago Tribune* (June 24, 2001).

others by the early 2000s. Since that time, companies have invested extensive resources—in terms of dollars, personnel, and programs—to effect change for women in technology. For example, as part of the *2006 Catalyst Member Benchmarking Report*, 91 percent of responding member companies in the information technology category told Catalyst that they had diversity-focused programs or activities designed specifically for women in the United States, and more than one-half of them had programs or activities for their female employees in every region of the world. Ninety-one percent of information technology participants also said they employed recruiting strategies in the United States aimed at increasing the number of women and people of color in their workforces. More than two-thirds—70 percent—offered formal, organization-sponsored mentoring programs to women employees, and 90 percent had organization-sponsored employee network or resource groups for women.

Catalyst Award-winning members in the high-tech industry also have been pushing to more fully develop, include, and satisfy women in the workplace since the early 1990s.

- Hewlett-Packard Company, recognizing the importance of the recruitment and retention of experienced technical women to their business, held a worldwide Technical Women's Conference in 1991 that attracted 800 attendees. The conference showcased female engineers and scientists in the company and also provided career development workshops.
- In 1992, Pitney Bowes Inc. formed a taskforce that would produce the company's Strategic Diversity Plan, which included, among other things, mentoring, strengthening of career-planning processes, rotational and special assignments, and the development of competency models. The Strategic Diversity Plan was aligned and individualized within each business unit, and progress was measured on a monthly basis, producing a steady increase in the number of women in management.
- Texas Instruments reorganized hierarchical structures in the early 1990s by creating multilevel, cross-functional teams to create opportunities for women by circumventing barriers. Women advanced more quickly within the organization because of increased visibility and access to developmental assignments.
- In the mid-to-late 1990s, IBM Corporation re-focused its business strategy to become more market-driven, recognizing that to appeal to a diverse customer base, the company itself must be diverse and incorporate women globally. Additionally, increased competition for technical talent demanded that the company embrace both diversity and workplace flexibility. As a result of its cultural change efforts, in the late 1990s, IBM saw a 175 percent increase in the number of women executives as well as a 235 percent increase in the number of women of color executives.

To what extent have company efforts at incorporation borne fruit for women in technology? What advances have been made, for whom, and where? To address these questions, Catalyst embarked on a study in 2005, in partnership with ISR (subsequently Towers Perrin-ISR), to more fully understand the management of women's talent in technology companies. Specifically, Catalyst used Towers Perrin-ISR employee survey satisfaction data to compare the attitudes of women to men and to subgroups of women based on features such as job

roles, employee age, and type of company. Catalyst analyzed Towers Perrin-ISR employee survey data from 21[5] global high-tech companies.[6] Women and men in these companies responded to a variety of questions in the following six areas.[7]

- Companies as places to work
- Supervision and corporate leadership
- Career development and talent management
- Fairness and voice
- Job satisfaction, engagement, and commitment
- Work-life effectiveness

For each of these substantive areas, analyses focused on two primary questions:

1) How, if at all, did the perceptions and experiences of women and men in these high-tech companies differ?
2) How, if at all, did the perceptions and experiences of women working in technical roles—such as engineering and research and development[8]—differ from the perceptions and experiences of women in non-technical roles, and from those of men working in any role, in these high-tech companies?

The findings revealed that while women in technology companies were generally satisfied, there were areas of particular concern—specifically around supervisory relationships and perceptions of fairness and voice—that companies must address.

Years of advisory service work has taught Catalyst that people do not leave companies—rather, they leave supervisors. A direct effect of companies' failure to address the supervisory relationships of technical women will be the loss of highly qualified talent. Likewise, data on the perception of fairness and voice make it amply clear that failure to provide employees with the opportunity to speak up, participate in decision-making processes, and be heard will result in lower employee satisfaction and performance. In an age of increased corporate competition, companies cannot afford these risks.

Motivated by these findings, Catalyst undertook a second study of women working for technology companies and/or in technical roles. In an online survey, we sought to hear directly from women their recommendations for ways that companies could improve the development and management of women's talent. Additionally,

[5] While the data represent 21 high-tech companies, there were 23 "survey events," meaning that, for two companies, more than one division was surveyed. The surveys were administered from 2002 to 2005.

[6] Towers Perrin-ISR defined "high technology" based on products, as well as the research and development (R&D) intensity of the organization. The R&D intensity was based on two factors: first, the relatively higher proportion of scientists, engineers, and technicians employed by the companies (vis-à-vis non-tech companies); and second, the nature of the R&D activities undertaken. Eligible product categories included: software development; office machinery and computer manufacturing; electronics (especially those with a communications function); and biotechnology. The definition did not include scientific instrument manufacturing and non-electrical machinery.

[7] These areas are described more fully later in the chapter.

[8] Employees were classified based on their job functions or titles. To accomplish this task, lead researchers from Towers Perrin-ISR, in consultation with Towers Perrin-ISR survey project managers for each company, reviewed specific job titles for the companies included in the analyses. Based on these job titles, employees working in jobs directly related to the development of the high-tech companies' products were classified as fulfilling a technology function or role. IT workers in high-technology companies were coded by Towers Perrin-ISR as technical workers based on their job titles and because the role of IT workers in technology companies was viewed as directly related to the development of companies' products. Employees working in jobs not directly related to the development of high-tech companies' products were classified as having a non-technical function or role. In those cases where it was not clearly evident from the job title that a job was directly related to the development of a company's products, the researchers were conservative and classified the employee as fulfilling a non-technical function or role.

the survey asked women about the barriers to career advancement that they faced within their companies, and analyzed the ways in which these barriers may vary by generational cohort and by the type of company in which they worked.

Findings from this second phase of analysis revealed the persistence of barriers for women working in high-tech companies and/or in technical roles. However, Catalyst was encouraged to find that the women surveyed were less likely to perceive barriers to career advancement than a cross-industry sample of women surveyed early in the decade.[9] Catalyst also found that the prominence of perceived barriers to advancement varied based upon the number of other women in a department or work group, as well as a woman's generational age.

In summary, this report presents findings from a two-phase investigation of multiple aspects of talent management and seeks to gauge to what extent improvements have been made for women. The report assesses the following areas:

- Measures of overall satisfaction, engagement, and commitment.
- Comparisons of perceptions between women and men in high-tech companies.
- Perceptions of barriers to career advancement.
- Variations among subgroups of women in technology based on factors such as age and company type.

The report also details specific action steps companies can take to improve the management of women's talent, their satisfaction with supervisors, and their satisfaction with their companies' approaches to diversity and inclusion.

KEY FINDINGS

The most important findings from this study are presented below. Subsequent chapters detail the findings and provide interpretations of the findings. We also provide two diversity and inclusion practices that describe programs companies have implemented to advance women.

Chapter 2: Technical Women: The Importance of Supervisors, Fairness, and Voice

- Technology companies have made progress for women in recent years. Analyses of employee survey data revealed that both women and men were generally satisfied—with few differences—with their jobs and work environments.
- However, substantial gaps emerged between technical women and other employee subgroups on two sets of measures:
    - Technical women were less satisfied with their supervisory relationships than women in non-technical roles, men in technical roles, and men in non-technical roles.
    - Technical women were less satisfied with their companies' approaches to fairness and voice than women in non-technical roles, men in technical roles, and men in non-technical roles.

[9] Catalyst, *Women in U.S. Corporate Leadership: 2003* (2003): p. 16-17.

- Companies must address the two critical areas of supervisory relationships and fairness and voice if they are to retain technical women.

Chapter 3: Making Strides: Advice From Women

- Women working in technical roles and/or for high-tech companies said that there were several steps their supervisors could take to improve the supervisor-supervisee relationship, including:
    - Communicating openly and directly with supervisees.
    - Providing regular, performance-related feedback.
    - Providing access to more challenging assignments.
    - Implementing stronger career- and goal-planning processes.
- Women working in technical roles and/or for high-tech companies said their companies could enhance perceptions of fairness and voice by taking the following steps related to equal opportunity:
    - Advancing and promoting more women.
    - Ensuring diverse corporate leadership.
    - Accepting diverse individual working styles.

Chapter 4: Factors Affecting Women's Perceptions of Barriers to Career Advancement in Technology

- While barriers to career advancement continue to exist for women within the high-tech sector, the extent to which these barriers were perceived diminished in relation to previous cross-industry analyses.
- Women who worked with greater numbers of women in their work groups or departments were less likely than others to perceive barriers to career advancement.
- Among the barriers that continue to exist for women in technology, women most often cited:
    - A lack of role models similar to themselves.
    - Not having a mentor, sponsor, or champion to make accomplishments known.
    - Being excluded from important networks of decision-makers.
- The perception of barriers to advancement varied by generational age, with Baby Boomers being more likely than members of Gen Y to perceive barriers to advancement.
- Women working in different types of companies differed on a number of individual-level and job-related characteristics, including educational background, nationality, managerial position, and job role. However, these differences did not translate into different perceptions when it came to barriers that had limited women's career advancement.

CONTEXT-SETTING: TRENDS FOR WOMEN IN THE HIGH-TECH JOB MARKET

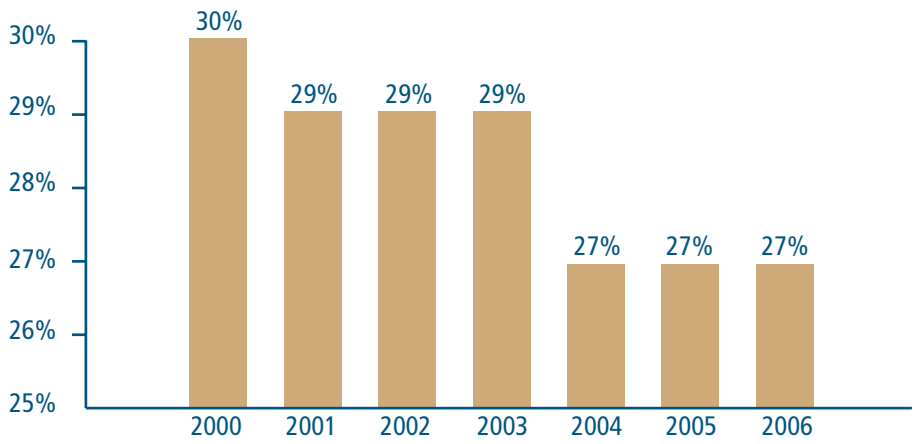
As noted earlier, prior research on women in the technology sector indicated that high-tech companies and especially technical jobs within high-tech companies were not particularly hospitable for women. Research documented that women faced numerous barriers to advancement that men managed to avoid.[10] Despite

[10] For an excellent review of this literature, see Bartol and Aspray. See also Nobel; Dana Wilson-Kovacs, Michelle Ryan, and Alex Haslam, "The Glass Cliff: Women's Career Paths in the UK Private IT Sector," *Equal Opportunities International*, vol. 25, no. 8 (2006): p. 674-687.

these challenges for women, recent research has suggested that women in technology are largely satisfied with their jobs.[11] An understanding of labor trends in the technical job market helps to set the context for the findings of this study.

Women's representation within the high-tech industry has fluctuated over the past couple of decades. Women made early strides into the high-tech industry in the 1970s and 1980s. During the boom of the 1990s, intense growth in the industry caused companies to focus considerable attention on the retention of women. When the downturn in the market came in 2001-2002, however, technical employees were hard-hit, and some observers have suggested that women may have been hit harder than men.[12] Now, several years following the market bust, demand for skilled technical employees is once again increasing at a substantial rate.[13] Women, however, do not appear to be benefiting this time. Indeed, Figure 1 indicates that the percentage of computing and mathematical jobs held by women within the United States declined between 2000 and 2004 and has remained flat for the past three years.[14]

Figure 1: Percentage of Computing and Mathematical Occupations Held by Women, 2000-2006[15]



Given increased demand for labor in the technology industry and a nonexistent growth rate in the share of computing jobs held by women, practitioners, journalists, and scholars have found themselves asking once again how to entice women into the high-tech industry. This report sheds light on this very important question using quantitative and qualitative data to provide traction on issues of concern to women in technology. Moreover, the report outlines action steps companies can take to meet the demands of women in high tech who are "voting with their feet."

[11] Shafer and Trautlein.
[12] John P. Mello Jr., "Women Gain, Lose in IT Woes: Some Fall Victim to Layoffs, Others See Responsibilities Increase," *The Boston Globe* (February 3, 2002).
[13] NCWIT, p. 14. Allen Bernard, "High Tech Jobs Rebounding," *CIO Update*, (April 25, 2007). CNN, "Higher Demand for Hi-Tech Workers: Challenger Report Shows That Job-Cuts in the Tech Sector Are Down 40 Percent From the Year-Ago Level," (April 10, 2006): http://money.cnn.com/2006/04/10/news/economy/jobs_tech
[14] Nobel, p. 34. Additionally, educational statistics show that women are currently earning only about 25 percent of bachelor's degrees in computer science, down from 37 percent in 1985 (NCWIT, p. 9).
[15] Ibid.

CHAPTER 2: TECHNICAL WOMEN: THE IMPORTANCE OF SUPERVISORS, FAIRNESS, AND VOICE

Findings at a Glance

- **Technology companies have made progress for women in recent years. Analyses of employee survey data revealed that both women and men were generally satisfied—with few differences—with their jobs and work environments.**
- **However, substantial gaps emerged between technical women and other employee subgroups on two sets of measures:**
  - Technical women were less satisfied with their supervisory relationships than women in non-technical roles, men in technical roles, and men in non-technical roles.
  - Technical women were less satisfied with their companies' approaches to fairness and voice than women in non-technical roles, men in technical roles, and men in non-technical roles.
- **Companies must address the two critical areas of supervisory relationships and fairness and voice if they are to retain technical women.**

The Towers-Perrin-ISR data covered six substantive areas. In four of these areas, very few significant differences emerged between women and men, or between women in technical roles and all others at their high-tech companies. However, in two highly important areas—supervisory relationships and fairness and voice—differences between perceptions of technical women and all others *did* emerge.

AREAS WITH FEW DIFFERENCES IN PERCEPTIONS BETWEEN WOMEN AND MEN, AND AMONG WOMEN, IN HIGH-TECH COMPANIES[16]

Few differences emerged between women and men, or among women in high-tech companies in the following areas:

- **Companies as places to work.** This topic included measures relating to quality of work, company image, and pay and benefits. It was characterized by relatively high levels of employee satisfaction (greater than 60 percent) except with respect to pay, where less than 60 percent of employees agreed that their salaries were competitive or fair compensation for their work.
- **Career development and talent management.** This topic included goals, recruitment and retention of talent, career development, performance evaluation, and equal opportunity and diversity. Satisfaction among employees in these substantive areas had greater variability, with general dissatisfaction (30 to 40 percent) on measures relating to career development and high levels of satisfaction (about 70 percent) with respect to goals.

[16] For the following analyses, t-tests of group mean differences were employed to ascertain that differences were significant at $p<.05$.

- **Job satisfaction, engagement, and commitment.** Levels of satisfaction relating to general job satisfaction, engagement, and intent to stay were generally high—about 70 percent.
- **Work-life effectiveness.** Measures relating to working conditions, staffing, stress, and workload revealed moderate levels of employee satisfaction at about 50 to 60 percent.

The analysis of these areas was quite comprehensive and tapped into multiple facets of corporate life. Given the potential number of areas in which differences in the perceptions of women and men could have arisen, it is reassuring to learn that women and men in high-tech companies shared generally high levels of work-related satisfaction in many substantive areas. These findings indicate that companies in the high-tech sector have made strides for women in recent years.

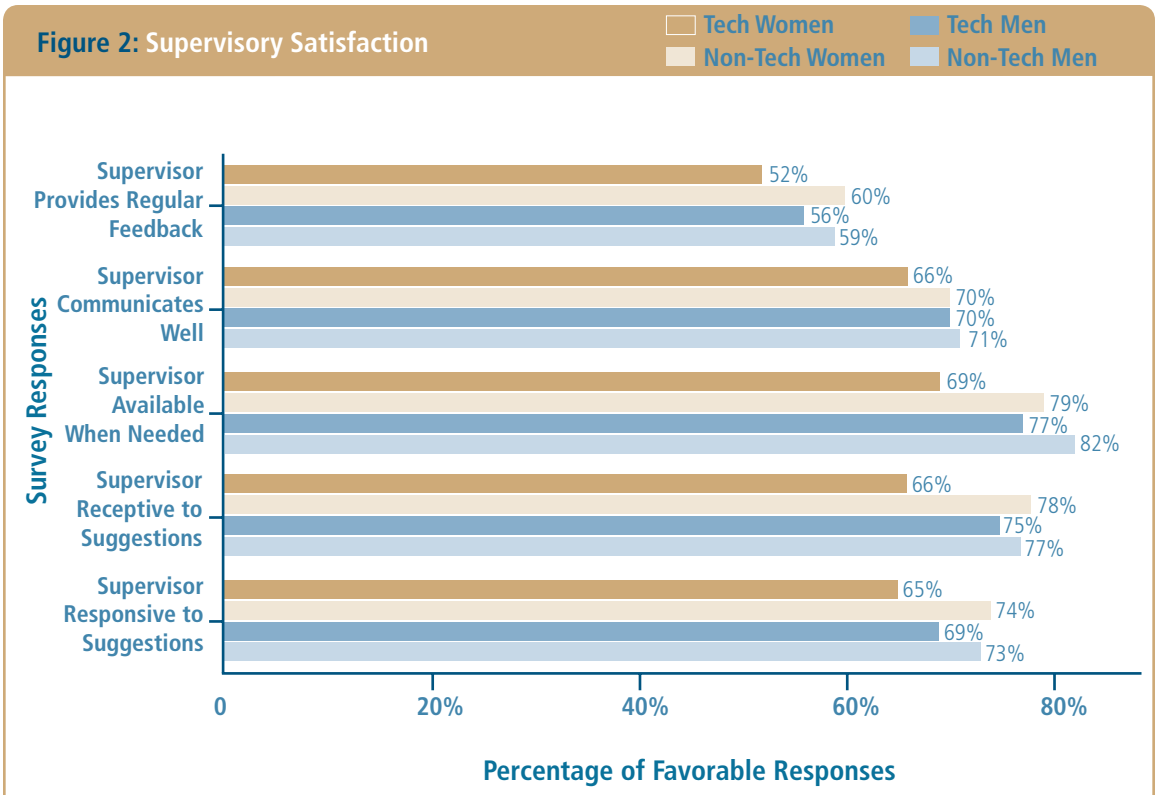
AREAS IN NEED OF IMPROVEMENT IN HIGH-TECH COMPANIES

In contrast to the areas described above, significant differences between women working in technical roles and all others were revealed on two issues related to talent management. First, technical women in high-tech companies scored their organizations lower than all other subgroups (i.e., non-technical women, and technical and non-technical men) with respect to supervisors and supervisory relationships. Second, technical women in high-tech companies scored their organizations lower than all other subgroups on perceptions of fairness and voice. In these two substantive areas, technical women scored their companies lower than others on *every* measure relating to supervisors and fairness and voice. In the following section, we explore each of these areas in depth.

Supervisors

As shown in Figure 2, while employees were generally positive about their supervisors, technical women were less likely to rate their supervisors satisfactorily than any other subgroup of employees. Fifty-two percent of technical women—compared to 60 percent of women in non-technical roles, 56 percent of men in technical roles, and 59 percent of men in non-technical roles—said that their supervisors provided them with regular feedback. Sixty-six percent of women in technical roles—compared to 70 percent of women in non-technical roles, 70 percent of men in technical roles, and 71 percent of men in non-technical roles—agreed that their supervisors communicated well. Sixty-nine percent of women in technical roles—compared to 79 percent of women in non-technical roles, 77 percent of men in technical roles, and 82 percent of men in non-technical roles—stated that their supervisors were available when needed.

Figure 2: Supervisory Satisfaction



Women in technical roles were also less likely than all others to say that their supervisors were both receptive to and responsive to their suggestions. Receptivity to suggestions indicates a willingness to listen, while responsiveness involves taking action on a suggestion. Sixty-six percent of women in technical roles—compared to 78 percent of women in non-technical roles, 75 percent of men in technical roles, and 77 percent of men in non-technical roles—said that their supervisors were receptive to their suggestions. Sixty-five percent of technical women—compared to 74 percent of women in non-technical roles, 69 percent of men in technical roles, and 73 percent of men in non-technical roles—found their supervisors to be responsive to their suggestions.

One cannot overstate the importance of supervisory relationships to the retention of employees. Indeed, as noted in the introduction, Catalyst knows that employees don't leave companies—they leave supervisors. If companies are to retain highly qualified women, they must recognize that addressing and improving supervisory relationships is a critically important issue.

One way that companies can begin to address this perceptual gap between technical women and other employee subgroups is through enhanced supervisory training. Managers—and in particular those managers coming from a technical background—could benefit from in-person training classes that teach them how to be better coaches, mentors, and advocates for their supervisees. Progress in this area would go a long way toward addressing the concerns raised by technical women around supervisory feedback, communication, receptivity, and responsiveness.

Fairness and Voice

Another area of concern that emerged from the data was the topic of fairness and voice. As Figure 3 (see page13) indicates, women in technical roles were consistently more negative than others on the four measures of fairness and voice. Fewer than one-half—49 percent—of women in technical roles—compared to 57 percent of women in non-technical roles, 54 percent of men in technical roles, and 62 percent of men in non-technical roles—agreed that management decisions regarding employees were usually fair. Similarly, 54 percent of women in technical roles—compared to 58 percent of women in non-technical roles, 61 percent of men in technical roles, and 64 percent of men in non-technical roles—agreed that management trusted the judgment of employees at their occupational level.

Fairness and Voice: *A Primer*

What does fairness mean? Procedural fairness pertains to people's perceptions about how fairly decisions are made. Addressing employees' perceptions of procedural fairness can benefit companies for a number of reasons:

- **Fair procedures lead to positive attitudes about decisions.**

Individuals who see the decision-making process as fair are more likely to be satisfied with the decision than those who view a procedure as unfair. Notably, a number of studies show that this happens even if an unfavorable outcome results from the decision.[17]

- **People evaluate fairness based on a number of tenets.[18]**

To determine whether a procedure is fair, people often assess different pieces of information.

  - Being given the opportunity to participate and have a say (voice) in the decision-making process leads to perceived fairness.
  - Procedures that benefit the decision-makers more than others lead to perceived unfairness.
  - The ability to challenge and/or voice one's concern about a decision[19] leads to perceived fairness.

- **Fair procedures lead to trust and positive experiences with workgroups, authorities, institutions, and rules.[20]**

When treated fairly, employees are more likely to trust not only the rules, but also the people who make those rules. Trust leads to more positive attitudes about leadership, workgroups, and the organization

[17] Organizational fairness research consistently finds that individuals' evaluations of *how* decisions are made are often distinct from their evaluations of the *outcome(s)* of those decisions. See Jerald Greenberg, "Organizational Justice: Yesterday, Today, and Tomorrow," *Journal of Management*, vol. 16, no. 2 (1990): p. 399-432. Evaluations of what constitutes a fair procedure are based on different elements, such as following consistent rules, avoiding bias, and making decisions based on accurate information. See G.S. Leventhal, "What Should Be Done With Equity Theory? New Approaches to the Study of Fairness in Social Relationships," in K.J. Gergen, M.S. Greenberg and R.H. Willis, eds., *Social Exchange: Advances in Theory and Research* (New York: Plenum Press, 1980): p. 27-53.

[18] Robert Wharton, Paula Potter, and Linda E. Parry, "Keeping the Faculty: Issues of Socialization, Justice, and Commitment to the Workplace," *Journal of Behavioral and Applied Management*, vol. 6, no. 1 (2004): p. 4-20. Within this context, it is important to note that people are often not (consciously) aware of the types of information they use to decide whether a procedure is fair. These decisions are often "snap" judgments about the situation.

[19] Ibid.

[20] T.R. Tyler and E.A. Lind, "A Relational Model of Authority in Groups," in M. Zanna, ed., *Advances in Experimental Social Psychology*, vol. 25 (New York: Academic Press, 1992): p. 115-192.

as a whole. Notably, work relationships based on trust are essential to creating an inclusive work environment.

- **Fair procedures lead to higher job commitment,[21] satisfaction,[22] and performance.[23]**

People appreciate being involved in decisions that affect them directly, even when it means simply voicing their opinions. Participation in developing a procedure leads to a greater degree of:

  - Commitment to the rules and procedures.
  - Job satisfaction.
  - Organizational commitment.
  - Cooperative behavior.[24]
  - Energy and motivation to perform based on the decisions that were made.[25]

- **Procedural fairness influences employees' perceptions of advancement opportunities within their organizations.[26]**

It should come as no surprise that employees who believe their companies employ unfair procedures also question the ways advancement decisions are made within their organizations. Women are especially likely to view lack of advancement opportunities as a reason to leave their organizations. Women are especially likely to leave when:

  - Promotion decisions are made based on stereotypic bias about women's abilities rather than on women's actual performance.[27]
  - Women have no say in promotional decisions and hence do not expect their opportunities to change in the future.

In either case, organizations end up losing talented women to other organizations that allow women's voices to be heard.

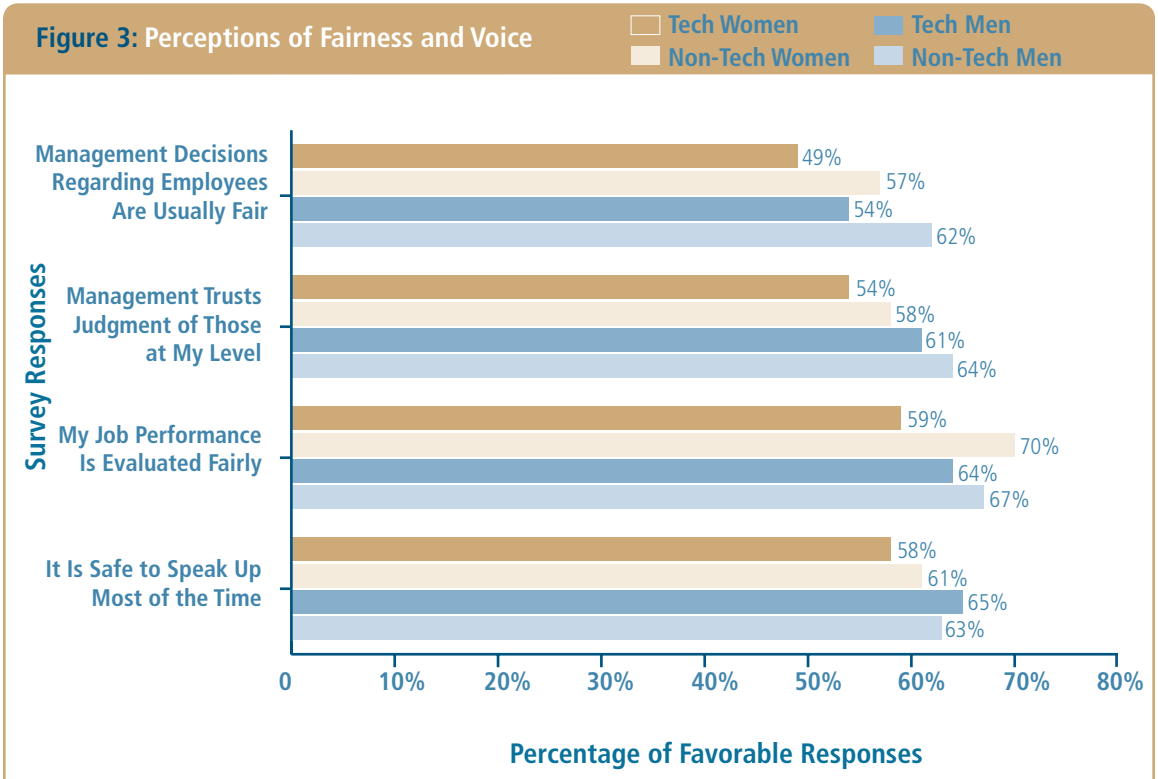
- **"Voice" is a critical component of employees' perceptions of fairness.[28]**

Research on organizational fairness finds that opportunity to have a say in decision-making processes is particularly important to perceptions of fairness. Employees who are allowed to "voice" their opinions are more likely to perceive procedures as fair. Recent investigations indicate that being able to challenge a decision or voice concern about a decision that has already been made also influence perceptions of fairness and lead to more satisfaction with decision-making processes.

[21] D.R. Avery and M.A. Quinones, "Disentangling the Effects of Voice: The Incremental Roles of Opportunity, Behavior, and Instrumentality in Predicting Procedural Fairness," *Journal of Applied Psychology*, vol. 87, no. 1 (2002): p. 81-86. M.A. Konovsky, "Understanding Procedural Justice and Its Impact on Business Organizations," *Journal of Management*, vol. 26, no. 3 (2000): p. 489-511.
[22] B.H. Sheppard, R.J. Lewicki, and J.W. Minton, *Organizational Justice: The Search for Fairness in the Workplace* (New York: Lexington Books, 1992).
[23] Konovsky.
[24] R.H. Moorman, "Relationship Between Organizational Justice and Organizational Citizenship Behavior: Do Fairness Perceptions Influence Employee Citizenship?" *Journal of Applied Psychology*, vol. 76 (1991): p. 845-855.
[25] Rhona Rapoport, Lotte Bailyn, Joyce K. Fletcher, and Bettye H. Pruitt, *Beyond Work-Family Balance: Advancing Gender Equity and Workplace Performance* (San Francisco, CA: Jossey-Bass, 2002).
[26] P. Herriot, W.E.G. Manning, and J.M. Kidd, "The Content of the Psychological Contract," *British Journal of Management*, vol. 8, no. 2 (1997): p. 151-162.
[27] E.R. Auster, "Professional Women's Midcareer Satisfaction: Toward an Explanatory Framework," *Sex Roles*, vol. 44 (2001): p. 719-750. E.R. Auster and K.L. Ekstein, "Professional Women's Mid-Career Satisfaction: An Empirical Exploration of Female Engineers," *Women in Management Review*, vol. 20 (2005): p. 4-23.
[28] Wharton et al.

Perceptions of fairness in performance evaluations were slightly more positive than perceptions of fairness of management decisions and trust of employee judgment. Fifty-nine percent of women in technical roles—compared to 70 percent of women in non-technical roles, 64 percent of men in technical roles, and 67 percent of men in non-technical roles—responded that their job performance was evaluated fairly. With respect to voice within their companies, 58 percent of women in technical roles—compared to 61 percent of women in non-technical roles, 65 percent of men in technical roles, and 63 percent of men in non-technical roles—agreed that it was safe to speak up in their companies most of the time.

Figure 3: Perceptions of Fairness and Voice



As with measures of supervisory satisfaction, the data clearly indicated that women in technical roles were least satisfied with certain elements of their workplaces relating to fairness and voice. If employers do nothing to correct perceptions of mistrust or unfairness within particular departments, business units, or companies overall, they take critical business risks. Indeed, inhospitable work environments have negative consequences for organizations and employees alike.

SUMMARY

Data presented in this chapter clearly indicated that companies have made significant progress in terms of their efforts to engage women in high-tech companies and improve women's experiences in the high-tech workplace. In most of the substantive areas evaluated here, no differences existed between women and men employees in terms of their satisfaction with their jobs or their employers. Despite this progress, the Towers Perrin-ISR survey data also clearly indicated that technical women were less satisfied than other employees with their supervisory relationships and with their companies' approaches to fairness and voice.

It is well-known that high-tech companies have often failed to train supervisors adequately—particularly those whose advancement into supervisory roles may have been due to their technical expertise rather than managerial capabilities. Many aspects of the issues related to supervisory relationships, fairness, and voice that were raised by employees surveyed here could be addressed effectively with high-quality training.

A fundamental driver of engagement within the technology sector is continuous development. While technical training and development is critically important, people development and talent management are also essential to business. High-tech companies must embrace the development of their supervisors and provide them with the training they need to develop, advance, and engage all the company's talent, including technical women.

In the next chapter, we delve more deeply into the topics of supervisory relationships, fairness, and voice, revealing suggestions from women in technology about how they would like their companies to improve in these two critical areas.

Findings at a Glance

- **Women working in technical roles and/or for high-tech companies said that there were several steps their supervisors could take to improve the supervisor-supervisee relationship, including:**
  - Communicating openly and directly with supervisees.
  - Providing regular, performance-related feedback.
  - Providing access to more challenging assignments.
  - Implementing stronger career- and goal-planning processes.
- **Women working in technical roles and/or for high-tech companies said their companies could enhance perceptions of fairness and voice by taking the following steps related to equal opportunity:**
  - Advancing and promoting more women.
  - Ensuring diverse corporate leadership.
  - Accepting diverse individual working styles.

Based on the Towers Perrin-ISR data, Catalyst launched an online survey of women to gain additional insight into the two areas where further improvement was needed: supervisory relationships and fairness and voice. We review findings from the online survey here.

SUPERVISORY RELATIONSHIPS

Quantitative findings from the online survey of women in technology were comparable to those found in analyses of the Towers Perrin-ISR data, although women in the online sample emerged as more positive on a couple of supervisory measures. As shown in Table 1, women in the online sample expressed similar levels of satisfaction on three measures of supervisory relationships as women in technical roles in high-tech companies surveyed by Towers Perrin-ISR. These measures included: supervisors' availability; supervisors' responsiveness to suggestions; and supervisors' communication skills. However, women in the online sample were more likely than women in the Towers Perrin-ISR sample to say that their supervisors were receptive to suggestions and that their supervisors provided regular feedback.

Table 1: Supervisory Satisfaction: Two Samples

Question	Catalyst Online Survey	Towers Perrin-ISR Survey
Supervisor Available When Needed	72%	69%
Supervisor Responsive to Suggestions	64%	65%
Supervisor Communicates Well	64%	66%
Supervisor Receptive to Suggestions	77%	66%
Supervisor Provides Regular Feedback	60%	52%

Voices of Women: Suggestions for Improving Supervisory Relationships

As part of the online survey, Catalyst asked women working in technology about ways in which supervisors could act to improve relationships with their direct reports.[29] Specifically, we asked women in technology the following open-ended question: *What could your supervisor do to increase your satisfaction with the supervisor-supervisee relationship?*

Women responding to the survey offered a variety of ways in which supervisors could act, but two emerged as particularly salient. The most often mentioned area for improvement was around supervisors' communication and feedback. Respondents stated that they wanted their supervisors to communicate clearly, openly, and directly with them, as well as improve communication skills. As one woman noted:

> *My supervisor doesn't know how to limit the information he communicates to the organization, and so he often gives us his opinion of how things should be rather than how they actually are. It can create confusion and uncertainty within the group. He will also have a conversation with one person, make a decision, and fail to communicate it to the rest of us. It makes others feel left out of the decision-making process….*
>
> —Woman in a non-technology company, technical role

Other respondents focused on performance-related feedback, as this woman did.

> *I have regular one-on-one meetings, but they don't focus only on performance. I would like them to do so more often.*
>
> —Woman in a high-tech company, technical role

Likewise, another respondent said:

> *[My supervisor could improve our relationship by] offering constructive feedback about my*

[29] For additional details regarding the survey and sample, please see Appendix 1.

performance. Too often I feel that our meetings are focused in on what I'm not doing right, never focusing in on what I am doing well or what I can do to improve.

—Woman in a non-technology company, technical role

By monitoring and improving the flow of information and by having open, direct conversations with employees about their performance and ways to improve their performance, supervisors can enhance women's satisfaction with the supervisor-supervisee relationship.

A second, related area that women in technology suggested as an area for improvement with respect to their supervisors was access to more challenging assignments and stronger career and goal planning. Respondents expressed the opinion that their supervisors should offer them the following.

- More direction within the organization
- Greater visibility
- More stretch assignments

The following quotations illustrate these points.

I would like to be involved with more projects than I am currently involved in; I feel that I am being underutilized. I would prefer my supervisor give me an opportunity…to expand my skill sets and my responsibility at work.

—Woman in a non-technology company, technical role

She [my supervisor] never nurtures my career.

—Woman in high-tech company, technical role

Survey respondents wanted their supervisors to engage more actively and more fully in their career development. This engagement could range from providing direct reports with additional responsibilities and with high-visibility assignments to providing greater guidance with respect to career-path opportunities within the organization. By building stronger goal-planning and career-planning systems and working with employees to develop their careers more fully, supervisors help to create trust, build loyalty, and enhance satisfaction among their direct reports.

FAIRNESS AND VOICE

The second area of concern that emerged among women in technical roles in high-tech companies centered on perceptions of fairness and voice. These perceptions are particularly important to address, as studies have indicated that employees who perceive their work environments or work procedures as unfair experience lower job satisfaction, lower levels of commitment, and lower performance appraisals.[30] Here, quantitative

[30] See, for example, Avery and Quinones; Konovsky; Sheppard et al.

findings from the online survey of women in technology were substantially similar to those found in the Towers Perrin-ISR analyses. Table 2 indicates that women in the online sample were closely aligned in terms of their perceptions of fairness and voice with women in technical roles in high-tech companies surveyed by Towers Perrin-ISR.

Table 2: Perceptions of Fairness and Voice: Two Samples

Question	Catalyst Online Survey	Towers Perrin-ISR Survey
Management Decisions Regarding Employees Are Usually Fair	53%	49%
Management Trusts the Judgment of Those at My Level	58%	54%
My Job Performance Is Evaluated Fairly	59%	59%
It Is Safe to Speak up Most of the Time	63%	58%

Voices of Women: Suggestions for Improving Organizational Fairness and Voice

Catalyst's online survey solicited from women action steps companies could take to enhance perceptions of fairness among employees and create environments where employees feel their voices are heard. When asked what their companies could do to enhance equal opportunity, women enumerated fair treatment in the following three areas as being especially important.

- Advancement and promotion
- Representative leadership
- Acceptance of diverse individual styles

As detailed below, responses in these three specific areas of fairness and voice indicated that women in technology want a level playing field—one in which individuals are given confidence that they can compete successfully regardless of their gender, race/ethnicity, or working style.

With respect to advancement, women wanted their companies to know that the paucity of women at higher corporate ranks was stark and notable. As one respondent phrased it:

> *I think if [management] saw in hard numbers the salary and promotion differentials between white men and everyone else, they would be shocked.*
>
> —Woman in a non-technology company, technical role

Other women agreed with this sentiment.

> *Often, positions are created and people [are] identified for them and promised those positions. Then the job is posted only due to formality. Essentially, the position is already filled before it's even posted.*
>
> —Woman in a non-technology company, technical role

Although there is equal opportunity at the surface level, if you look at the promotions and who is getting the most visibility, you will see things are not equal—especially between men and women.

—Woman in a high-tech company, non-technical role

As these quotations reveal, women working in technology were acutely aware of the lack of women in corporate leadership positions within their companies. Employers need to continually monitor their workforce statistics to ensure that advancement and promotion systems are not biased, and that women and people of color are represented and promoted at each organizational level.

As strong reinforcement and confirmation of the lack of women in management within their companies, women in technology also sent a clear message to companies about increasing diversity at higher organizational ranks. In the words of women themselves:

If I look up and all the managers are men, it doesn't feel open to me. If I look up and see a diverse set of leaders, I feel comfortable we can all succeed.

—Woman in a high-tech company, non-technical role

The company has virtually no women at the director or VP level except for in HR positions. There are also no women on the board of directors. More women need to fill director and VP spots.

—Woman in a high-tech company, technical role

Until women are truly represented in all layers of management, men will continue to be more comfortable working with other men and [will] hire and promote more men.

—Woman in a high-tech company, non-technical role

In addition to increasing the representative nature of the workforce within their companies, women in technology also wanted their companies to accept a wider range of working styles. Many of them expressed the belief that only a certain personality or working type was viewed as competent and that employees who did not conform to that style were penalized or disregarded. As one respondent said:

Preferences are given to certain personality types. People have to learn to adopt certain work styles in order to succeed. [I'm] not sure that is really embracing equal opportunity.

—Woman in a high-tech company, non-technical role

Similarly, another respondent wanted her company to:

> *Understand that talent comes in many forms.*
>
> —Woman in a high-tech company, technical role

One woman said that to enhance equal opportunity, her company's management and employees would have to:

> *Remove our mental image of that successful employee as an aggressive, take-no-prisoners, go-getter type…more styles [must be] seen to be valuable.*
>
> —Woman in a high-tech company, technical role

Thus, women in technology indicated that by embracing a wider variety of working styles, companies could allow people to work in the ways that are best suited to them—and in doing so, better meet the needs and goals of the company. As an added benefit of allowing people to be more authentic at work, companies can expect to build trust and perceptions of fairness among their employees.

SUMMARY

The progress companies have made on behalf of women has resulted in enhanced satisfaction for women in the technology workforce. Indeed, findings presented here indicate that differences between women and men in high-tech companies were not pervasive, nor were differences between women in technical jobs and women in non-technical jobs pervasive. These findings underscore the improvements that have been made by companies for women in technology. However, there remain two critical areas that companies must address if they are to more fully develop, satisfy, and retain women in the field. Companies must take steps to build and improve supervisor-supervisee relationships, as well as address procedural fairness and voice to increase the satisfaction and engagement of women. As the voices of the women surveyed imply, these two areas have tremendous implications for turnover and retention within companies. By attending to these concerns, companies will reduce the cost of losing employees to competitors, deepen levels of organizational commitment among women, and signal to others their willingness to innovate where their employees are concerned.

DIVERSITY AND INCLUSION PRACTICE

Intel: *Intercultural Awareness and Training—Part of Life at Intel*

Intel believes that its employees' unique perspectives and experiences enable the company to create innovative, market-driving products. As a company with employees all over the world, Intel has taken a comprehensive approach to cultural integration and awareness training. The company offers specific programs on intercultural training and also weaves lessons on cultural awareness into its general training and learning curriculum.

Intercultural content is featured in Intel's business-skills courses on topics such as decision-making, communication, and team-building. Intel also customizes training products for local use in specific countries and cultures. A "Constructive Confrontation" course, for example, was adapted to meet the unique needs of Asian cultures. Similarly, Intel's "Into Intel" program for new employees includes required classes such as "Performing to Intel Values," which helps employees and managers examine the tension between Intel values and their own cultural values.

Intel's courses on intercultural training include:

- Language courses for employees who have a business need to learn a language such as Mandarin, Spanish, or Japanese.
- English as a Second Language (ESL) courses for employees who want to improve their oral and written English communication skills.
- Country-specific courses that offer training on how to conduct business within a specific country or culture, such as "Working With China" or "Working With Israel."
- Globesmart—a web-based tool developed by Meridian Resources that provides in-depth, country-specific cultural information to users through a single, powerful repository—that helps employees conduct business more effectively around the world. Globesmart provides a "snapshot" of a country, explaining in detail its unique cultural and business practices and giving tips on how to approach conflict resolution and establish working and personal relationships.
- MicroInequities: The Power of Small—a course based on research conducted at the Massachusetts Institute of Technology (MIT)—that is designed to help employees identify the subtle positive and negative micro-messages that occur in daily interactions.

Intel's commitment to diversity and message of global inclusion permeates all facets of its employee training programs. Intel recognizes that workforce diversity is critical to the company's continued success and that to work and communicate effectively, employees need tools and resources to help them quickly understand various cultures and form relationships with colleagues and partners around the world. Because of its intercultural awareness training, Intel's employees are well-prepared to meet the needs of the global marketplace.

DIVERSITY AND INCLUSION PRACTICE

IBM Corporation: *Taking the Stage*

Taking the Stage®, developed by The Humphrey Group, is a program at IBM designed to show women how to achieve a strong leadership presence when speaking in any situation, from board rooms and meeting rooms to conference halls and phone calls. The four-step curriculum strengthens leadership skills of IBM women by using structured discussions and providing an opportunity to network and build relationships. As a result, IBM women can develop a more confident presence and become more persuasive leaders.

1) **Choosing to Take the Stage** focuses on achieving a leadership presence. It discusses the need to adopt a new mindset that helps women stand out and be heard.
2) **Unlocking the Power of Your Voices** shows women how to find their leadership voices. Participants are taught to avoid behavioral patterns that encourage others not to listen or that soften or suppress their voices and are given positive alternatives to practice.
3) **Creating a Leader's Script** teaches women how to "script" themselves as leaders—whether they are giving a speech or making a phone call.
4) **Developing a Powerful Presence** helps women establish confident body language by exploring various aspects of women's physical presence, including eye contact, pace, expression, body language, and gestures.

Taking the Stage® is accessed via IBM's intranet and conducted in a group setting or on an individual basis. It is a global program, so there is no central scheduling coordination or registration process. Rather, women are asked to take ownership of both scheduling and conducting their own discussion groups. Ideally, facilitators or discussion leaders are IBM women role models who can provide a forum for the program and the networking opportunities that will result from the gathering of women.

Designed to run one hour each in length, the four-part program consists of a web-based facilitator-led discussion (using Video JukeBox) and a facilitator guidebook. The facilitator guidebook includes all the information needed to conduct a session, including notes for the speaker, participant journals, class lists, discussion topics, questions to ask, feedback forms, and the link to Video JukeBox.

IBM has leveraged this resource in various venues including departmental meetings, business-unit town hall sessions, diversity network group lunch-and-learns, and mentoring meetings for technical women. Available to IBM women around the world, the four program components of Taking the Stage® have been viewed more than 36,000 times since the program launched in 2003.

Findings at a Glance

- **While barriers to career advancement continue to exist for women within the high-tech sector, the extent to which these barriers were perceived diminished in relation to previous cross-industry analyses.**
- **Women who worked with greater numbers of women in their workgroups or departments were less likely than others to perceive barriers to career advancement.**
- **Among the barriers that continue to exist for women in technology, women most often cited:**
  - A lack of role models similar to themselves.
  - Not having a mentor, sponsor, or champion to make accomplishments known.
  - Being excluded from important networks of decision-makers.
- **The perception of barriers to advancement varied by generational age, with Baby Boomers being more likely than members of Gen Y to perceive barriers to advancement.**
- **Women working in different types of companies differed on a number of individual-level and job-related characteristics, including educational background, nationality, managerial position, and job role. However, these differences did not translate into different perceptions when it came to barriers that had limited women's career advancement.**

By undertaking the online survey to better understand supervisory relationships and fairness, Catalyst had an additional opportunity to assess whether progress had been made in certain areas not reflected in the Towers Perrin-ISR data—namely, barriers to advancement—which Catalyst has been addressing for many years. Catalyst research has consistently shown that women face challenges in the workplace that men do not. Barriers to advancement—including a lack of access to informal networks, gender-based stereotyping, and a lack of role models—can inhibit women's ability to move ahead in their careers.[31]

BARRIERS TO ADVANCEMENT

Despite a large degree of satisfaction among the women represented in the online survey, results confirmed the presence and persistence of barriers for women working in the high-tech field. On a positive note, however, women in this sample were less likely than women in previous cross-industry Catalyst studies to state that they faced significant barriers to career advancement.

[31] Catalyst, *Women in U.S. Corporate Leadership: 2003* (2003). In this 2003 study, Catalyst found that 46 percent of women in the *Fortune* 1000 named exclusion from informal networks as a barrier to their career advancement; 46 percent named gender-based stereotypes as a barrier; and 43 percent named a lack of role models as a barrier.

Some women working in technology were more likely to perceive barriers to career advancement than others. When we examined a scale measure of the barriers we found that women with graduate degrees—specifically, a Master's degree or higher—were more likely to perceive barriers to career advancement than women without Master's degrees.[32] This finding is not surprising, given that women with more education are more likely to be higher up in corporations and may have experienced a glass ceiling.

Women working in larger corporations were more likely to perceive barriers to career advancement than women working in smaller corporations.[33] In large corporations, it may be harder to "get noticed" since women face competition from greater numbers of coworkers seeking advancement. This finding reinforces the need for women to have influential mentors or champions who can call attention to their quality work and abilities.

Lastly, women who worked with smaller percentages of women in their workgroups or departments were more likely to perceive barriers to career advancement.[34] Since fewer women were, by definition, available to serve as role models or mentors, this finding was expected. Interestingly, however, the relationship held regardless of the sex of a respondent's supervisor. That is, women working for male supervisors and for a department with a lower percentage of women perceived greater barriers than those working for male supervisors and for a department with a higher percentage of women; the same held true for women employees with women supervisors.

This finding reinforces the importance of having more women on teams and in departments. Increasing the number of women in a workgroup or department increases the likelihood that individual women will find similarly situated others who can serve as sounding boards, role models, and mentors. It also creates more opportunities for women to network within departments.

Technical women and non-technical women did not differ in the extent to which they perceived barriers to career advancement, nor were there differences between technical women in high-tech companies and technical women in non-technology companies.

Individual Barriers: Overall Sample

Overall, women working in technology were most likely to say that lacking similar role models in their companies constituted a barrier for them. As shown in Table 3, 38 percent of women surveyed said that this lack of role models affected their career advancement to a great or very great extent. Similarly, 34 percent of women said that not having an influential mentor, sponsor, or champion who made their accomplishments known posed a significant barrier for them. Just under one-third of women surveyed—32 percent—said that being excluded from the important networks of influential decision-makers hampered their career advancement. The

[32] Result derived through ordinary least squares regression, $p<.05$.
[33] Result derived through ordinary least squares regression, $p<.05$.
[34] Result derived through ordinary least squares regression, $p<.001$.

perception of these barriers reinforces the importance of advancing women within corporations, as well as the importance of attracting and retaining significant numbers of women employees.

More than one-quarter of women surveyed also agreed that having a limited number of important or special job assignments that were highly valued by higher-level managers affected their career advancement to a great or a very great extent. Other barriers to advancement that were named as particularly challenging by about one in five women included not understanding the "unwritten rules" of a department or company (21 percent), not getting sufficient performance-related feedback (20 percent), being seen as not having been in the pipeline long enough to be promoted (20 percent), facing gender-based stereotypes about abilities or commitment (19 percent), and not fitting the company image of how a leader should look and behave (18 percent).

Table 3: Individual Barriers to Career Advancement: Overall Sample

Barrier	Percentage of Women Responding That Barrier Affected Career Advancement to a Great or Very Great Extent
Lacking Role Models in the Company Who Are Similar to Me	38%
Not Having a Mentor, Sponsor, or Champion Who Makes My Accomplishments Known to Important People in the Company	34%
Being Excluded From the Important Networks of Key Decision-Makers	32%
Having a Limited Number of Important or Special Job Assignments That Are Highly Valued by Higher-Level Managers	27%
Not Understanding the "Unwritten Rules" or Norms of My Company or Department	21%
Not Getting Sufficient Feedback That Would Allow Me to Improve My Performance	20%
Being Seen As Not Having Been in the Pipeline Long Enough to Be Promoted	20%
Facing Stereotypes About My Commitment or Abilities Based on My Gender	19%
Not Fitting the Company Image of How a Leader Should Look and Behave	18%
Not Having the Necessary Flexibility to Manage Work and Personal Life	12%
Feeling Like an Outsider in the Company Because of My Race, Ethnicity, or Nationality	7%

PROGRESS FOR WHOM? GENERATIONAL COHORTS

To further explore the perception of barriers to career advancement, Catalyst examined subgroups of women. Some variability appeared in the barriers that posed the greatest hurdles to women in technology when we examined subsets of women based on age and organizational type. In Table 4, we focus on how different generations of women—including Baby Boomers, Gen Xers, and Gen Yers—perceived barriers to their own advancement.[35]

Table 4: Individual Barriers to Career Advancement: Generational Cohorts

Barrier	Percentage of Women Responding That Barrier Affected Career Advancement to a Great or Very Great Extent		
	Boomers	Gen X	Gen Y
Not Having a Mentor, Sponsor, or Champion Who Makes My Accomplishments Known to Important People in the Company	45%	32%	18%
Lacking Role Models in the Company Who Are Similar to Me	43%	38%	31%
Being Excluded From the Important Networks of Key Decision-Makers	40%	32%	20%
Having a Limited Number of Important or Special Job Assignments That Are Highly Valued by Higher-Level Managers	26%	28%	27%
Not Understanding the "Unwritten Rules" or Norms of My Company or Department	25%	20%	16%
Not Fitting the Company Image of How a Leader Should Look and Behave	23%	18%	16%
Not Getting Sufficient Feedback That Would Allow Me to Improve My Performance	22%	20%	20%
Facing Stereotypes About My Commitment or Abilities Based on My Gender	21%	20%	16%
Being Seen As Not Having Been in the Pipeline Long Enough to Be Promoted	18%	18%	33%
Not Having the Necessary Flexibility to Manage Work and Personal Life	14%	13%	4%
Feeling Like an Outsider in the Company Because of My Race, Ethnicity, or Nationality	10%	6%	2%

[35] Women aged 47 through 66 (the high end of the age range in the sample) were classified as Baby Boomers and comprised 23 percent of the sample. Women aged 28 through 46 were classified as Gen Xers and comprised 67 percent of the sample. Women aged 21 (the low end of the age range in the sample) through 27 were classified as Gen Yers and comprised 10 percent of the sample. These percentages were consistent with the generational distribution found in the overall workforce at the time of the survey.

As Table 4 indicates, women in the Baby Boom generation were most likely to perceive barriers. This finding is not surprising, given that these women have been in the workforce longer and are more likely to have experienced or witnessed the difficulty that women have faced with regard to advancement. For Boomer women, not having a mentor, sponsor, or champion in the corporation to make their accomplishments known represented the most significant barrier, followed closely by lacking similar role models in the company and being excluded from important networks of decision-makers.

Generation X women shared the top barriers with the women of the Baby Boom generation, though in slightly different order of importance. Lacking role models similar to them was the most-often cited barrier for this group. Because these women are at a critical point in their careers—being at an age where many of them may be breaking into management and beginning to climb the corporate rungs—a lack of role models would be especially salient at this time. However, networks and mentors were also important to them, and a lack of access to or presence of these influential people was named by almost one-third (32 percent) of these women as having limited their career advancement.

Women in Generation Y were least likely among the three generational cohorts to express the belief that their careers had been limited by barriers. Because these women were just embarking on their career paths, this finding is understandable. Indeed, for them, having not been in the pipeline long enough to be promoted was viewed as the most prominent barrier, with one-third (33 percent) of these women citing this barrier. Gen Y women in technology, like Gen Xers and Baby Boomers, also named a lack of similar role models in their companies as an impediment; almost one-third (31 percent) of Gen Yers cited this as a factor that limited their advancement. Finally, more than one-quarter (27 percent) of Gen Y women said that having a limited number of important or special job assignments that were highly valued by higher-level managers constituted a barrier for them.

The findings for the various generational cohorts revealed that perceptions of barriers to career advancement did vary with age. Older women were more likely to perceive barriers to advancement than younger women. However, a lower proportion of women in technology—overall and in each generational cohort—claimed that barriers to their career advancement existed compared to women in previous Catalyst studies.

PROGRESS WHERE? TYPE OF COMPANY

The culture and climate of high-tech companies varies from one place to the next: some are engineering-driven, and some are marketing-driven; some are very young, and some are a century old; some are "Silicon Valley," and some are not; some are constantly turning out new products, and some rely on established mainstream products; some are explosively high-growth, and some keep pace with the economy; some are global, and some are not.

All of this is to say that companies within the high-tech sector are not monolithic. Therefore, as with generational differences, Catalyst wanted to know if the likelihood of perceiving barriers to career advancement varied

when we considered perceptions of companies' position in the marketplace vis-à-vis the products or services they provided.

To begin to uncover some of these differences, Catalyst asked survey respondents to answer the following three questions about their firms[36]:

- Were the major products or services currently produced by the organization available in the marketplace five years ago?
- Is your organization required to constantly make major technical changes in products or processes to be competitive?
- Is allocating resources to research and development a major priority in the organization's budget decisions?

Respondents who answered "No" to the first question and "Yes" to the second and third questions were classified as working for technology company type A. Respondents who did not answer in this manner were classified as working for technology company type B. We then compared the perception of barriers among respondents from company type A and company type B.

Analyses of the three questions as laid out above revealed that 16 percent of the sample worked for company type A; 84 percent of the sample worked for company type B. Table 5 details differences between the two samples.

Table 5: Individual and Job Characteristics: Type of Company

Individual and Job Characteristics	Company Type A	Company Type B
Bachelor's Degree in Science, Engineering, Technology**	80%	60%
Doctoral-Level Degree**	20%	6%
Different From Majority of Employees in Company Due to Nationality*[37]	23%	14%
Top-Level Manager**	15%	5%
Both Line and Staff Responsibilities*	22%	13%
Supervised by a Male*	83%	74%
Work for a Global Company**	82%	91%
Work for a Hardware Company*	28%	19%
Work for a Services Company**	43%	64%
Work for a Company That Is Exclusively Internet***	15%	39%

Chi-square tests were employed to ascertain that differences were statistically significant. A single asterisk denotes $p<.10$; two asterisks denote $p<.05$; three asterisks denote $p<.001$. No statistically significant differences emerged on the following variables: working in a technical role; number of years worked in the high-tech industry; years worked for current employer; percentage of women in workgroup or department; or working for a company that was exclusively software.

[36] Non-technology companies were excluded from the analyses in this section.
[37] No statistically significant differences were reported for other dimensions of identity on which respondents expressed difference from the majority of employees at their companies, including differences based on age, gender, sexual orientation, race/ethnicity, or marital status.

As Table 5 reveals, some interesting trends emerged when we examined these subgroups of women. Women working in companies classified as type A were more likely to have college science, engineering, or technology degrees and were also more likely to hold doctoral-level degrees. Respondents at type A companies also were more likely to indicate that they were different from the majority of their company's employees based on their nationality.

When we examined job characteristics, we noticed that women in type A companies were more likely to be top-level managers. This finding suggests that women may have greater opportunities for advancement and upper-level management when they are in this type of organization.[38] The data also suggested that these companies were less likely than type B companies to be global, or to be Internet or services-focused. Type A companies were more likely to be producing exclusively hardware than type B companies were.

Women in type A companies were more likely than women in type B companies to have both line and staff responsibilities, suggesting that there may be some ambiguity and/or flexibility in the type of work women do in type A companies. Women in type A companies also were more likely to be supervised by men.

Overall, the perception of barriers between women working in type A companies and those working in type B companies was strikingly similar. Only one difference emerged: women in type A companies were slightly less likely than women in type B technology companies to state that a lack of flexibility had hindered their career advancement.[39]

These analyses reveal while the women working in each of these types of companies varied on a number of individual-level and job-related characteristics, these differences did not translate into different perceptions when it came to barriers that had limited their career advancement.

[38] We investigated the possibility that this effect was due to company size, but found no evidence to support this hypothesis.
[39] Chi-square test with $p<.10$.

SUMMARY: INDIVIDUAL BARRIERS TO CAREER ADVANCEMENT BY SUBGROUP[40]

Women in technology were less likely than women in previous Catalyst studies to perceive barriers to their own career advancement.

Barriers Named by Women in the *Fortune* 1000[41]

In a 2003 study, Catalyst found that *Fortune* 1000 women named barriers to their career advancement similar to the ones named by women in technology. However, the *Fortune* 1000 women were more likely than women in technology to perceive barriers.

- 46 percent of *Fortune* 1000 women named exclusion from informal networks as a barrier.
- 46 percent of *Fortune* 1000 women named gender-based stereotypes as a barrier.
- 43 percent of *Fortune* 1000 women named a lack of role models as a barrier.

As was indicated by the Towers Perrin-ISR data, companies appear to have made progress for women in technical roles and in technology companies. Findings of barriers to advancement among different subgroups of women in technology were quite consistent, with small variations among women based on generational age and type of company.

The overall message that emerged from the barriers analyses is that a lack of women colleagues—who serve as mentors and champions, who act as role models, and who provide opportunities for the formation of networks—is a substantial and systemic obstacle to the advancement of women in technology. Increasing the number of women in high-tech companies, especially in highly visible leadership roles, is crucial to building momentum for further growth. Indeed, the lack of women in leadership positions itself appears to be posing a barrier to other women's advancement.[42] Both the high-tech industry as a whole and non-technology companies must be aware that, in failing to recruit, retain, and advance women in sufficient numbers, they put at risk the satisfaction and retention of the women they do employ.

[40] Appendix 2 presents a summary table of rankings of individual barriers to career advancement among the subgroups of women analyzed.
[41] Catalyst, *Women in U.S. Corporate Leadership: 2003* (2003).
[42] Catalyst, *Women in U.S. Corporate Leadership: 2003* (2003). Catalyst, *Women and Men in U.S. Corporate Leadership: Same Workplace, Different Realities?* (2004).

High-technology companies across the globe now recognize that "gender diversity is no longer just an HR goal; it has become a business imperative."[43] As companies increasingly compete in a global market, the recruitment, advancement, and retention of women has taken on greater importance. While high-tech companies have made progress in recent years, critical areas of improvement remain to be addressed so that women's talents—especially those of technical women—can be fully leveraged. The findings in this report point to concrete steps companies can take to improve the advancement and talent management of women.

Supervisory relationships and fairness and voice emerged as areas of primary concern for technical women. Given these findings, companies must ensure that managers receive adequate training to enhance their people management, communication, and decision-making skills. In high-tech companies, technical expertise is a core requirement for advancing the business, and as such, it is—and should be—valued and rewarded. However, the data here illustrate that people development and a greater organizational focus on developing managers' people skills must also be valued and rewarded because they are also core to the business.

Technical women surveyed made it clear that they want their supervisors to act on their behalf and in ways that are fair. To achieve this, supervisors need to be trained so that their ability to communicate with women, coach women, and provide career guidance is improved. Supervisors must be given the necessary skills—including how to give feedback, develop and communicate career plans, and identify advancement opportunities—to act effectively on behalf of their employees. Without this training, supervisors have to rely on modeling behavior they have seen in their own careers—which may or may not be a platform for supervising well.

In addition to training, high-tech companies must examine the reward systems they put into place for supervisors and managers. Creating and building effective teams is essential to a company's business and must be recognized and rewarded. By rewarding innovation and excellence not only for product or service achievements, but also for personnel development and team achievements, companies convey the importance of people management to the business.

Additionally, companies must ensure that routine mechanisms are in place to track the representation, retention, and promotion rates of employees by both gender and race/ethnicity. Measurement of workforce trends is critical to building a business case for diversity, and for seeing where gaps and biases in promotion and advancement may exist. More importantly, until companies have a critical mass of women at every level, in every department, and in every functional area, they are undermining the progress they make along other dimensions of inclusion.

[43] "Women Are IT," *HT Mint (Hindustan Times Supplement)*, November 5, 2007, vol. 1, no. 38, p. C1.

Career development and talent management are vitally important issues for both women and men in technology companies, as well as for companies themselves. By taking action on the areas of concern outlined in this report, high-tech companies can continue to build corporate cultures in which women's talent is fully developed and valued. By providing evidence on the talent management challenges that women in the high-tech industry currently face as well as solutions-oriented suggestions for addressing these challenges, we hope that the industry will continue to take notice and take steps to make greater progress possible for women in both technical roles and in technology companies.

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APPENDIX 1: METHODOLOGY AND SAMPLE CHARACTERISTICS

PHASE 1

The Towers Perrin-ISR surveys for Phase 1 of the project were fielded at 21 high-tech companies from 2002-2005. While the data represent 21 high-tech companies, there were 23 "survey events," meaning that for two companies, more than one division was surveyed.

Company-Level Characteristics

- 82 percent of respondents worked for companies with global operations.
- 70 percent of respondents worked for organizations with at least 30,000 employees worldwide.
- 11 percent of respondents worked for organizations with more than 100,000 employees worldwide.
- 77 percent of respondents worked for companies with more than $1 billion in annual sales.
- 17 percent of respondents worked for companies with more than $5 billion in annual sales.

PHASE 2

The online survey in Phase 2 was fielded from January through February of 2007. Participants were recruited using the "snowball" technique.[44] The survey examined two groups of women: 1) women working for technology companies in any role; and 2) women working for non-technology companies in technical roles. Catalyst received 471 completed responses to the survey.

Respondents provided data for two sets of demographic characteristics: 1) company-level characteristics; and 2) individual-level characteristics.

Company-Level Characteristics

- 85 percent of respondents worked for companies with global operations.
- 45 percent of respondents worked for companies with fewer than 60,000 employees worldwide; 40 percent of the sample worked for organizations having between 60,000 and 100,000 employees; and 7 percent of the sample worked for companies with more than 200,000 employees worldwide.
- 79 percent of respondents considered their companies high tech.

Individual-Level Characteristics

- 67 percent of respondents were employed in technical roles.
- 56 percent of respondents held line jobs; 31 percent held staff jobs; and 13 percent had both staff and line responsibilities.
- 52 percent of the sample held non-managerial positions; 18 percent worked in lower management; 25 percent worked in middle management; and 5 percent held positions in upper management.

[44] Because the resultant sample was a "convenient" sample, the findings may or may not generalize to the population.

- 32 percent of the sample had worked for 10 or fewer years; 36 percent of respondents had worked for between 11 and 20 years; and 32 percent had worked 20 or more years.
- 25 percent of women sampled had worked for their employers for between zero and two years; 22 percent had worked for their employers for between three and five years; 32 percent had worked for their employers for between 6 and 10 years; 21 percent had been with their employers for 11 or more years; and 5 percent had been with their employers for more than 20 years.
- Respondents' ages ranged from 21 to 66, with a median age of 38 years.
- 34 percent of the sample held a Bachelor's degree; 38 percent held a Master's degree; 12 percent had completed some graduate work; and 8 percent held a doctoral, law, or medical degree.
- 61 percent of respondents held a college degree in science, engineering, or information technology.
- 69 percent of respondents were married; 21 percent were single; and 10 percent were either divorced or widowed.
- 61 percent of the sample had no children; 34 percent of the sample had one or two children; 5 percent had more than two children.
- 87 percent of respondents worked in the United States; 7 percent worked in Canada; 4 percent worked in Asia; and 3 percent worked in Europe.

APPENDIX 2: BARRIERS TO CAREER ADVANCEMENT— SUMMARY RANKINGS

Individual Barriers to Career Advancement: Summary Rankings

	Overall	Company Type A	Generations		
			Boomers	Gen X	Gen Y
Lacking Role Models in the Company Who Are Similar to Me	1	1	2	1	2
Not Having a Mentor, Sponsor or Champion Who Makes My Accomplishments Known to Important People in the Company	2	2	1	2	
Being Excluded From the Important Networks of Key Decision-Makers	3	3	3	2	
Having a Limited Number of Important or Special Job Assignments That Are Highly Valued by Higher-Level Managers	4		4	3	3
Not Understanding the "Unwritten Rules" or Norms of My Company or Department					
Not Getting Sufficient Feedback That Would Allow Me to Improve My Performance		4			4
Being Seen as Not Having Been in the Pipeline Long Enough to Be Promoted					1
Facing Stereotypes About My Commitment or Abilities Based on My Gender					
Not Fitting the Company Image of How a Leader Should Look and Behave		4			
Not Having the Necessary Flexibility to Manage Work and Personal Life					
Feeling Like an Outsider in the Company Because of my Race, Ethnicity or Nationality					

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