REBOOTING REPRESENTATION

Using CSR and philanthropy to
close the gender gap in tech

McKinsey&Company

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VENTURES

FOREWORD

The technology sector occupies a unique role in our society as one of our most powerful engines of economic growth and social mobility. Ensuring more women have pathways into this sector is both a fundamental issue of equity and a business imperative. The data is clear that diverse companies are more innovative and profitable. Tech companies have much to gain—and much they can contribute—by choosing to make diversity and inclusion a priority.

The report you see before you is the result of a first-of-its-kind effort to collect data directly from tech companies to understand how they approach philanthropic and corporate social responsibility (CSR) initiatives focused on closing the gender gap in tech. The research suggests there is significant potential for tech companies to use these levers to drive progress, especially for tech's most underrepresented group: women of color.

Collectively, the 32 tech companies we surveyed spent slightly more than $500 million on philanthropic giving in 2017, but only around 5 percent of that $500 million went toward programs aimed at correcting tech's gender imbalance. We also found that, although the companies expressed a strong desire to increase the number of black, Latina, and Native American women and girls in tech, less than 0.1 percent of their philanthropic investing was directed at removing the barriers keeping these women and girls of color from pursuing careers in tech. Increasing these investments can help change the face of the industry.

It is our hope that this analysis will empower companies with concrete guidance for developing more effective gender-focused philanthropic and CSR strategies—and that it will position tech leaders who want to be part of the solution to put those ambitions into action.

Melinda Gates, philanthropist
Kevin Sneader, global managing partner, McKinsey & Company

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It is hardly news that women—and particularly women of color—are chronically underrepresented in the US tech sector.

Perhaps more alarming is that the trend is headed in the wrong direction. The percentage of computing roles women hold has largely declined in the United States over the past 25 years.[1] Unless we take action, the trajectory is unlikely to change.

The situation is even more grave for underrepresented women of color: black, Latina, and Native American women. Despite accounting for approximately 16 percent of the general population, these women of color only hold around 4 percent of roles in the computing workforce, and are almost completely absent at the senior leadership level, with zero black or Latina women CEOs of Fortune 500 tech companies.[2] While men of color are also largely excluded from tech, they participate at almost three times the rate of women of color.[3]

Things are getting worse, not better:

- The share of black, Latina, and Native American women receiving computing degrees has dropped by one-third over the past decade, from 6 percent to 4 percent.[4]

- If this trend continues, the number of underrepresented women of color receiving computing degrees will not double over today's numbers until 2052—by which time they will represent a vanishingly small proportion of all graduates.[5]

This lack of gender diversity carries with it a major opportunity cost, both for individual tech companies and the entire sector.

WOMEN COMPRISE JUST:

23% of high school Advanced Placement Computer Science exam takers

19% of bachelor's degree recipients for computer and information sciences

26% of jobs in the computing workforce
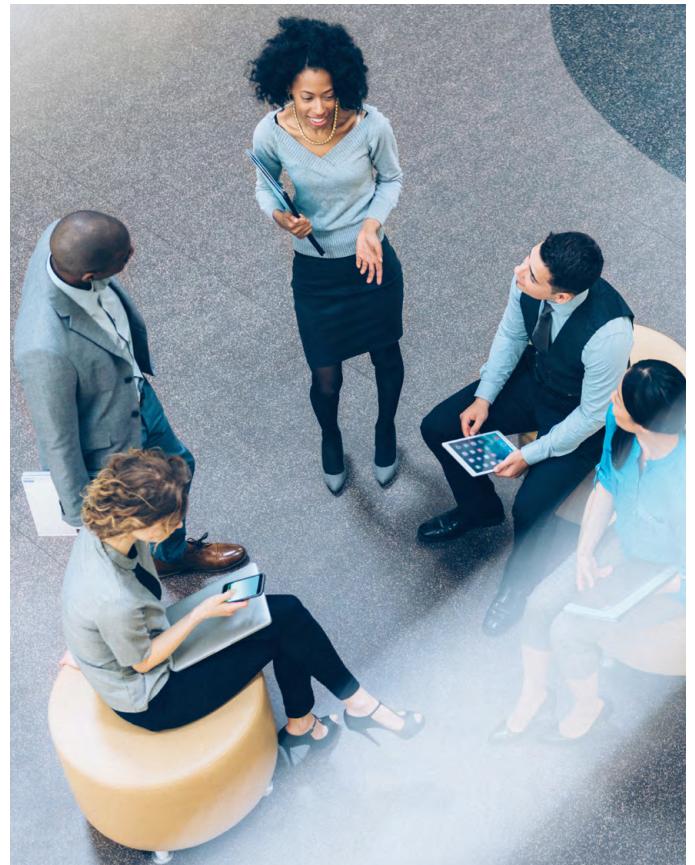
11% of chief information officer roles in tech companies

11% of senior leadership roles in tech companies
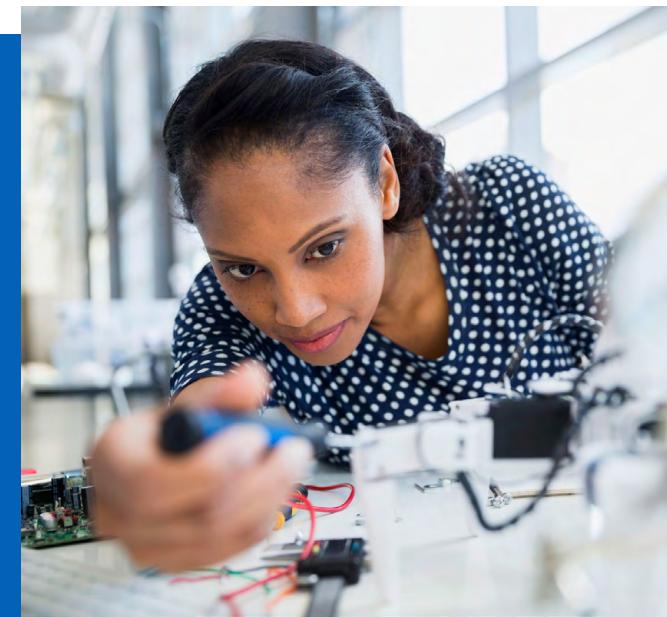
Sources: College Board, collegeboard.org; Integrated Postsecondary Education Data System, National Center for Education Statistics, nces.ed.gov/ipeds; "By the numbers," National Center for Women & Information Technology, April 9, 2018, ncwit.org; Alexis Krivkovich, Kelsey Robinson, Irina Starikova, Rachel Valentino, and Lareina Yee, *Women in the Workplace* 2017, October 2017, McKinsey.com.

Diverse teams, including ones with greater gender diversity, are on average more creative, innovative, and ultimately more profitable.[6] This strong, positive correlation between higher levels of employee diversity and stronger financial performance has been demonstrated consistently across sectors and geographies, and tech is no different.[7] Plus, tech companies' recent public struggles on gender-related issues have demonstrated there are real, immediate costs that result from a lack of inclusion and diversity—lost stock value, lower market share, HR costs, and public relations costs, among others.

- The tech sector needs to innovate to expand its technical workforce—and quickly.

- Demand for advanced IT and programming skills will grow by as much as 90 percent over the next 15 years.[8]

- Business leaders across sectors are already reporting an expected tech skills shortage in their companies within the next three years.[9]

- The competition for technical talent is about to become much fiercer across industries as companies of all types grow their technical capabilities.

- To stay ahead, the tech sector needs to rapidly expand its talent pool by investing in and attracting historically underutilized talent, including women.

IT IS TIME TO TRANSFORM TECH.

Despite the growing number of voices pushing for gender equality across the United States, and many tech companies stating diversity as a priority, we are not yet seeing concrete gains in the industry.

If tech companies can successfully create pathways for women and girls—particularly the most marginalized women of color who face the greatest number of barriers—to pursue careers in technology, the industry will benefit from a much broader talent pool and realize new economic opportunities.

Tech companies have been primarily focused on using their HR and diversity and inclusion (D&I) functions to improve their recruitment, retention, and advancement of women. While these efforts have been complemented by philanthropy and corporate social responsibility (CSR) initiatives focused on building the gender diversity of the overall talent pipeline, these external efforts are needed at a much greater scale.

Fortunately, there is not a major drop-off in women's representation in tech in the transition between college and the workforce, suggesting that recruitment into the sector is working effectively.[10] However, given the small share of computer and information sciences degrees held by women (19 percent), and especially underrepresented women of color (4 percent), these recruitment efforts will not expand the talent pool, meaning women's overall low levels of representation will not change.[11] As such, tech companies' strategies need to evolve, increasing their focus on growing the number of women and girls pursuing computing education in the first place.

Companies can increasingly use CSR and philanthropic initiatives to complement their current internal strategies and create new pathways for women into tech.

CSR and philanthropy efforts are a unique lever because they allow companies to work with communities to involve women and girls in tech at various stages of their educational journey. Such efforts include financial contributions to non-profit organizations, in-kind contributions of employee time and expertise, convenings and public awareness campaigns, and sponsored research. Using CSR and philanthropy to actively shape the larger tech talent environment today will enable tech companies to expand the talent pool they will hire from tomorrow.

PURPOSE OF THIS REPORT

This report draws attention to concrete opportunities for tech companies to use their philanthropy and CSR efforts to create pathways for women and girls into the sector. While the report speaks directly to tech companies, it contains insights that will be useful to a range of actors involved in tech, gender equality, and education.

This report examines the current state of how tech companies use their philanthropy and CSR to address gender diversity, providing companies, non-profits, and academics with groundbreaking insights on where the tech sector's investments go, how decisions are made, and what the main opportunities and challenges are for executing a gender-diversity strategy via philanthropy and CSR.

In addition, this report shares what works for women and girls in tech, using insights from interviews with approximately 100 experts across the field—practitioners, researchers, policy makers, and tech-company leaders alike—to call out opportunities for investment and help companies identify, support, and scale programs that will deliver results for women and girls.

Finally, this report describes opportunities for action by individual tech companies, and the tech sector as a whole, to accelerate efforts to improve gender diversity through philanthropy and CSR, providing companies with a practical tool kit to develop effective strategies that leverage their company's unique assets and capabilities.

Tools in this report

Building blocks checklist for companies to use in discussions with grantees and in designing their own gender-diversity initiatives to ensure that programs are designed with the specific needs of women and girls in mind (p. 58)

Metrics dashboard describing the key indicators for companies and their grantees to capture across their CSR and philanthropic programs to help determine what's working (p. 53)
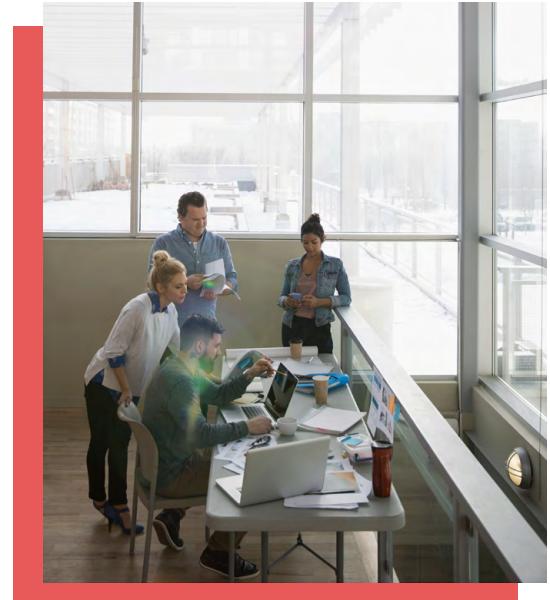
Short list of action opportunities, consisting of five major strategies for how tech companies can drive gender diversity through philanthropy and CSR, based on what we know works and what's most needed to have real impact (p. 42)

Strategy diagnostic tool to help companies develop a philanthropic and CSR strategy on gender diversity that leverages their unique assets to generate impact at a greater scale than the dollar value of their investments would otherwise enable (p. 80)

CURRENT PHILANTHROPIC AND CSR EFFORTS TO ADDRESS GENDER DIVERSITY IN TECH

Through a survey of 32 leading tech companies representing nearly $500 billion in revenue and more than $500 million in philanthropic giving in 2017, as well as extensive interviews with approximately 40 tech-company leaders, we found:

- Most companies do not apply a gender lens to their CSR and philanthropy. Despite many leaders' stated desire to bring more women into the sector, most companies do not invest significantly in improving the gender diversity in tech through their philanthropy. In 2017, only 5 percent ($26 million) of companies' philanthropic giving went to programs with an explicit focus on women and girls in tech. Without deliberately focusing on women's representation in programs that prepare people for careers in tech, companies risk replicating the same gender ratios we see in the sector today.

- Underrepresented women and girls of color fall through the cracks. Though companies express a strong desire to reach underrepresented women of color, less than 0.1 percent (or $335,000) of the 32 tech companies' 2017 philanthropic giving focused on reaching them specifically. Many companies sponsor programs to reach underrepresented minority communities generally, rather than doubling down on removing barriers for women of color in particular. This current gender-neutral approach is unlikely to change the persistently low number of underrepresented women of color in tech.

- Current investments focus on middle and high school students, though later on-ramps are effective at involving more women and girls. Companies concentrate 66 percent of their philanthropic funding on K–12 programs, compared to 3 percent on college-level programs. Though many invest in recruiting efforts in the later college years, few invest philanthropically earlier in higher education to build the cohort they will ultimately recruit from, pointing to a missed opportunity for tech companies to influence the pipeline in the short term.

- Decision-making and ownership regarding gender-diversity initiatives are fragmented within tech companies. Companies reported that their various groups and functions involved in gender diversity (for example, HR, D&I, and CSR) rarely coordinate on strategy, with no clear owner overseeing the company's approach to increasing the number of women in technology overall. Companies that successfully link their philanthropy and CSR efforts together with their D&I initiatives under a unified strategy are more likely to see success on both fronts.

- Companies struggle to navigate the limited evidence of what works. Sixty-one percent of companies reported that it is difficult to know which programs have the most impact, and 42 percent resort to self-guided online research to drive their giving strategy. The need for more research, as well as the synthesis and dissemination of findings, is clear.

BEST PRACTICES TO INCREASE TECH SECTOR GENDER DIVERSITY THROUGH PHILANTHROPIC AND CSR INVESTMENTS

This report distills the evidence regarding the approaches that show the most promising results in increasing the number of women studying computing and entering tech. A few critical best practices emerged from this research. Tech companies can draw on them in the design of their own programs and when engaging with organizations they fund or partner with.

Focus on women and girls.

As part of a broader diversity effort, it is important for companies to support either girls-only programs or coed programs that focus on achieving at least 40 percent representation of girls through proactive recruitment and retention efforts. Maintaining a focus on women's equal representation, with stated goals at the program level, is the only way to avoid replicating the same gender ratios we see in tech today.

Solve for those facing the most barriers—underrepresented women and girls of color.

Women experience different types of roadblocks and biases when studying computing and pursuing a career in tech that may be due to their race or ethnicity, socioeconomic status, sexuality, and other elements of their identities and backgrounds. Companies can support strategies and programs that attend to the specific challenges faced by the segments of women who are facing multiple forms of marginalization. Focusing on the experiences of those who face the greatest number of barriers will spur solutions that ultimately improve the inclusion of the tech sector for all underrepresented groups.

It is never too late; consider multiple on-ramps.

Girls and women can begin their journeys into tech at many different points in their lives. According to our research, because girls are less likely than boys to have previous exposure to computing as children,[12] later on-ramps—such as those during higher education—are a high-impact opportunity to make up lost ground by onboarding women and girls with minimal previous exposure to computing.

Deliver eight critical building blocks for success.

The evidence base points to eight components that programs need to incorporate to empower women and girls to succeed in tech. Tech companies should work with their partners to ensure these success factors are in place to maximize the impact of their investments:

01 Offer on-ramps for beginners

02 Create a sense of belonging

03 Build her confidence in her abilities

04 Cultivate a community of supportive peers

05 Ensure adult gatekeepers (family, teachers, counselors) are encouraging and inclusive

06 Foster interest in computing careers

07 Create continuity between computing experiences

08 Provide access to technology and computing experiences

Connect programs to each other.

Most programs only target one particular stage in the tech journey. However, if women's and girls' experiences in tech are one-off, they are less likely to remain engaged in computing. Companies can encourage the programs they support to connect with one another and transition young women smoothly from one experience to the next—and invest to fill any gaps in the program offerings. Developing this "connective tissue" increases the likelihood that the experiences a company invests in will ultimately lead to women entering the sector.

Measure impact.

Companies can drive knowledge development by funding organizations and grantees to collect data against a consistent set of metrics. This report contains a dashboard that captures the relevant metrics for companies to apply across their CSR and philanthropic programs related to women in tech; the intention is to help the field coalesce around a manageable set of indicators that will enable us to understand what works.

Tech companies will be most effective in increasing the number of women and girls in tech if they apply the tactics listed above through a distinctive and evidence-based philanthropic and CSR strategy.

Choose a strategic focus that reflects your company's unique DNA.

Aligning on a strategic focus helps companies allocate resources most effectively to deliver on their ultimate objectives. This research identified five high-impact opportunities for company action based on the evidence of what works and what is needed most to foster gender diversity in tech:

- Fight stereotypes about women in computing (p. 45)

- Create more inclusive experiences of computing for girls in middle and high school (p. 46)

- Redesign the experience for college students majoring in computing (p. 47)

- Create connections among programs so women and girls move directly from one tech experience to the next (p. 49)

- Build knowledge of which programs are working (p. 54)

In addition, this report provides a strategy diagnostic tool (see p. 80) that guides companies through a structured conversation to determine the optimal inputs to their strategy design that align with their existing competitive advantages.

Take a best-practice approach to strategy design.

Today, many companies are hampered by the difficulties of coordinating across a disconnected set of initiatives and stakeholders working on various aspects of this issue from within HR, D&I, CSR, corporate philanthropy, and business units. It does not have to be this way.

- Unite all the company's activities and initiatives under an overarching strategy for gender diversity in tech. By bringing together the relevant players, companies can link up internal and external-facing efforts to deliver on a cohesive strategy.

- Designate a senior executive sponsor to coordinate the company's comprehensive gender-diversity strategy across internal and external functions. Given the number of stakeholders involved, tech companies rarely have a single person connecting the dots on gender diversity. By designating a sponsor, companies will ensure there is accountability for delivering results.

- Measure the impact of CSR and philanthropic efforts with the same rigor applied to the company's business. Today, companies do not have systems in place to capture data on what is working. By tracking both short-term performance management indicators and long-term impact metrics, companies will have a data-driven guide to scaling up what works.

THE NEXT FRONTIER: SECTOR-WIDE PARTNERSHIP

There is already momentum building in the sector around collaborating to design the diverse tech sector of the future. If tech can create pathways that work for those who face the greatest barriers to entry—particularly underrepresented women and girls of color—those solutions will make the sector more inclusive to all, unlocking the most innovative thinking from the broadest possible talent pool.

Partnership is the most powerful tool to get concrete results in a short time.

If tech as a sector can translate the energy around gender diversity into collective, sector-wide action, it will move beyond incremental improvement to significantly transform the face of the industry. Gender diversity is an area ripe for partnership; as with other issues that tech companies have partnered on previously, such as net neutrality and immigration, all tech companies have a long-term stake in building and broadening the talent pool for the sector and making tech the industry of choice for top talent, regardless of gender or race.

Partnership is the most powerful tool to get concrete results in a short time because it:

Allows companies to do things they cannot do individually by pooling resources and rapidly scaling what works

Brings each company's unique capabilities to the table and connects them to solve the larger puzzle

Amplifies the power of companies' voices by speaking together as a sector

01

The status of women in computing
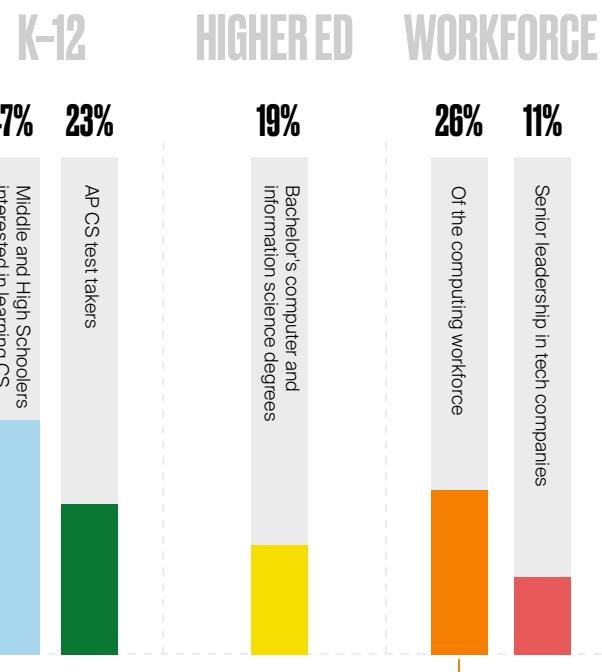
SETTING THE STAGE

The lack of diversity in the US tech sector is not a recent phenomenon; it has been a significant and consistent challenge for tech companies for many years. From tech start-ups to Fortune 500 industry anchors, tech companies of all sizes recognize that their workforce continues to draw mainly from a small segment of the talent pool—predominantly white and Asian men from elite educational institutions.[13] Drawing from a narrow talent pool leaves money, innovative ideas, and star employees on the table—and potentially exposes organizations to criticism and reputational risk.

Girls and women are underrepresented across the board in computing.

Percentage women

K–12   HIGHER ED   WORKFORCE

| 47% | 23% | 19% | 26% | 11% |

Middle and High Schoolers interested in learning CS

AP CS test takers

Bachelor's computer and information science degrees

Of the computing workforce

Senior leadership in tech companies

3% BLACK WOMEN IN THE COMPUTING WORKFORCE

1% LATINA WOMEN IN THE COMPUTING WORKFORCE

SOURCES: "Diversity Gaps in Computer Science," Google, http://services.google.com/fh/files/misc/diversity-gaps-in-computer-science-report.pdf; "By the numbers," National Center for Women & Information Technology, April 9, 2018, ncwit.org; Alexis Krivkovich, Kelsey Robinson, Irina Starikova, Rachel Valentino, and Lareina Yee, *Women in the Workplace 2017*, October 2017, McKinsey.com.

This report speaks directly to tech companies.

While this report contains insights that will be useful to a range of actors involved in the fields of tech and education, it speaks directly to tech companies. Specifically, it addresses tech-company leaders in philanthropy, corporate social responsibility (CSR), diversity and inclusion (D&I), and HR who are interested in increasing the diversity of the tech pipeline.

We've interviewed leaders from tech companies large and small, representing nearly a cumulative $500 billion in revenue, to understand what information and resources would support these companies in creating a more diverse, innovative, and profitable sector. We've written this report to respond to the interest we heard for an action-oriented play book filled with practical tools companies can use to design and implement a best-in-class philanthropic and CSR strategy on gender diversity.

What counts as a tech company?

With more and more companies engaging in technically sophisticated tasks as part of their core operations, the roster of tech companies is ever expanding. The companies included in our survey and quoted throughout this report are drawn predominately from the mainstream US tech sector—that is, hardware, software, and online services. However, as companies in other sectors undertake digital transformations, any company that seeks to grow its technical workforce will benefit from the findings of this research.

Progress toward inclusion within the tech industry continues to be slow, despite tech companies making significant investments in D&I.[14] In fact, in recent years, tech companies have invested about $800 million to $1.2 billion in various initiatives aimed at increasing diversity.[15] Yet women of almost all races and ethnicities, in addition to black, Latino, and Native American men, remain significantly underrepresented in tech.

However, progress is possible through an intentional approach to gender diversity; for example, a decade ago, Advanced Placement Computer Science (AP CS) exam takers were only 17 percent girls compared with 23 percent today.[16] This is thanks to a significant reboot that has made the program more inclusive, including through a greater effort to recruit girls, and a new curriculum, computer science principles, which explores many parts of computing instead of maintaining a singular focus on programming.[17]

But the overall picture of women's inclusion in tech remains a sobering one—especially for women of color.

Women of color face additional headwinds in computing.

All women are underrepresented in computing and the tech sector compared with men from the same racial and ethnic groups.[18] So while there is ample room to strengthen pathways into tech for *all* women and girls, that is not to say that all women are similarly situated in tech. Women experience different types of roadblocks, stereotypes, and biases when studying computing and pursuing a career in the industry based on their racial and ethnic identities, as well as other elements of their identities and backgrounds.

These race- and gender-based barriers can combine in potent ways to amplify the exclusion of certain groups of women, particularly women of color, from studying computing and entering the sector. This is the notion of intersectionality–that the intersection of the multiple threads of identity, including gender and race/ethnicity, create a distinctive experience that is not merely the combination of, for instance, being a woman and being a person of color. Paying attention to the distinct experiences of different communities of women will help pinpoint both the unique and common barriers they face that need to be dismantled.
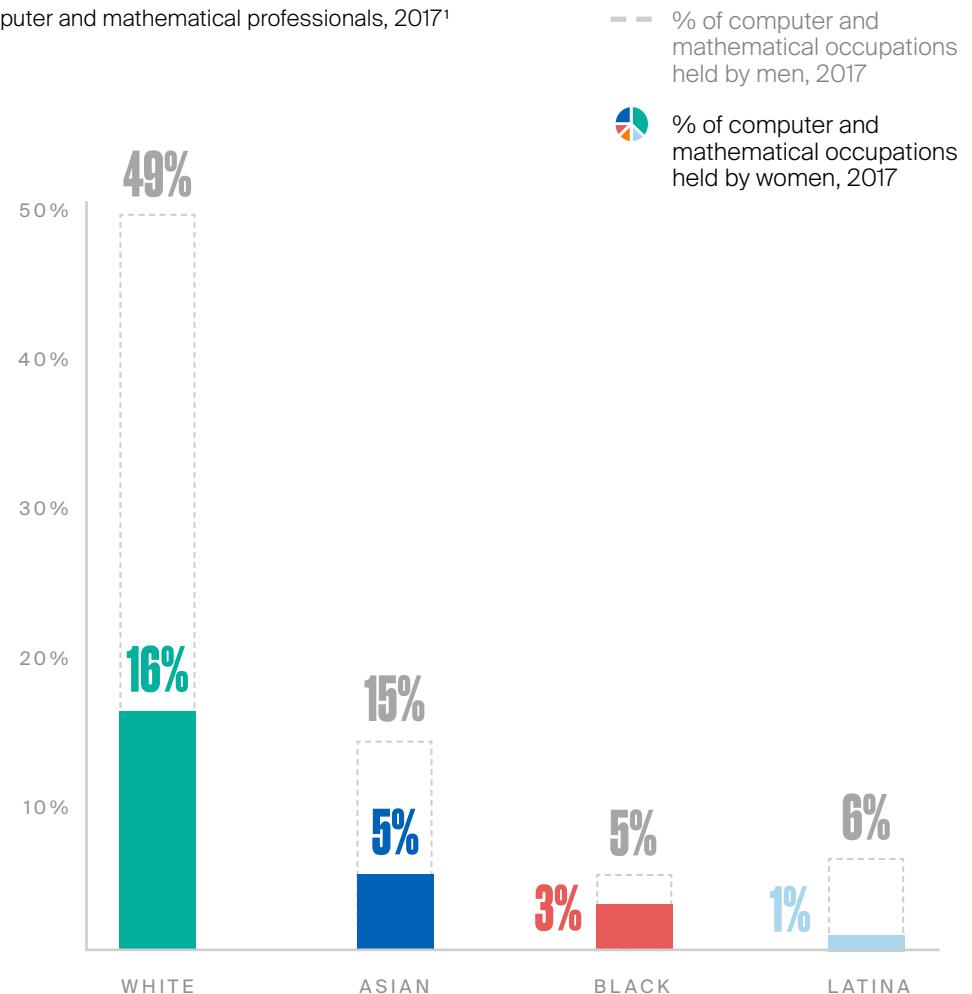
Black, Latina, and Native American women face even greater headwinds than white and Asian women when it comes to studying computing and entering the tech sector. They represent approximately 16 percent of the total US population, yet they make up only 4 percent of those students obtaining computer and information sciences degrees.[19] The story is similarly stark within the technology sector, where black women hold only 3 percent of computing jobs and Latina women hold 1 percent.[20]

Asian women, by contrast, make up both approximately 3 percent of the general population and 3 percent of those receiving computer and information sciences degrees.[21] That does not mean Asian women are fully included in tech, however. For example, they face significant headwinds in promotion to leadership positions. As of 2015, Asian women's representation in leadership in the Bay Area's tech sector was 66 percent below parity.[22]

For tech companies, the takeaway is similar to the segment-based marketing approach that a company would use for its products. Treating women as a monolithic group means that they will miss critical insights about the different experiences and challenges particular communities of women face, which will hold them back from making progress for women as a whole. As a result, it is crucial to collect gender and racially or ethnically disaggregated data at every stage of the pathways into tech and design interventions that fit the distinct experiences of different segments of women.

Women in every racial / ethnic group are significantly underrepresented in the tech sector relative to men.

Computer and mathematical professionals, 2017[1]

- - % of computer and mathematical occupations held by men, 2017

% of computer and mathematical occupations held by women, 2017

[1] Data excludes from numerators those who did not identify with a particular race
SOURCE: US Bureau of Labor Statistics, employed and experienced unemployed persons by detailed occupation, sex, race, and Hispanic or Latino ethnicity 2017 (unpublished table from Current Population Survey 2017)

OVER THE PAST DECADE, THE PERCENTAGE OF STUDENTS RECEIVING COMPUTER AND INFORMATION SCIENCES DEGREES WHO WERE BLACK, LATINA, AND NATIVE AMERICAN WOMEN FELL BY NEARLY 40 PERCENT.

Not only are women of color in computing severely underrepresented, the trend is headed in the wrong direction.[23] Over the past decade, the percentage of students receiving computer and information sciences degrees who were black, Latina, and Native American women fell by nearly 40 percent.[24]
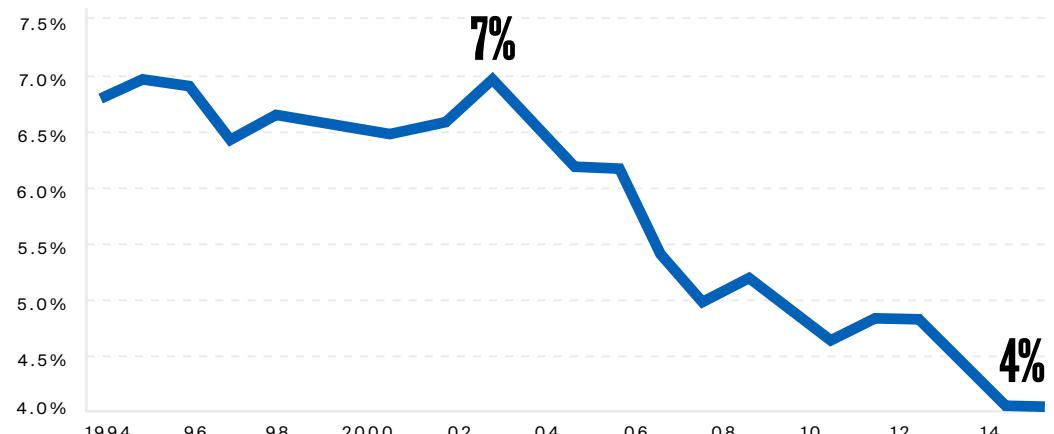
This decline reinforces the urgent need for tech companies to take action. Representation of black, Latina, and Native American women is unlikely to improve, even slowly, without a dramatic intervention.

If current trajectories continue, the absolute number of black, Latina, and Native American women earning computer and information sciences degrees will not double until 2052.[25]

Given the very low percentage of computing degree recipients who are underrepresented women of color, an internal talent strategy to recruit, retain, and advance those who do exist, while crucially important, will not be sufficient. Instead, companies must also work to reverse the trend and increase the number of women of color studying computing in the first place. That is where philanthropic and CSR efforts can have a major impact.

Black, Latina, and Native American women are a low and declining portion of computing degree recipients.

Percentage of bachelor's degrees in computer science and information sciences awarded to black, Latina, or Native American women (1994–2016)

Source: NCES IPEDS

It is important to focus on the experiences of underrepresented women of color. Interventions for these women will also remove barriers that other women, as well as men of color, face.

The expression "underrepresented women and girls of color" is used in this report to refer to groups of women whom the data shows are most severely underrepresented in tech across computing professions—that is, black, Latina, and Native American women.

Efforts to remove the barriers that underrepresented women of color face when studying computing and entering the tech sector will help other women and men who are facing similar barriers based on their gender, race, or ethnicity, including white and Asian women, as well as men of color. Focusing on the experiences of those who face the greatest number of barriers will open up pathways into computing and the tech sector for everyone and ultimately create a larger talent pool and a stronger workforce.

THE BUSINESS CASE FOR DIVERSITY

Strengthening pathways for women and girls into tech is a matter of basic equality.

Building stronger pathways into tech can provide many more women with a skill set that will remain in demand in the evolving labor market, thus increasing women's access to high-paying jobs. At the same time, creating more diverse workplaces within tech companies is as much about economics as it is equality:

- Diverse teams are more creative and innovative.[26] Research shows that teams with greater gender diversity have certain dynamics that allow for more radical innovation, which is especially critical for tech companies.[27]

- Greater gender diversity is linked to greater profitability. Research shows a strong, positive correlation between companies' gender diversity and both profitability and value creation.[28] Reaching gender parity in the US tech sector has been estimated to be worth an additional $320 billion to $390 billion in enterprise value.[29]

As the tech sector continues to grow, it will need to significantly expand its workforce, which will require going beyond the traditional sources of tech talent.

Corporate leaders are feeling the tech talent crunch now. A survey of more than 3,000 executives on their workforce skill needs confirmed business leaders' anxieties about meeting the need for tech talent in the near term. Business leaders list data analytics, IT, and mobile and web design as the most-needed functions, and they expect to see a skills mismatch in these areas as early as within the next three years.[30]

The need for people with tech skills will rise rapidly. According to a McKinsey Global Institute report, demand for advanced technological skills will grow by 44 percent over approximately the next 15 years. Demand for advanced IT and programming skills will grow by as much as 90 percent from 2016 to 2030.[31]

Tech companies can unlock the upsides of a gender-diverse workforce and most rapidly meet these pressing talent needs by investing in and drawing on sources of historically under-leveraged talent, including women. Beyond this potential upside, recent events in tech have demonstrated the significant downside that companies face when they fall short on gender diversity and inclusion. Several tech companies have found themselves in highly visible struggles regarding their treatment of women employees, gender wage gaps, and other gender-related issues. While the public relations cost alone is substantial, the full cost of these gender-related controversies is much larger and more lasting—and can include lost stock value and lower market share, as well as a perception among top talent that the company is not an attractive place to work. Building more diverse and inclusive pathways into the tech sector is the first step to avoiding this backlash.

NOW IS THE TIME TO TRANSFORM TECH

Companies are already working to improve gender diversity in tech on multiple fronts—and a compelling opportunity exists to dial up philanthropic and CSR efforts.

Four levers for increasing gender diversity

01 Developing an internal talent strategy: Working to recruit, retain, and advance women within the company by creating a more inclusive environment and removing bias from core processes.

02 Leveraging philanthropy and CSR: Making philanthropic and CSR investments in the larger community to strengthen pathways for women and girls into tech.

03 Influencing other companies in the value chain: Exercising the company's power in procurement and partnership decisions to require its suppliers and partners to meet certain standards pertaining to gender diversity.

04 Shaping society through product and service offerings: Designing and delivering products that help to advance the status of women and girls. In tech, such offerings include toys and games targeting girls to spark early tinkering and computational thinking and debiasing software to help companies more objectively assess job candidates.

Tech companies have pulled the internal talent strategy lever through their HR and D&I functions with the greatest frequency, investing $800 million to $1.2 billion across the sector in the past five years.[32] Of course, it is unsurprising that companies have focused so far on internal efforts since that is the most immediate and near-term way to have a direct impact on a company's levels of gender diversity.

These internal efforts are essential to evolving the environment and culture of the tech sector. However, representation is not the same as inclusion, and tech companies need to ensure women and men feel the same sense of belonging in the sector. Unless the experiences of women currently in the tech sector improve, the next generation of women innovators will take their talents elsewhere.
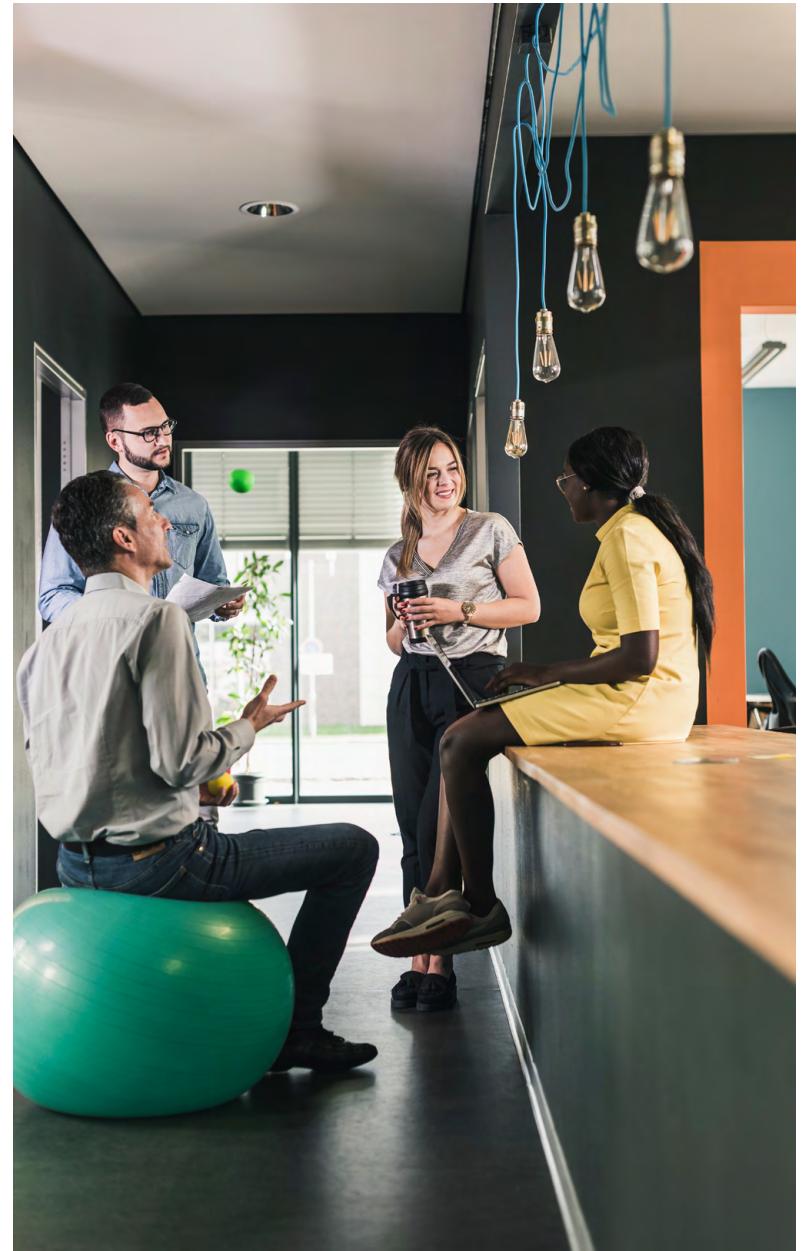
At the same time, recruitment efforts are not enough to sustainably increase women's involvement in tech. Indeed, the root cause of women's underrepresentation in tech is not a failure in recruitment. The drop-off in women's involvement in tech does not occur in the transition between college and the workforce: 19 percent of the people who receive a bachelor's degree in computer and information sciences today are women, and 26 percent of jobs in the computing workforce are held by women.[33]

Rather, companies must reach beyond the immediate pipeline of current applicants to remove the barriers that women and girls face earlier and create additional pathways on their journeys toward the tech sector. This effort will require companies to use other levers beyond internal talent efforts—levers that enable companies to connect with and shape the larger tech ecosystem. In this report, we will focus on how companies can use the philanthropy and CSR lever to remove barriers for women and girls in tech.

MOVING BEYOND INTERNAL TALENT STRATEGY

Unless the experiences of women currently in the tech sector improve, the next generation of women innovators will take their talents elsewhere. Gender equality movements have existed in the United States for decades, but recent efforts have created a tipping point. The #MeToo and "TIME'S UP" movements have demonstrated how far there is to go to reach full equality for women in the workplace, in the home, and in society. These highly visible movements have elevated and amplified the push for gender diversity and inclusion, demanding change and holding accountable institutions and leaders that fail to act.

While the tech sector lacks diversity on a range of dimensions, a unique opportunity exists to seize on this unprecedented activity and awareness around gender. Now is the moment to push for gender equity and greater inclusion of women—particularly underrepresented women of color, who continue to be left out of opportunities in the tech sector. By focusing on the women who are most marginalized in tech—underrepresented women of color—tech will create an environment that also removes barriers that other women and underrepresented men face, thus giving these companies access to the broadest possible talent pool.

A ROAD MAP FOR TECH PHILANTHROPY AND CSR

This report is a first-of-its-kind playbook for tech companies wanting to use their philanthropy and CSR to increase gender diversity.

The original research in this report shines a light on how the tech sector currently approaches its philanthropic and CSR initiatives that are focused on women in tech. Neither tech companies nor non-profit and academic experts have had visibility into these initiatives before.

Philanthropy, CSR, and D&I leaders in the tech sector shared with us that they want to learn more about what actually works to involve more women and girls—particularly underrepresented women of color—in tech. Therefore, in this report we map out the most critical findings from the emerging evidence base to help companies know where to focus their efforts.

Leaders can use this report as a playbook to help develop their company's unique philanthropic and CSR strategy and operating model—both for individual company efforts and in partnership with other tech companies. The report can help leaders understand the efficacy of their investments in improving gender diversity, so they can better evaluate their strategy with an eye toward impact.

These critical insights will help all stakeholders in the space, including tech companies and players in the social and public sectors, think about how corporate philanthropy and CSR resources can have the greatest impact.

It is time to unleash the full power and potential of women's talent in the tech sector. Tech companies can use philanthropy and CSR to not only benefit women and girls but all underrepresented groups in tech.

Original research conducted

32
US-based
tech companies
surveyed

Representing nearly
half a trillion dollars in
annual revenue.

100+
Tech-company
leaders Interviewed

Including academic researchers,
company leaders, government
officials, heads of non-profit
organizations, and faculty
in computing

100+
Existing reports and
studies reviewed

On the best ways to increase
the number of women and girls
involved in tech

02

Current state of tech-sector giving to improve gender diversity in tech

CORPORATE INVOLVEMENT TODAY

Companies know gender diversity matters and are making significant internal investments through D&I.

This chapter delves into tech companies' philanthropic and CSR investments in gender diversity. It synthesizes insights from a survey of 32 US tech companies with, collectively, nearly $500 billion in annual revenue and more than $500 million in philanthropic giving in 2017, as well as extensive interviews and focus groups with tech-company leaders. These combined insights shine a light on the following:

- How much tech companies give in philanthropic grants today to increase the number of women in technology and what their CSR efforts on gender diversity look like.

- Where companies focus their philanthropic and CSR initiatives in terms of growing the involvement of women and girls in tech.

- How decisions are made within tech companies about where to give to increase pathways for women and girls into the tech sector.

- Challenges and opportunities companies face as they begin to use their philanthropy and CSR to invest in gender diversity.

- Tech companies recognize there is still a long way to go before the sector is fully diverse and inclusive. To reach their diversity aspirations, companies are devoting substantial resources to making their workplaces more inclusive of all underrepresented communities, including women. It has been estimated that tech companies have invested between $800 million and $1.2 billion in internal diversity initiatives in the past five years, demonstrating a significant commitment to attracting, retaining, and promoting the best possible talent from a diverse talent pool.[34]

Tech companies are making significant investments in workplace gender diversity.

EXAMPLES OF INTERNAL EFFORTS

Salesforce conducts a recurring equal pay audit. Wherever they find unexplained differences in pay between men and women, they compensate the affected employees for the difference. They also provide monthly diversity data to each executive at the company, showing them how they are doing at attracting, retaining, and promoting women and underrepresented groups.[35]

Cisco invests in two training programs for women employees—DARE for junior women and JUMP for midlevel women. They have found that participating in one of the programs doubles a woman's chances of promotion and also significantly increases the odds that she will stay at the company.[36]

Slack revamped its hiring process to attract a more diverse set of applicants, including through carefully phrased job postings. They took steps to enable all applicants to show their best abilities and be evaluated without bias creeping in. Their latest diversity report shows that women hold 34 percent of technical roles at the company, far above the industry average of 26 percent.[37]

Google expanded maternity leave from three months to five months in 2012. As a result, 50 percent fewer new mothers now leave the company.[38]

At tech companies, there is significant and growing momentum on efforts to increase the number of women in the industry.

Trisa Thompson
Former senior vice president and chief responsibility officer of corporate social responsibility, Dell

"People want to have the conversation on women in tech so badly they'll show up in a snow storm."

Tonie Hansen
Senior director of CSR and sustainability, NVIDIA

"Interest has gone from zero to something over the past few years—companies' attitudes are definitely changing."

Despite these investments, women are still only 26 percent of the computing workforce.[39] Internal efforts, while critically important, will not be enough on their own. Companies must simultaneously pull the other levers available to them on gender diversity. Focusing philanthropic and CSR efforts on strengthening pathways for women to enter tech in the first place is critical to shifting representation across the sector.

MANY COMPANIES ARE COMPLEMENTING INTERNAL DIVERSITY EFFORTS WITH CSR AND PHILANTHROPIC GIVING.

Tech companies use their philanthropy and CSR to contribute to a range of important issues. The 32 US tech companies surveyed in this report contributed more than $500 million in philanthropic grants in 2017 to causes such as fighting poverty, alleviating hunger, and protecting the environment. Tech companies also make in-kind contributions of technology (both hardware and software) and other resources, such as office space and employee time, together worth billions of dollars.

As part of their giving, many tech companies have prioritized creating paths into computing for underrepresented people of color. Many companies are also making grants or in-kind contributions to support education and economic development in low-income communities generally. One company's D&I leader shared: "We don't have a philanthropic strategy around women in technology. We don't think about it that way. Instead, our strategy is to reach underserved communities. Women fall into that group, but we don't have a distinct strategy to reach them." Many companies shared a similar approach, describing that in their efforts to reach communities of color and low-income communities, they of course aspire to reach the women and girls within those groups—hopefully in equal measure with boys and men. For example, one tech-company leader told us: "If we are developing programs that target the underserved, we are inherently targeting women and girls."

Companies may intend to reach women by serving under-represented communities in general—however, this gender-neutral approach is not gender neutral in effect; it continues to put girls and women at a disadvantage.

Most of the mixed-gender programs in underserved communities are not prioritizing action that attracts, engages, and retains women. As a result, many programs currently have a minority of women and girls participating in their programs, as they end up mirroring today's strongly male-skewed gender ratios that we observe in computing involvement at various ages. For example, one leading program for high schoolers has 28 percent girls among its participants, very similar to the 23 percent of girls who took AP CS in 2017.[40]

While such programs may positively change the face of the technology sector and increase racial and socioeconomic diversity, if they continue to serve more men than women, they are unlikely to meaningfully improve the gender diversity of the sector.

# A GENDER-NEUTRAL APPROACH IS NOT GENDER NEUTRAL IN EFFECT.
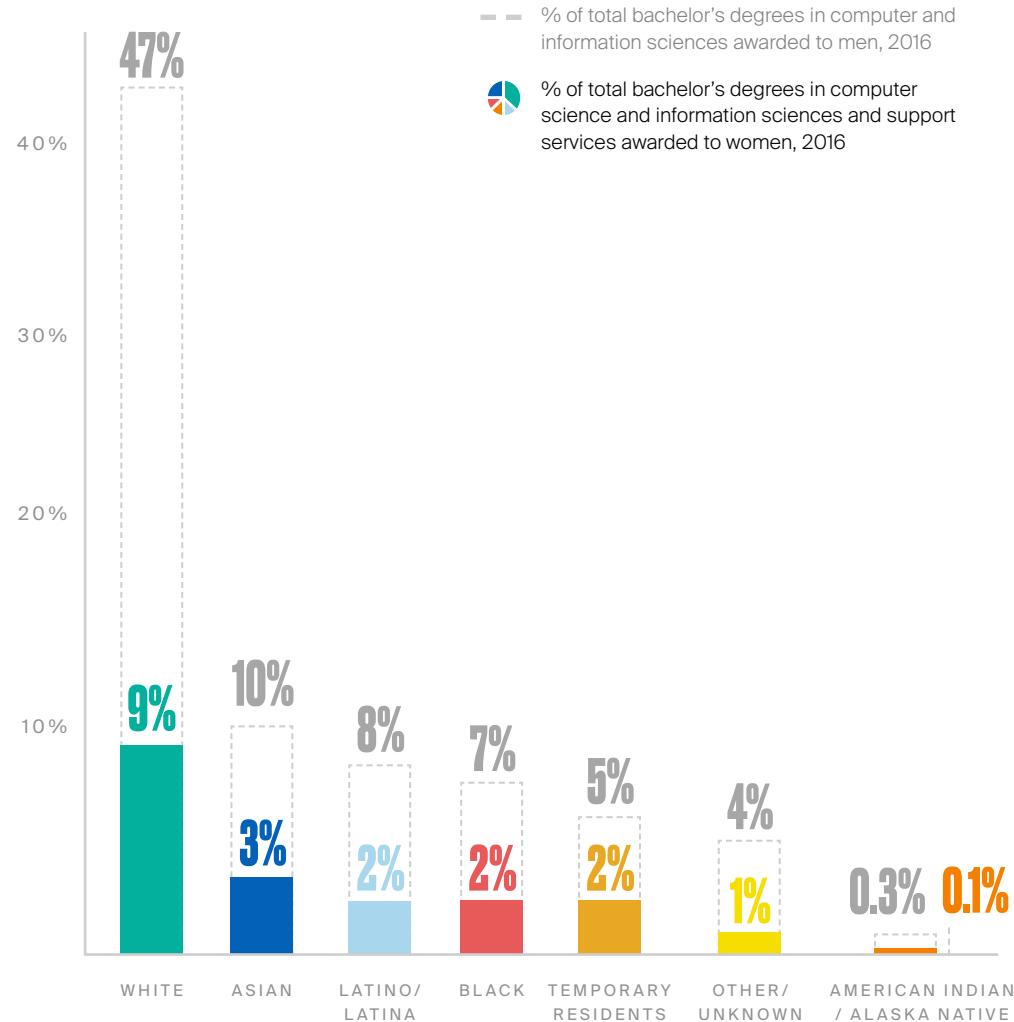
Why focus on girls specifically?

Many companies contribute grants, employee time, and other in-kind resources to programs that broadly work to get all children or children from disadvantaged backgrounds interested in technology. These programs are vital and can spark a life-long love of technology. Those that largely serve students of color may increase racial diversity within tech. However, many of these programs do not focus on how they can serve girls in an inclusive way. They do reach some girls, but these girls generally participate alongside a much larger group of boys.

Since several of the coed programs have scaled up significantly, they will end up reaching a large number of girls in aggregate. However, if they are still reaching an even larger number of boys, gender ratios in the industry will not even out.

A lack of focus on what works best for girls will also make the girls who do enroll in a program less likely to continue further into computing. Reflecting on her experiences funding coed programs that did not focus on gender, one tech-company leader said that in those programs "the girls did just as well, and their content knowledge was the same as the boys, but there was a big drop-off in interest in continuing to study computing afterward."

Women in every racial/ethnic group earn a significantly lower proportion of computer and information sciences degrees than men

- - % of total bachelor's degrees in computer and information sciences awarded to men, 2016

% of total bachelor's degrees in computer science and information sciences and support services awarded to women, 2016

	WHITE	ASIAN	LATINO/ LATINA	BLACK	TEMPORARY RESIDENTS	OTHER/ UNKNOWN	AMERICAN INDIAN / ALASKA NATIVE
Men	47%	10%	8%	7%	5%	4%	0.3%
Women	9%	3%	2%	2%	2%	1%	0.1%

Degrees: National Center for Education Statistics – Integrated Postsecondary Education Data System. Bachelor's Degrees for Computer and Information Sciences and Support Services (2016).

To move the needle on increasing the percent of women entering tech, we need programs that prioritize best practices by removing the specific barriers that many women and girls face and that prioritize creating access for women and girls to the critical building blocks they need to thrive in tech. This in no way means losing sight of inclusion of underrepresented racial and ethnic communities more broadly; in Los Angeles, for example, 49 percent of Exploring Computer Science's students are girls and 85 percent of their students are black or Latino/a.[41]

Therefore, this report concentrates on interventions that focus squarely on girls and women, whether that is in the form of girl-focused programs or coed programs that put a deliberate focus on making themselves gender inclusive, such as Exploring Computer Science, which has a participant population that is more than 40 percent girls.[42]

Companies are starting to translate a growing consensus on the need to increase women's involvement in the industry into action through their philanthropic grants and in-kind contributions as well as CSR efforts. As one tech-company leader said, "We are just beginning down the road of what this journey looks like."[43]

THE NEXT FRONTIER: CORPORATE PHILANTHROPY AND CSR TARGETING WOMEN AND GIRLS IN TECH

Corporate philanthropy efforts

Currently, philanthropic giving specifically focused on getting more women in tech accounts for a relatively small percentage of companies' overall philanthropic giving. The 32 companies surveyed, representing nearly half a trillion dollars in annual revenue, reported giving a combined $26 million in philanthropic grants to programs specifically focused on creating pathways for women and girls in tech in 2017, or approximately 5 percent of their total philanthropic giving. Current levels of giving average less than $1 million per company going to women in technology.

Few companies have made women in technology a signature focus area for their philanthropic programs. Two of the 32 companies surveyed spent more than 25 percent of their overall philanthropic grants in this area. Nearly 70 percent of the companies surveyed spent less than 10 percent of their philanthropic giving on women in technology. More than a quarter of the companies surveyed did not make any grants to programs that specifically focus on increasing the number of women in technology, although most did contribute through CSR efforts on gender diversity.

These numbers indicate that significant space exists for companies to distinguish themselves by tackling the issue of gender diversity in tech through their philanthropic efforts. Chapter 05 provides a guide for how to shape a company's strategy to maximize its impact in this space.

CSR efforts

In addition to their philanthropic grants for women in tech, companies also reported conducting a variety of gender diversity–related CSR activities, ranging from having their employees mentor students to supporting tech platforms and hosting events. The 32 companies surveyed spent at least $49 million collectively on CSR activities focused on strengthening pathways into tech for women.

But while most companies are deploying CSR efforts to help create pathways for women into tech, many struggle to track and quantify their contributions or impact. It is therefore difficult to determine the scale of companies' CSR efforts in this area, and the above estimate only reflects the investment of those few companies who were tracking it. A third of companies that reported significant CSR activity were unable to provide a total dollar value because their internal financial reporting did not enable them to track it. Other companies, whose numbers are included in the above total, indicated that they were sharing rough estimates because they had not previously tracked their CSR in this way.

The grassroots way some companies engage in CSR activities left them struggling to know the scope of their investments, thus making it more difficult to understand the impact of their approach. One large company reported that in-kind contributions are encouraged to blossom organically in many different departments. The company, then, had to collect data for the survey from 50 different groups that could each set their own priorities and independently run programs.[44]

Both companies and non-governmental organizations (NGOs) shared that tech employees are excited to engage in gender-diversity initiatives by volunteering to mentor and teach girls and young women. A striking 94 percent of companies reported that their employees volunteer in efforts to involve women and girls in tech, most commonly through teaching high school girls.

Damien Hooper-Campbell, chief diversity officer at at eBay, said he frequently asked himself: "How are our employees able to get engaged and get closer to the work, beyond just donating money? How can we get people into the community?" One company mentioned that their employees frequently pushed them to get involved with women in tech. They shared that, while it was difficult to find the budget to agree to employee requests for funding of programs, it was an "easy yes" to provide space in their offices or enable employees to volunteer time.[45]

While non-profits appreciated the enthusiasm of tech-company employees to get their hands dirty, they also noted that more volunteers will not solve their most pressing needs, which often revolve around funding shortages to support core programmatic functions.[46]

How tech companies engage in CSR efforts to improve gender diversity in tech.

% of companies who reported engaging in each of the following activities to increase the number of women entering tech

- Employee volunteering (94%)
- Convenings such as conferences and hackathons (69%)
- In-kind investments such as office space or equipment (56%)
- Advocacy or public awareness (34%)
- Research or publications (25%)

SOURCE: Survey of technology companies by Pivotal Ventures and McKinsey & Company; n=32

Companies want to reach underrepresented women of color, but little tech-company funding focuses directly on programs designed specifically to reach them.

Companies we spoke to reported that they are specifically hoping to reach underrepresented women and girls of color through philanthropy and CSR. However, while companies are currently donating to programs that reach communities of color (which disproportionately reach men) and programs to reach women, fewer support programs targeted at underrepresented women of color. In 2017, the 32 tech companies surveyed granted only $335,000 specifically to organizations with programming dedicated to supporting underrepresented women of color entering tech. ▶

Anoymous tech-
company leader

"I'm not surprised that there are so few dollars going directly to women of color. If you're not intentional about reaching them, they tend to get lost in the cracks between supporting women and supporting communities of color."[47]

Programs will be most effective when they can incorporate ways to help women of color overcome the "double bind," or the issues of compounding race- and gender-based exclusion and discrimination that affect them differently and more intensively than they affect white women or underrepresented men of color. ▶

▶ **WHAT DOES THE $335,000 REPRESENT?**

It includes both programs that are exclusive to women of color, as well as programs open to a larger group of students that makes a deliberate and successful effort to attract and serve women of color. It does not include other programs that broadly serve women, broadly serve communities of color, or even more broadly serve the general population. While some underrepresented women of color may be reached through those programs, they are generally present in very small proportions that align with the severe underrepresentation of women of color in tech.[48]

▶ ## Examples of how to support girls of color who face the double bind of race and gender[49]

In addition to best practices to make programs inclusive of girls, which is covered extensively in chapter 04, there are specific elements for programs to include to be welcoming and effective for women and girls of color. Companies can discuss these with their implementing partners or factor them into their own in-house program design.

ROLE MODELS WOMEN AND GIRLS CAN SEE THEMSELVES IN:

Role models are extremely important for young people entering the tech industry. While there are few women role models and few men of color role models, there are even fewer women of color role models in the technology space. Highlighting those that do exist is important for those girls and women.
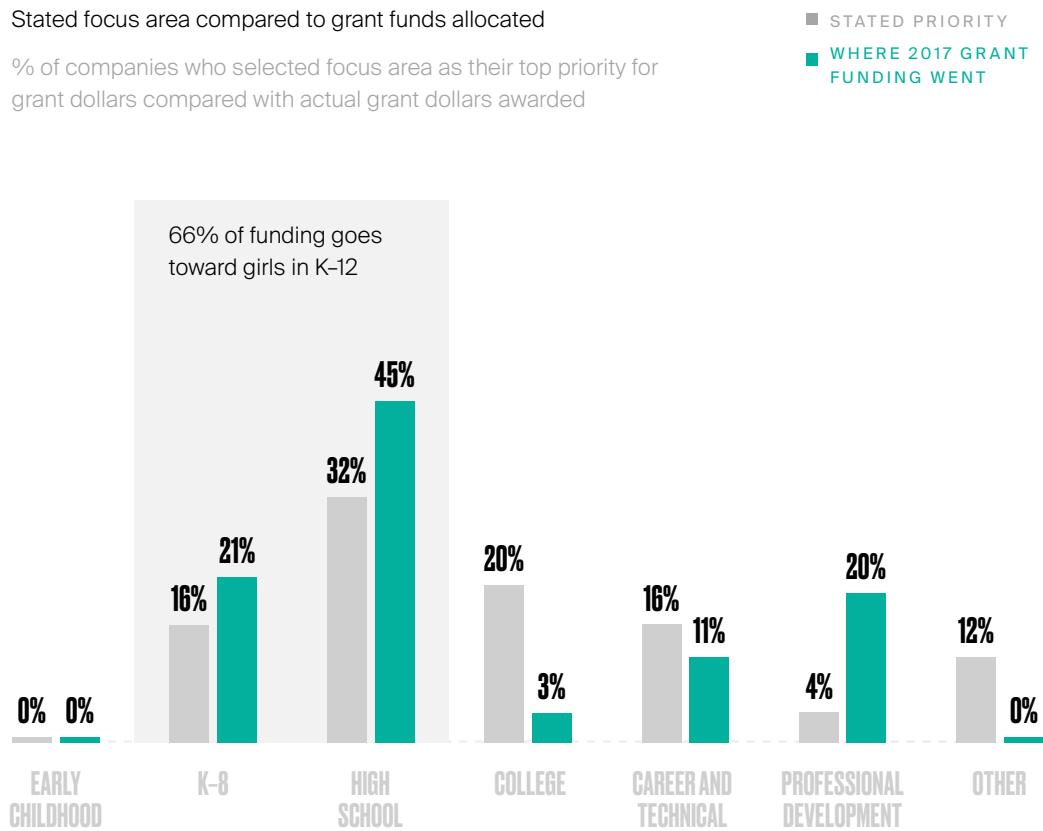
CULTURAL RELEVANCE:

Curricula developed to target largely white or Asian girls should be adapted to ensure it is culturally relevant for underrepresented girls of color, including real-world examples that they are familiar with and excited about. Without a significant and specific focus on women of color, many may not be well-served by programs focusing generally on people of color, or generally on women.

Current philanthropic funding for women in tech primarily goes toward K–12 efforts and professional development.

Stated focus area compared to grant funds allocated

% of companies who selected focus area as their top priority for grant dollars compared with actual grant dollars awarded

■ STATED PRIORITY

■ WHERE 2017 GRANT FUNDING WENT

66% of funding goes toward girls in K–12

	EARLY CHILDHOOD	K–8	HIGH SCHOOL	COLLEGE	CAREER AND TECHNICAL	PROFESSIONAL DEVELOPMENT	OTHER
Stated Priority	0%	16%	32%	20%	16%	4%	12%
2017 Grant Funding	0%	21%	45%	3%	11%	20%	0%

SOURCE: Survey of technology companies by Pivotal Ventures and McKinsey & Company; n=32

Funding clusters around high school and middle school, instead of later stages like higher education

When looking at investing in programs that focus on reaching women and girls, companies concentrate 66 percent of their funding on K–12 programs, compared with 3 percent for college.[50] The comparatively low level of funding for college-level programs is surprising, given that 20 percent of companies reported supporting women in tech during the college years as the number-one priority for their philanthropy focused on gender diversity in tech. This discrepancy is particularly important given that college-level programs have seen substantial success in attracting more women to major in computing, as described in chapter 03.

There are two main reasons why companies currently spend more on funding programs that focus on younger girls:

A MISPERCEPTION ABOUT THE EFFECTIVENESS OF PROGRAMS AT CERTAIN AGES:

Many companies worry that once girls reach high school or college, it is difficult, if not impossible, to build their interest in tech.[51] However, research shows that it is never too late—there are effective ways to create on-ramps for women and girls to tech at later life stages, even in higher education, as explored in chapter 03.

NON-PROFITS TEND TO FOCUS ON K–12:

A recent landscape analysis of non-profits in the women in tech space found that more high-profile non-profits focused on women in technology exist in the middle and high school space than in higher education.[52] Initiatives in the college space are more likely to be driven by individual schools and academic departments.

If organizations and non-profits directed more funding to creating pathways for women in early college years to join computing programs, they could more efficiently increase the talent pool of women in tech.

Of course, many companies do spend heavily on internships and hiring events aimed at college students. However, such recruiting programs typically focus on attracting junior- and senior-year women who would have already decided to major in computing.

By contrast, philanthropic and CSR efforts could be devoted to expanding the number of freshmen and sophomore women who are interested in a computing major and increasing the number of women who persist in this major all the way to graduation. Such efforts would improve the success of companies' eventual recruiting efforts. See to learn more about how companies can get involved in making computing majors more inclusive.

HOW TECH COMPANIES DECIDE WHERE TO INVEST

Although companies report executive-level involvement in their gender-diversity strategies, many lack a clear owner. Instead, companies report that a range of different stakeholders are involved in CSR and philanthropic support for women in technology—but they rarely coordinate with one another, which makes it difficult to effectively make investment decisions.

The C-suite's role in establishing company involvement with women in technology

The CEO and executive leadership team most commonly make decisions about companies' philanthropic and CSR contributions to women in tech. In interviews with companies, many emphasized the central role that the CEO has in deciding what areas get substantial philanthropic and CSR support. For example, Apple's partnership with the Malala Fund, which has the goal of providing education for at least 100,000 girls, was launched after a meeting between Apple CEO Tim Cook and Nobel Peace Prize winner Malala Yousafzai.[53]

The CEO's level of excitement is often what catalyzes the company's involvement in programs that focus on women and girls entering tech. And a lack of executive sponsorship on this issue typically leads companies to focus efforts elsewhere.[54] Rosanna Durruthy, head of global diversity, inclusion, and belonging at LinkedIn, shared that "It's essential to gain resounding buy-in from the leaders of the organization. If leaders are not brought in it's very difficult to do this work."

It is therefore critical to cultivate senior-level commitment to this issue, creating opportunities for CEOs and other tech-company leaders to hear directly from women and girls on what motivated them to enter computing, the barriers they had to overcome, or what pushed them away.

## Companies lack a clear owner of gender-diversity strategies

Even when energy and direction come from the very top, many companies reported that there is no single clear owner in the company for their CSR and philanthropic strategy on women in technology, and many different functions get involved when it comes to execution. For example, one large tech company told us that they have 10 to 15 departments that each have their own strategy for increasing the number of girls and women engaging with computing.[55] Depending on the company, HR, D&I, a foundation, the CSR function, and marketing may all have some degree of involvement in the gender-diversity strategy, which adds substantial complexity if there is not a clear owner.

Another company reported that they have even more decision makers because their efforts are mostly driven by grassroots employee engagement. A leader there shared: "There is a massive amount of activity around women in technology at our company, though it's not heavily coordinated—employees can each pursue their individual goals and programs. There seem to be hundreds of disconnected activities."[56] In chapter 05, we discuss how and why to bring this energy together under a holistic strategy.

## Companies currently pursue fragmented philanthropic and corporate social responsibility efforts.
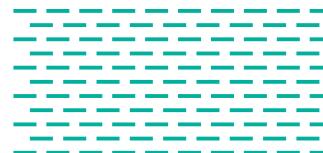
FROM Currently, the strategies of D&I, philanthropy, and CSR are often not coordinated.
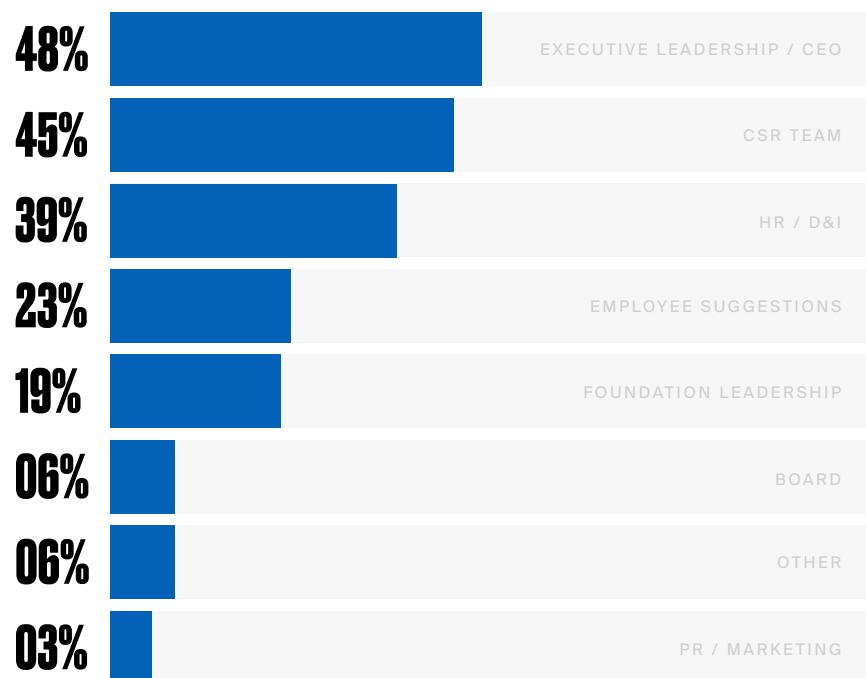
TO Coordinated efforts and strategies within tech companies will reach a larger percentage of girls and women across all stages of education and professional development

Companies reported that several different stakeholders are involved in decisions about CSR and philanthropic investments focused on women in technology.

% of companies who reported each stakeholder as one of the top two stakeholders involved in making decisions around gender diversity-related CSR and philanthropy

48%	EXECUTIVE LEADERSHIP / CEO
45%	CSR TEAM
39%	HR / D&I
23%	EMPLOYEE SUGGESTIONS
19%	FOUNDATION LEADERSHIP
06%	BOARD
06%	OTHER
03%	PR / MARKETING

SOURCE: Survey of technology companies by Pivotal Ventures and McKinsey & Company; n=32

THE CHALLENGE OF IDENTIFYING, MEASURING, AND SCALING WHAT WORKS

Companies reported that HR and D&I rarely coordinate with CSR and corporate philanthropy teams on their holistic gender-diversity strategy.

Many companies expressed an urgent need for more research, including evaluations of programs, to help them determine which interventions are most effective. At the same time, academics and NGOs report that most programs—their own and others they observe—have yet to build out a significant measurement and evaluation approach.

As a result, nearly two-thirds of companies reported that it is difficult to know which organizations are having the most impact.

Fifty-two percent were concerned about what they perceived as a lack of data and research on which types of interventions are effective. Today, individuals in many companies are left trying to piece together where to invest in this space. In fact, 45 percent of companies cited self-guided online research as one of their top two sources for learning how to allocate their resources.

TECH-COMPANY LEADERS SHARED THEIR OBSERVATIONS

"I was struck by how many different efforts and investments we have. We don't have one comprehensive approach. Doing the survey illustrated to me that we really need to coordinate more. Today we only do it in a semicoordinated way."[57]

"HR and the foundation don't sit in the same place, so it can sometimes feel difficult to make decisions here. As of last year, HR and the foundation now report to the same executive, which has helped, but it's still an issue."[58]

"Investments in women in technology are split between the foundation and my diversity and inclusion office, and it can be challenging to align these."[59]

"I have been at this company for nearly a year now. I've sat down with our head of philanthropy, in the whole time I've been here, once."[60]

"It's an 'aha!' moment for me to think how some of us do D&I, and some do philanthropy, and some think long term, and some think short term, and we're not doing a good job connecting those strategies in our companies."[61]

Companies are eager to address this research gap. As a tech-company representative shared, a game changer for women in technology would be to "use data and rigorous research studies to understand trends and which interventions have the most impact, both short term and long term."[62]

Standardizing long-term metrics for programs provides a substantial opportunity to ensure that companies invest resources in the most effective interventions. As a tech-company representative reported: "Determining one measurement or set of metrics to show impact would be a critical pivot point."[63]

In chapter 03, we provide a list of metrics companies can use to collect data on the programs they support.

Companies reported challenges deciding the best types of programs to finance.

Percentage of companies that reported concern as one of the top two challenges in gender diversity–related philanthropy / CSR

45% Difficulty creating systemic change

39% Difficulty knowing which organizations have the most impact

29% Concerns that existing organizations are subscale

35% Lack of data on which types of interventions work

SOURCE: Survey of technology companies by Pivotal Ventures and McKinsey & Company; n=32

Struggles in measurement and evaluation

Despite tech-company interest in better measurement, non-profits have struggled to attract funding from the sector to improve their data collection, a necessary step for better long-term measurement and evaluation. One prominent non-profit organization in the space reported that they find it relatively easy to secure corporate funding for direct programming but extremely difficult to convince them to support data collection.[64]

Unsurprisingly, many companies today struggle to track whether their current philanthropic and CSR investments are leading more girls to decide to commit to computing and eventually enter the industry. Three-quarters of companies are not currently tracking any long-term metrics regarding their philanthropic and CSR initiatives. Instead, they are either tracking no metrics, or only input metrics such as dollars spent or in-kind contributions given. One company leader shared the company's eagerness to be able to find better data. "We are frustrated because we don't think we are learning anything about best practices or organizations that have a successful model to be replicated because people aren't tracking outcomes."[65]

Companies' interest in greater measurement needs to start translating into stronger support for and involvement with data collection and analysis.

For more ideas on how companies can contribute to moving the needle on gender diversity in tech, see the opportunity for action on p. 53.

Concerns about creating systemic change

Involving more women and girls in computing and creating pathways for them into the tech industry is a complex undertaking that plays out in millions of households, tens of thousands of schools, and thousands of colleges across the country. Therefore, it is understandable that 60 percent of the largest companies surveyed cited difficulty in creating systemic change as their top challenge when thinking about becoming more involved in increasing the number of girls and women entering tech.

This is a positive indicator, demonstrating that companies aspire to change the face of computing.

Creating large-scale systemic change is not easy no matter the issue or industry, but tech companies are specialists in disruption. The best place to start will be investing in what we know works to disrupt the standard gendered patterns that permeate pathways into tech (for more, see chapter 04). And by coming together in an industry-wide partnership, companies could achieve the scale needed to create true systemic change that benefits the entire industry.

Tech companies understand they have a long way to go to achieve equitable representation of women in their workplaces. They have begun to make substantial efforts to address this gap through internal investments in recruiting, retaining, and advancing women. In terms of corporate philanthropy and CSR, many companies are creating pathways into technology for underrepresented communities as a whole. However, such programs typically reach more men than women, reinforcing and perpetuating women's underrepresentation in the field.

Adding a deliberate and explicit gender lens to those programs, as well as supporting programs that are focused exclusively on girls and women, will begin to change the proportion of women entering and remaining in the tech sector.

Companies also have an opportunity to bring together all of their different functions to work on these issues, including D&I, HR, CSR, philanthropy, and grassroots employee engagement, to create a cohesive strategy.

Understanding which interventions are most effective and pursuing collective action will help tech companies have impact at scale and drive the systemic change they themselves would like to see in this field.

The rest of this report outlines what works to involve women and girls in tech and highlight opportunities for tech companies to make a significant difference through their philanthropic and CSR initiatives, both individually and in partnership.

03

Pathways for girls and
women to enter tech

OPPORTUNITIES FOR IMPACT

TECH ACTION OPPORTUNITIES

Knowing the approaches that are showing the most promising results in increasing the number of women studying computing and entering the industry will help companies invest CSR and philanthropic resources in ways that deliver results for women and girls.

Based on the current evidence base, as well as insights from interviews with more than 100 leading experts in the field, this chapter provides a clear picture of the following:

- Root causes of women's underrepresentation in computing in the United States

- The many on-ramps for women to begin their journey into computing, from early childhood up through college and beyond

- Ways to create a continuous journey to keep interested women and girls engaged with computing and tech after each experience

- The critical metrics to measure program effectiveness, including a metrics dashboard companies can use with programs they support to better understand what is working ▶

This chapter highlights five action opportunities for tech companies based on our research findings. These are areas that could make a significant difference for women in tech and are well suited to corporate engagement. Companies can use them as thought starters for designing or strengthening their strategy, and they can find more guidance on how to determine which approach is best suited to their company in chapter 05. ▶

Working with programs to capture data for a metrics dashboard, such as the one in this chapter, will be a breakthrough in the field's ability to learn from and advance the approaches that are having the most impact. ◀
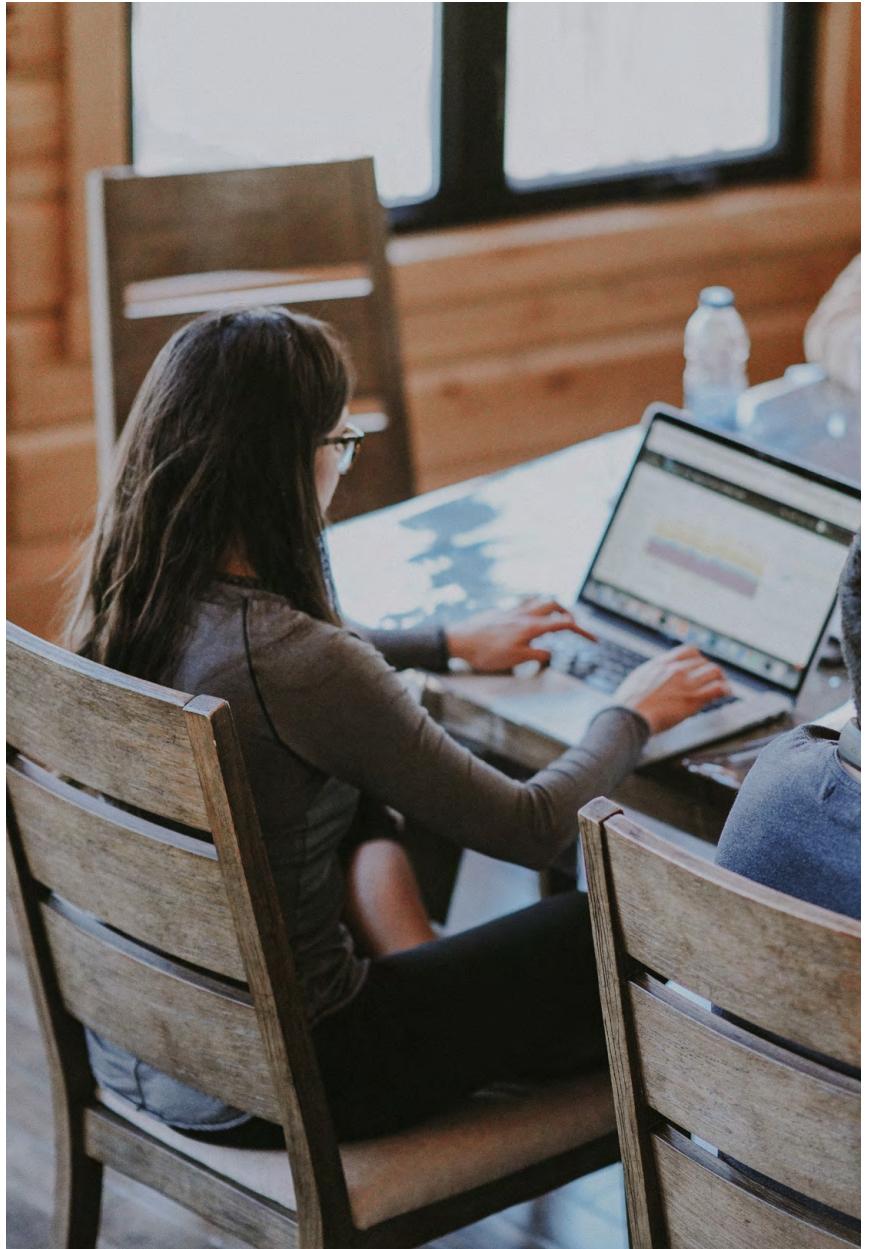
▶ FIVE ACTION OPPORTUNITIES

01 Fighting stereotypes around women in computing

02 Creating more inclusive experiences of computing for girls in middle and high school

03 Redesigning the experience of college students majoring in computing

04 Creating connections among programs so women and girls move directly from one tech experience to the next

05 Building knowledge of which programs are working

THE ROOT CAUSES OF WOMEN'S UNDERREPRESENTATION IN COMPUTING

The barriers women and girls face to studying computing and entering the tech sector can be boiled down to four root causes. Understanding those four causes will help industry actors craft solutions that squarely target them, thus enabling girls and women to thrive in the sector.

It is important to note that these barriers are not intrinsic to computing as a discipline or to women and girls. They can, therefore, be overcome. In Brazil, for example, women make up 63 percent of the graduates in information and communications technology,[66] so we know the gender imbalances we see in tech in the United States are not predestined.

01

Those who get an early introduction have advantages

There is nothing inherent in computing that prevents people from first becoming involved in the discipline at a later point in their lives. People can begin their computing education at any age or level of schooling, as long as on-ramps are created for true beginners.

However, the way computing education is typically structured today gives a major advantage to people with previous exposure. Roles in the tech sector that are less vulnerable to automation typically require a college degree in computing. Institutions of higher education are facing a faculty shortage in computing disciplines, so many colleges have more students interested in computing than they have seats for them, and therefore they restrict the number of students who can enter the major.[67]

These restrictions commonly favor those who have had more opportunities to start computing at a younger age or those who get the best grades in introductory courses. Those with the best grades are, in turn, disproportionately those with prior childhood exposure to computing, who are predominately men.[68] This pattern persists even though there is no link between previous exposure to computing and later performance as a computing major.[69]

Similar barriers exist earlier on. The computing teacher shortage at the high school level means that many schools that offer computing will put all students into one section regardless of previous exposure. This practice can serve to intimidate the students with less previous exposure, because they are made to feel they are behind their classmates.[70] Since men are more likely to have had computing exposure earlier in childhood, students who have not had previous access are disproportionately women.[71]

There is no link between previous exposure to computing and later performance as a computing major.

02

Women see few people like them in the room

Because there are comparatively few women and girls in computing, those who do study the subject—and especially underrepresented women of color—are less likely than white men to have access to peers already studying computing. This means they miss out on friends who could tutor them when they encounter tricky problem sets or who could provide important informal information about job opportunities in the tech sector and how to navigate them. They are also far less likely to have repeated and consistent exposure to role models who look like them and build their confidence that people "like them" can excel in tech. For example, Dona Sarkar, head of the Windows operating team at Microsoft, recounted to the authors of *Geek Girls Rising* that, when growing up, she "didn't know anyone like the woman I would later become."[72]

03

Stereotypes that tech is not for girls are pervasive

There is a prevailing stereotype that tech is for geeky boys and that men tend to be better at computing.[73] These stereotypes—perpetuated by *Star Trek*, *The Big Bang Theory*, and images of successful young male tech workers and tech founders—push teachers, family members, and others to overlook the potential of girls to excel in tech. These stereotypes often steer girls away from computing: when girls themselves begin to buy into these stereotypes, or even when they simply know others around them are likely holding these perceptions, it reduces their confidence in computing and lowers their interest in entering the field.

When women do enter computing, they are then more likely to face "belonging uncertainty," where the bumps in the road that everyone hits at some point—such as a low grade—play into the stereotypes about who can thrive in computing. This leads girls and women to falsely conclude that they do not belong in computing.[74]

Fight stereotypes around women and computing

By fighting stereotypes, companies can shift who girls and women—as well as their friends, families, and teachers—perceive are the types of people who can thrive in the tech sector. Below are some of the ideas for stereotype-fighting initiatives companies could implement. Google has gone a step further and worked alongside Hollywood and the media to change how the tech industry is portrayed. Danielle Brown, chief diversity and inclusion officer at Google, shared that "we're thinking about the representation of women and underrepresented groups in media. When computer science or engineering is portrayed in a movie or TV show, how do we make sure it's an inclusive portrayal?"

REEXAMINE PRODUCT OFFERINGS TO ENSURE MEN ARE NOT THE DEFAULT

Companies can take a close look at any avatars, characters, or other potentially gendered representations they use to ensure they avoid accidentally sending a message that a male character is the default and women are atypical. Make sure that gender-neutral options are not more closely aligned with the needs or interests of men than women.

REVIEW COMMUNICATIONS MATERIALS TO ENSURE THEY ARE GENDER INCLUSIVE

Take a second look at marketing materials, advertisements, recruiting materials, and other published communications to ensure women, and women of color, are well represented.

TRAIN EMPLOYEE VOLUNTEERS

According to the original research conducted for this report, 94 percent of companies surveyed reported that their employees volunteer in gender diversity–related programs. Train employee volunteers on best practices for reflecting and promoting an inclusive tech culture in their interactions with students, including showing that many tech workers do not fit the stereotypes they may have heard. For more on these best practices, see the building blocks in chapter 04.

SHIFT REPRESENTATION ON PANELS AND AT CONFERENCES

Companies can consider the message they are sending by the events they participate in. For example, avoid sending any representatives to speak on all-male panels.[75] Reconsider the use of promotional models, sometimes known as "booth babes," who use their bodies to promote tech companies or products.

04

Underrepresented women of color face a double bind

Underrepresented women of color fight a double burden of both racial and gender-based discrimination and stereotypes. Role models who look like them are particularly scarce because most women in computing today are white and Asian—and most underrepresented people of color in the tech sector are men.

Underrepresented women of color are also disproportionately affected by issues of access. For example, in one study by Google and Gallup, only 49 percent of black students, compared with 62 percent of white students, reported that there were computing classes at their schools.[76]

Black, Latina, and Native American women are heavily underrepresented in the sector, and their representation among computing degree recipients has actually declined by nearly 40 percent over the past decade.[77]

Create more inclusive computing experiences for girls in middle and high school

For now, girls remain far less likely than boys to take the Advanced Placement test in computer science.[78] A core part of a tech company's strategy could be enabling and encouraging more middle and high school girls to get involved in computing for the first time by expanding access to computing, especially at schools that do not currently offer it. To support access to programs that will attract and support girls, see the checklist on p. 57.

"Among younger children, girls tend to be equally interested in computing. But that peters off toward middle school." — Lucy Sanders, CEO and cofounder, National Center for Women and Information Technology (NCWIT)

WORK WITH LOCAL SCHOOL DISTRICTS
Expand the number of schools offering computing classes that actively work to recruit girls and provide them with the critical elements they need to thrive—covered in chapter 04. Engage families as champions of computing for girls. Support programs with a track record of diverse participation in the schools, such as Exploring Computer Science.

INFLUENCE MAJOR CHANNELS OF INFORMAL EDUCATION
Invest in computing education for girls in programs where millions of girls are already enrolled, such as 4-H, Campfire, Girl Scouts, Head Start programs, and Boys and Girls Clubs. Companies can also work with the programs they fund or partner with—particularly the coed programs—to ensure their offerings are inclusive and effectively serving girls. Informal education settings can also use tech-company-employee volunteers to provide role models and teach students.
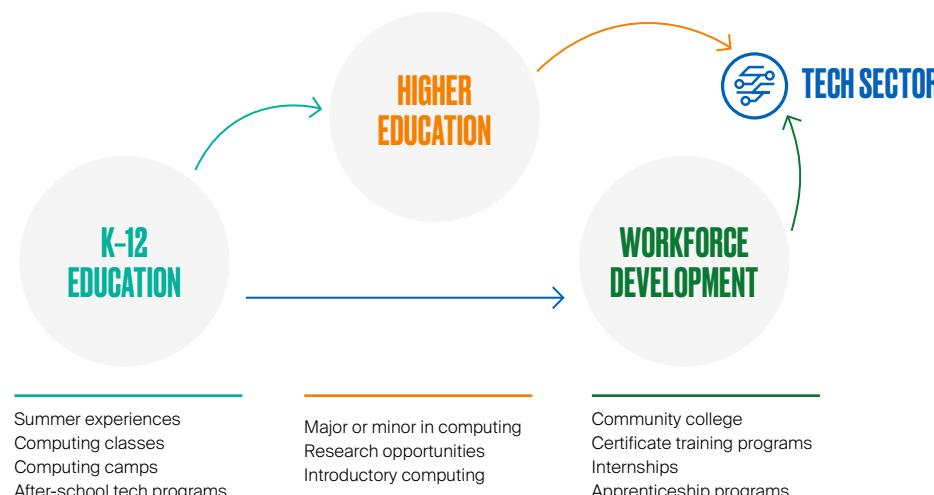
SHAPE THE DIALOGUE WITHIN SCHOOL DISTRICTS
Bring a corporate voice into discussions about the expansion of inclusive computing education, underscoring its importance for the health and growth of the US tech sector. Support efforts to push for mandatory computing courses in high school and earlier, and support schools in making use of inclusive curricula.

IT IS NEVER TOO LATE: WOMEN CAN ENTER COMPUTING IN MANY WAYS AND AT ANY AGE

Girls and women can begin their journey into tech at many different points in their lives. While some may get excited about computing in elementary or middle school, others may first come to the subject in their first year of college or even beyond. In fact, because girls are less likely than boys to have previous exposure to computing as children, later on-ramps are an especially useful and important opportunity for women.

There is nothing inherent about computing that means students cannot begin their study in college, or even later. For example, one study found that 60 percent of women computing majors—compared with 15 percent of male computing majors—at the University of Washington said they did not plan to major in computing when they took the university's intro course.[79] And computing isn't the only path to the tech industry; many women and men who end up in tech studied other subjects in college, such as math.

K-12 EDUCATION
Summer experiences
Computing classes
Computing camps
After-school tech programs

HIGHER EDUCATION
Major or minor in computing
Research opportunities
Introductory computing

WORKFORCE DEVELOPMENT
Community college
Certificate training programs
Internships
Apprenticeship programs

TECH SECTOR

ACTION OPPORTUNITY

Redesign the experience of college students majoring in computing

Tech companies can help grow the number of women studying computing in college. Given that college-age women are so close to entering the workforce, this change will quickly impact the talent pipeline from which tech companies recruit. "The most bang for your buck when it comes to computer science programs is if you focus on the transition when young women first get to college." – Maria Klawe, president, Harvey Mudd College

WORK WITH BOTH TWO- AND FOUR-YEAR COLLEGES

Look beyond "the usual suspects" of elite schools to create inclusive environments at colleges of all types, creating a much deeper pool of talent and finding innovative minds wherever they are. Support and partner with institutions that show leadership commitment to commitment to doubling-down on increasing gender diversity in computing. These changes could include separating intro courses for those with programming experience and those without; using intro class curricula that introduce students to the range of applications for computational thinking; creating a deeper sense of community; and providing early research or internship opportunities.

OFFER A SIGNIFICANT CASH AWARD TO INCLUSIVE COLLEGES

Reward those institutions that are able to substantially increase gender diversity among computing majors. A prize program could incentive many colleges to work to implement initiatives that have a track record of success and attempt new innovations, ultimately rewarding those that deliver real results.

SUPPORT ADDITIONAL COMPUTING TEACHERS AND PROFESSORS

There is a national shortage of computing faculty.[80] Tech companies should consider funding faculty positions at schools that are willing to split out their introductory courses based on whether students have significant previous experience.

CREATE AN EARLY INTERNSHIP PROGRAM

Welcome women for a summer or winter internship during their freshman year. Such programs help keep women committed to studying computing.[81] Ensure that women in the internship are in a supportive atmosphere with a cohort of peers to help build a community and sense of belonging.

SUPPORT COMMUNITIES FOR COLLEGE-AGE WOMEN

Fund both national and local conferences for women in computing. Support women-focused student groups, including chapters of national organizations. Work with colleges to support efforts to increase community among women computing students—both those who have already declared a computing major and those who have not.

There are many college majors—such as economics and psychology—that most students are exposed to for the first time in depth at the college level. And, counter to popular perception, girls arrive at college with the fundamental math and science background they would need to pursue computing; they earn roughly the same number of high school math and science credits as boys and have gotten slightly better grades than boys in these classes since the 1990s.[82]

Judith Spitz, the founding program director of Women in Technology and Entrepreneurship in New York, shared that there is room to do more to get college-age women interested in computing. "We are missing an important opportunity at the undergraduate level. Most people go to college without a clear idea what they want to be—it's while they are there that they figure out what they are interested in."

Several colleges that have focused on increasing the representation of women in their computing majors have found dramatic success over relatively short periods of time. As discussed further on p. 61, Carnegie Mellon University increased the percent of women entering their computing program from 7 percent to 42 percent, and Harvey Mudd College rapidly went from 10 percent to 40 percent.[83] Other universities, including Columbia University; Stanford University; the University of California, Berkeley; and the University of Washington, have also seen rapid progress.[84]

There are many college majors—such as economics and psychology—that most students are exposed to for the first time in depth at the college level.

Partner with various programs along women's computing journeys

Mission Measurement developed a framework (interest/proficiency/persistence) to capture the typical pattern in how people get involved in tech, and to use as the basis for evaluating program effectiveness.[85] A program that builds interest or proficiency, but does not foster persistence, will not by itself increase the number of women who enter tech. An individual program will not carry a girl or woman throughout her whole tech journey, so there must be programs to meet her each step of the way and ensure she develops interest, builds her proficiency, and sustains her persistence in tech.

If the ultimate goal is to grow the talent pool of women in tech, only investing in programs that spark interest or that teach rudimentary computing skills will not generate durable change.

To maximize the impact a strategy, companies need to make additional investments further along in the proficiency and persistence journey too. Investing in young girls requires a multiyear commitment to support them through to persistence. Otherwise, as Maria Klawe, the president of Harvey Mudd College, put it, "While it's so easy for a young woman to get interested in something earlier on, when the culture shifts at a later stage so it's no longer cool to be taking that CS class, you risk losing them." To keep girls on a path to a tech career, additional programs will be needed to help them sustain interest over a period of many years while they build their tech skills and pursue opportunities to enter the tech sector.

INTEREST	**Girls or women start their journey with interest**, defined as wanting to learn more about computing or the technology industry. Some may be curious about tech as a possible career path, and others will see computing as an "interesting" tool that can be used to solve real-world problems.
PROFICIENCY	**Girls and women can choose to build proficiency in computing**, defined as developing the skills necessary to participate and succeed in tech.
PERSISTENCE	**Ultimately, persistence is needed** to thrive in the tech sector. Persistence is defined as the demonstrated ability to continue in the field. As a woman persists, continued interest will keep her involved.

Create connections among programs so women and girls move directly from one tech experience to the next

Building direct bridges between experiences will increase the odds that girls keep developing their interest, proficiency, and persistence in tech. If they do not clearly see their next step in computing, they will move on to other focus areas. As Daisy Auger-Dominguez, the former senior vice president of talent acquisition at Viacom, shared: "The next frontier this field needs is developing a platform that allows women and girls to tap into everything that already exists, because now there is nothing to connect one experience to another."

SMOOTH THE TRANSITIONS BETWEEN PROGRAMS

Companies can work with all the programs they fund to find suitable next steps for girls when they complete the programs. Encourage programs to develop relationships with each other to routinely and smoothly hand off girls from one experience to the next, keeping girls engaged along the tech journey.

SUPPORT THE DEVELOPMENT OF A PLATFORM WHERE GIRLS CAN SEE ALL OF THE PROGRAM OPPORTUNITIES AVAILABLE TO THEM

Figuring out what next step in computing is right for an individual girl can be daunting, especially for those coming from underresourced communities. Create a tool where girls and their families can easily see the options that are available, for both in-person and online programs. A "smart" model could be an AI-informed tool that personalizes recommendations for girls and women based on their preferences, previous computing exposure, life stage, and location. This tool would help put together a set of experiences that link to each other and ultimately into the tech sector.

PLUG THE GAPS BETWEEN EXISTING PROGRAMS

Use a mapping of current programs to figure out where additional bridges and connective tissue are needed beyond what currently exists in different schools or cities. Recruit programs from other geographies to open chapters locally to fill a gap. Create portals into the tech sector itself by linking programs for older girls or women to internships and apprenticeship programs.

SUPPORT EXPANSION OF COMMUNITY GROUPS

Connect girls and women who are either current students or alumnae of any computing program. The community provides a forum for women and girls to connect with one another, provide each other with advice and tips about the tech journey, and connect with voices in the industry.

There are many types of programs to get women into computing, but limited research on which are most effective.

As the need and the opportunity to increase the number of women in computing becomes more apparent, individuals and organizations have created many programs and pursued various efforts to target this issue. These efforts have included girl-specific programs as well as work to increase the number of girls engaged in coed programs. However, based on a proprietary landscape scan in 2017 by McKinsey and Company, the girl-specific space today is largely filled with small players, with only a small handful of larger organizations. ▶

While more programs and activities exist today than in years past, supporting data and evidence has lagged behind—little research exists on which types of programs are the most effective in causing more women and girls to major in computing. One non-profit group that conducted a survey of tech companies' involvement in this space found that "everyone was investing in the same set of programs, yet no one was satisfied with the outcomes from those programs. They had thousands of non-profits doing great things, but they weren't connected and weren't sharing data on what they've seen work."[86]
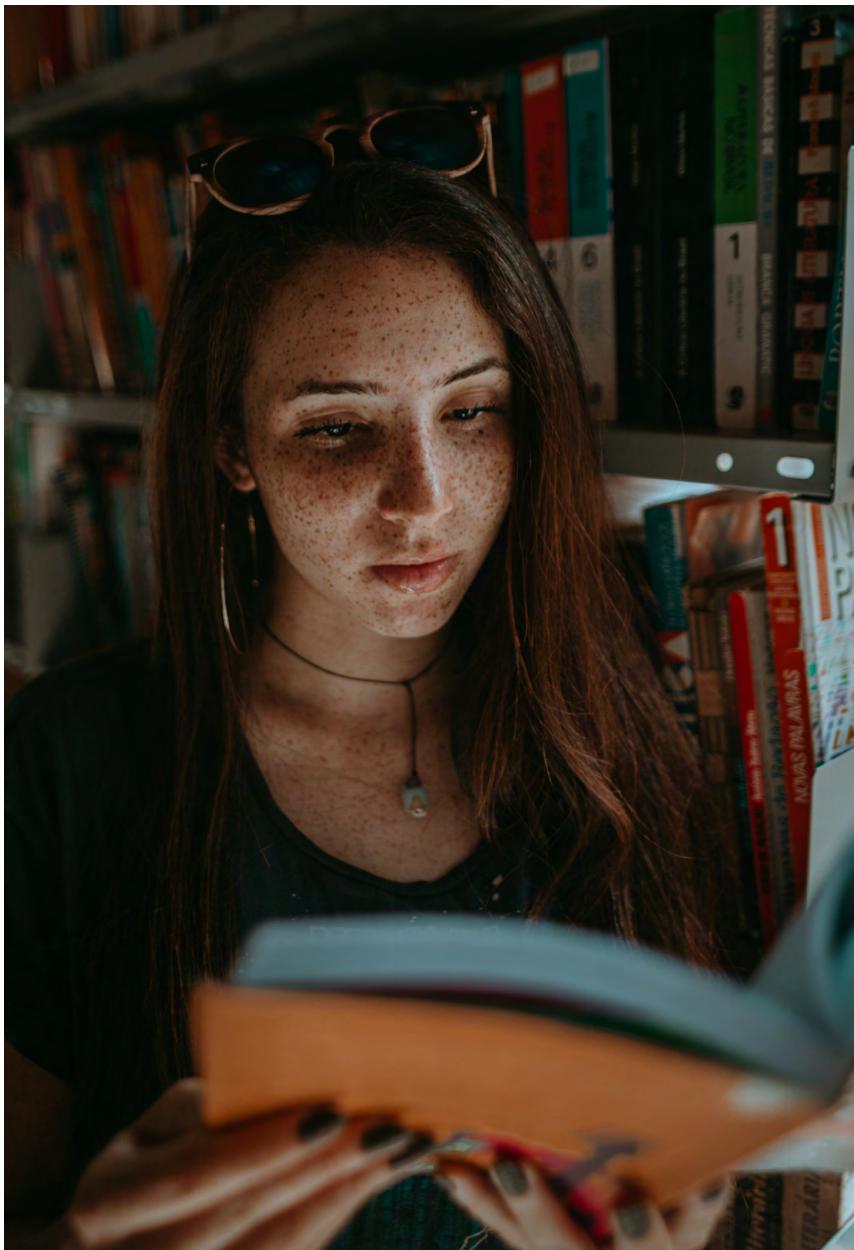
The lack of coordination between organizations in the field was a repeated theme we heard in interviews with non-profits, academics, and companies. Each organization develops its own programs to support a certain part of a girl's journey into tech, but comparatively little exists to make it easy to share best practices or to ensure that there is a coordinated hand off between programs to help a girl progress from one tech-related opportunity to the next. One government technology official shared that "there are a lot of players in the field, all of whom want to do good, but because there's no coordination, they are all moving in different directions."

A broad range of programs and interventions target the various stages of a girl's life. Greater evaluation is needed to learn which experiences have the greatest long-term impact. Types of programs and interventions include the following:

- After-school programs and clubs in middle and high schools incorporating computing intensive summer camp–style programs to teach girls computing skills

- Efforts to bring computing course offerings to more middle and high schools, especially with a more inclusive curriculum

- A reimagining of the experience of computing majors at certain colleges

- Celebrations of women in computing

- Early internship and research opportunities for women, especially after their first year in college

- Affinity groups that build community among women studying computing

Little long-term data exists to show what length, type, and intensity of programs work best for girls before they get to college.

Currently no system is in place to capture large-scale data from women and men to determine what experiences and programs led them to major in computing or pursue a technologist role.[87] Individual programs also struggle to capture longitudinal data regarding their impact on their alumnae. Linda Sax, a professor of education at UCLA and principal investigator for research of the BRAID project, shared that: "We need to know more about what makes programs effective for women and girls in the long run, but tracking individuals over time and collecting relevant comparison data can be costly and time intensive."

One company reported that the biggest challenge it faces with the non-profits it works with is tracking impact. "We are working with such a long pipeline—we don't know if anyone eventually goes to college or studies tech. We don't yet know if we have any impact, or if we do, what it is."[88] Non-profits are also eager to fill the evidence void and are seeking out the resources to track outcomes for their graduates. One organization shared that it would be interested in tracking outcomes for their girls compared with a control group, but "right now they don't have the resources for that."[89]

Using academic research and experiments, we have identified the critical elements for women's success in computing (which we have distilled into eight critical building blocks that women need to succeed in tech in chapter 04). However, we need more data to determine the optimal dosage, duration, and format of programming, as well as the ideal age for intervention, to best provide those building blocks.[90]

We need more data to determine the optimal dosage, duration, and format of programming.

WE SEE FOUR CRITICAL MISSED OPPORTUNITIES FOR DATA COLLECTION.

Companies should take the following approach to collecting data:

Collect all data with markers of identity—sex and gender, race and ethnicity, age, and socioeconomic status—so it can be understood if and how program results differ for various segments of participants. For example, is the program having the same effect on girls and boys? On white girls and black girls?

Measure both long- and short-term metrics to understand the impact programs have.

Collect core operational metrics, such as cost per participant.

Collect data about the content and methods of the program, including what was taught, the length of the program, the format it was delivered in, and the demographics of instructors.

Provide an opportunity for free text for programs to explain *why* they think certain metrics turned out the way they did.

Measure impact for girls and women compared with their baseline before they entered the program and compared with a control group of girls with similar original interest in computing who did not take the program. This is an important but more advanced approach to program measurement and evaluation, so it will likely only make sense to pursue once the program has reached a meaningful scale.

01 No agreed-upon metrics

02 No population-wide data collection

03 Lack of measurement focused on girls in coed programs

04 Lack of access to the resources needed to track graduates

No agreed-upon metrics

The field has not yet come together to identify a manageable set of metrics to track so that companies, researchers, and programs can look across the field and determine which elements are working best.

To fill this gap, this report provides a standardized list of metrics companies and programs can work together to collect.[91] Using this common metrics scorecard will enable companies to look across the field and determine program strengths that can be scaled and replicated. ▶

No population-wide data collection

The sector lacks a system that collects data from a broad range of students on which computing experiences they had access to and what worked best for them. This data would reveal what programs and combinations of experiences were the most effective in moving girls toward a major in computing. Sites for that kind of broad data collection could include the College Board, freshman surveys, or the National Student Clearinghouse.

HOW TECH COMPANIES CAN HELP FILL THE EVIDENCE GAP:
SUPPORT THE PROGRAMS THEY WORK WITH TO COLLECT KEY METRICS

Tech companies can use the dashboard to the right to capture the relevant metrics they use across all their CSR and philanthropic programs in women in tech—and they can ask grantees and partners to fill it out as well.

The metrics not only provide tech companies with the information they need to clearly see what is effective but they also encourage practitioners to consistently track outcomes that the field can use to better understand what works. This knowledge, in turn, will help companies and other donors make smarter investments in the long run—a virtuous circle that will help generate better results.

Of course, gathering some of this data will require resources, such as the staff and technology to gather and analyze the data, so it is important for companies to support the organizations they work with in developing the data collection and analytic capabilities to carry out these measurements.

CHECKLIST FOR PROGRAM METRICS ⊘

Gather all data with demographic markers attached to better understand experiences of different communities

INTEREST

- Percent of girls enrolled (if coed) compared with nationwide computing participation ratios for girls to boys at that age

- The following is to be measured before and several months after the program:

  · Percent of program graduates who want to sign up for more computing activities and percent who do

  · How much program graduates feel they belong in computing and tech (on a scale of 1–10)

  · How confident program graduates feel about their ability to thrive in computing (on a scale of 1–10)

- Percent of program graduates interested in pursuing a higher-education degree in computing

- Percent of program graduates interested in pursuing a career in tech

PROFICIENCY

- Percent of girls who complete the course

- Performance of women and girls on any assessment of skills during the program

- Percent of program graduates who take a standardized computing test (such as AP CS) and their average score

- Percent of program graduates who take some courses needed to major or minor in computing

PERSISTENCE

- Percent of program graduates who major or minor in computing

- Percent of program graduates who get a graduate degree in computing

- Percent of program graduates who take their first full-time job in the tech sector

- Percent of program graduates who are still in the tech sector midcareer

Lack of access to the resources needed to track graduates

The majority of programs focusing on girls are not equipped to collect long-term data on their graduates and similar control groups, thus filling the gaps in population-wide data. Factors largely outside of practitioners' control, such as difficulty following up with young girls when they move and limited resourcing to conduct intensive follow-up or randomized control trials, impedes programs' abilities to collect this data.

Many of the programs targeting younger girls started in the past decade, meaning that the first wave of their graduates are entering college now.[92] Programs report difficulties tracking how their graduates do in college when they have not been active in the programs for several years and have lost touch.[93]

Some programs are collecting only correlation data, not causal evidence, on girls and women continuing to study computing.[94] That means they are testing whether the girls who participate in their program are more likely than other girls to go on to take further computing classes, but they are not testing to see if that is because of the program itself or because of another independent factor, such as underlying interest in computing. To understand how much of an effect the program itself is having, outcomes for program participants would need to be measured against those for an otherwise similar group of girls who did not participate in the program.

Lack of measurement focused on girls in coed programs

Many programs that serve both boys and girls are not separating their outcome data by sex and sometimes are not even reporting the ratio of girls enrolled in their programs.[95] That means that it is difficult to know how effective they are at recruiting girls, much less whether the program is generating an equally positive impact for girls and boys.

ACTION OPPORTUNITY

Build knowledge of which programs are working

Better evidence of which program elements have the strongest positive effect would enable programs to improve and tech companies to concentrate their resources on the interventions that deliver the greatest impact.

"We're hoping to uncover what delivery methods and dosages are most effective for girls. There must be a sweet spot somewhere between the brief exposure programs and ones that need someone in a chair for 40 hours a week. What's the magic amount of dosage that gets a valuable experience?"
– Howard Rankin, chief diversity officer and vice president of employee relations, Best Buy

FUND DATA COLLECTION AND EVALUATION FOR PROGRAMS

Include comparisons with control groups of girls to figure out what the most effective program designs are to get more girls and women into the technology sector.

ENCOURAGE LARGE-SCALE DATA COLLECTION ON COMPUTING EXPOSURE

Mechanisms include AP exams, the SAT, and first-year college surveys. Companies also have an opportunity to collect better baselines for current participation. On a population-wide level, they can pinpoint which combinations of experiences are most likely to lead girls into computing.

INVEST IN CROSS-SECTORAL RESEARCH TEAMS

Computing teachers, experts in pedagogy, program administrators, and academic researchers should work together to experiment with different program designs while working side by side to assess what works. These teams could work with colleges, school districts, or existing non-profits to innovate, test, and refine different models.

This chapter laid out the following five opportunities for action companies can take to support women and girls from interest to proficiency to persistence in tech:

01 Fight stereotypes around women in computing

02 Create more inclusive computing experiences for girls in middle and high school

03 Redesign the experience of college students majoring in computing

04 Create connections among programs so women and girls move directly from one tech experience to the next

05 Build knowledge of which programs are working

Companies and programs still have significant work to do to build out the evidence base to learn which of the many on-ramps for women into computing are most effective and what the optimal length and intensity of different programs is. Committing to developing that evidence base will help companies, and the field at large, make more informed decisions about where to invest; it will also help schools and non-profits refine their programs to become as effective as possible.
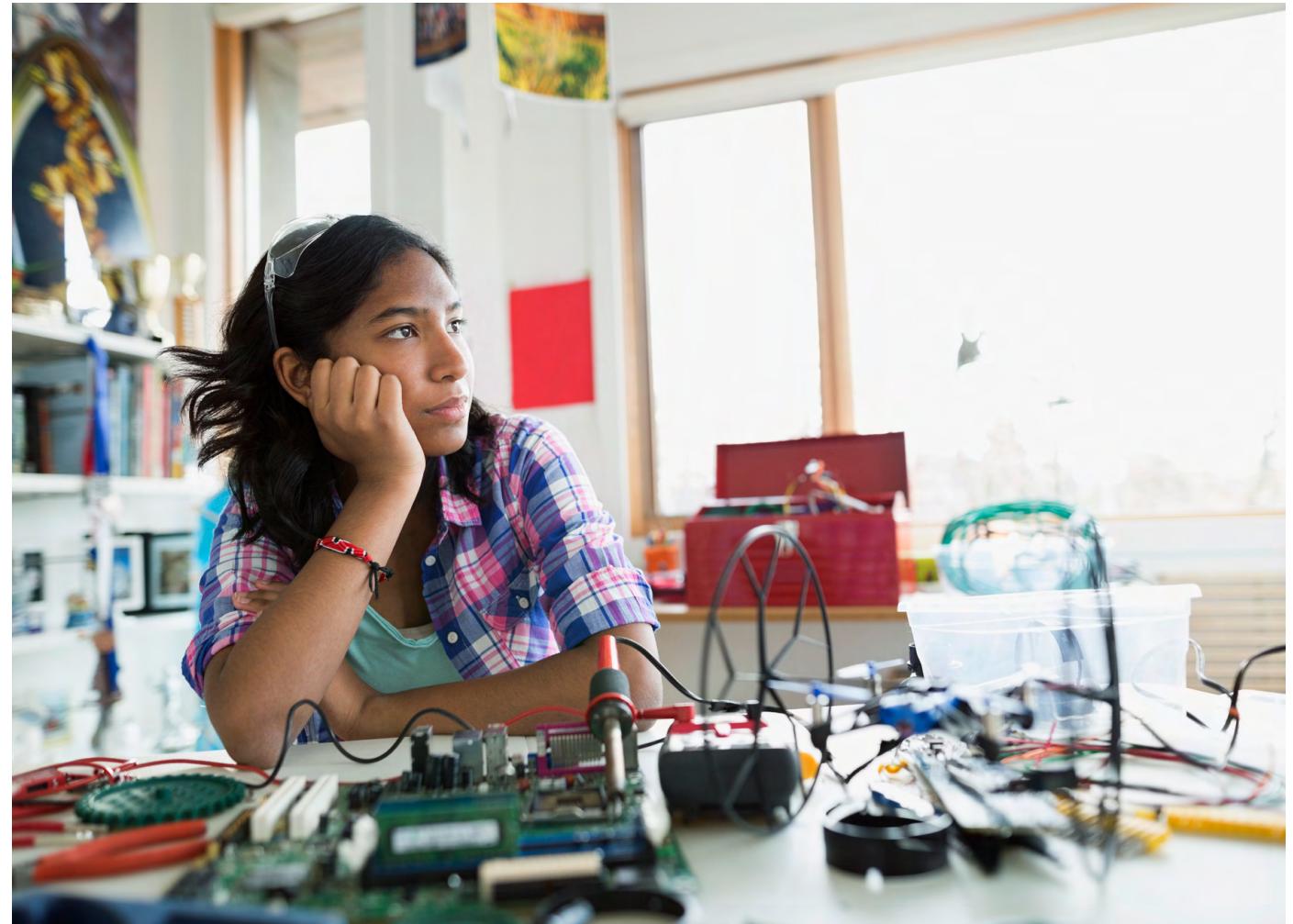
Nonetheless, from academic research and success stories, we have been able to determine the eight critical building blocks that programs must provide to enable women to thrive in computing. The next chapter shares those building blocks, enabling companies to help the programs they support become more successful in reaching women and girls.

Chapter 05 provides tools companies can use to design or refine their distinctive strategy.

04

Supporting the critical building blocks for women's success in computing

WHAT WORKS

8 CRITICAL BUILDING BLOCKS

This chapter synthesizes the critical building blocks that women and girls need to thrive in computing, providing tech companies and the practitioners they support the tools they need to better design, execute, and scale programs that provide those elements. These building blocks apply both to programs companies own and operate themselves, as well as the programs they partner with or support via philanthropic grants.
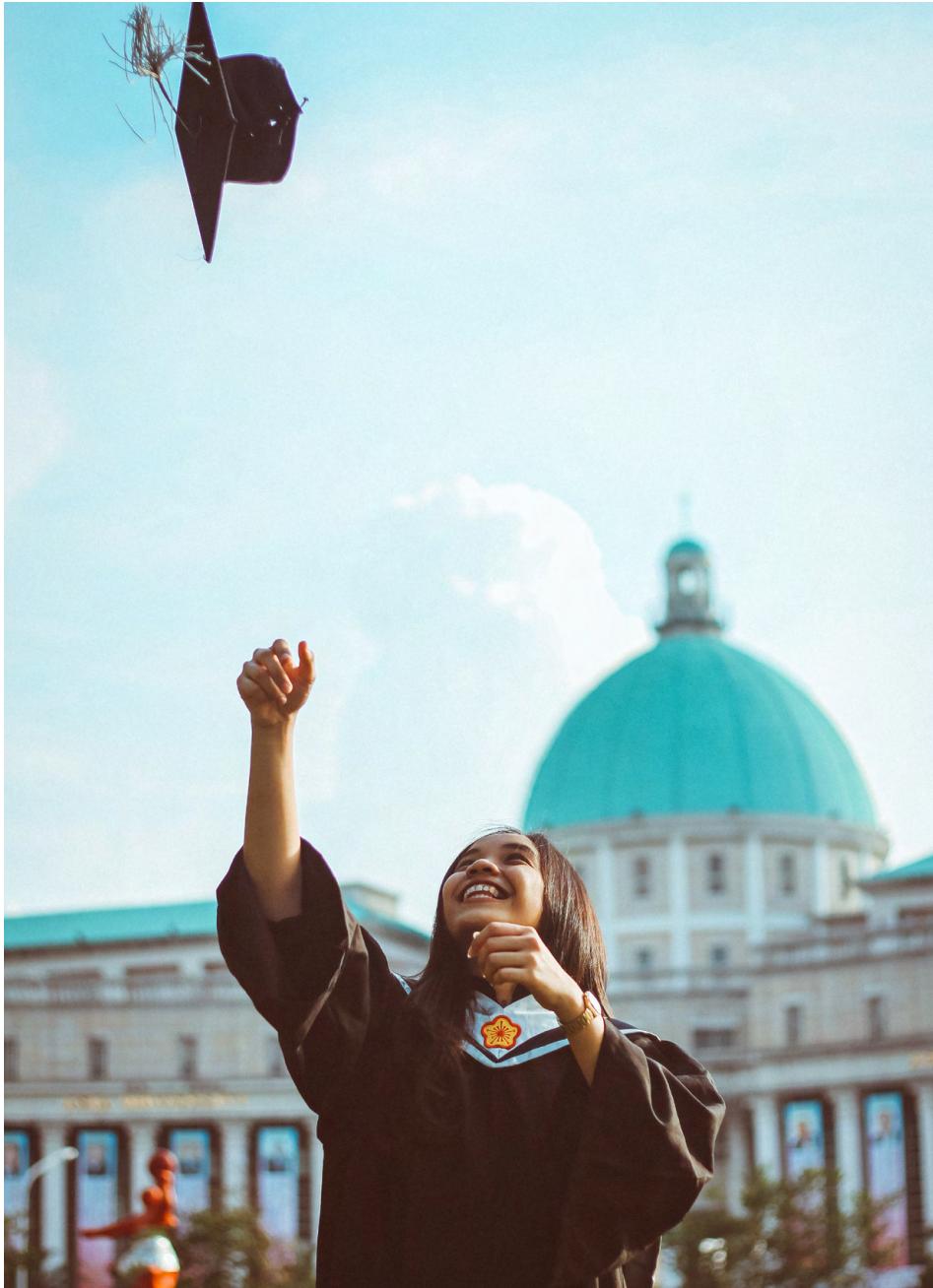
We have created this building blocks framework based on an extensive review of the academic literature on what works for women in computing. We also drew from more than 100 interviews with leaders in the field, including prominent researchers, non-profit leaders, government officials, and computing professors.

Companies can use this building blocks framework to become more informed investors in gender-diversity initiatives, shaping the conversations they have with partners and programs and the way their companies evaluate their investments. We have outlined tactical next steps for how programs can incorporate these building blocks. As some will require resourcing to bring to life, it will be important for companies to support their partners as they work to incorporate them into their programs.

Building blocks framework

Offer diverse on-ramps for beginners

Ensure adult gatekeepers (family, teachers, counselors) are encouraging and inclusive

Create a sense of belonging

Foster interest in computing careers

Build her confidence in her abilities

Create continuity between computing experiences

Cultivate a community of supportive peers

Provide access to technology and computing experiences

This chapter includes the following:

A checklist that tech companies and practitioners alike can use to make sure their programs set women and girls up for success. Companies can bring this to the meetings they have with practitioners and researchers to make sure the interventions they support are gender inclusive.

Greater detail on the elements of each building block to support programs in getting it right. Companies can use this as a reference whenever they need additional information on how to incorporate a particular element into a program.

THE CHECKLIST: HOW TO ENSURE PROGRAMS ARE INCLUSIVE FOR GIRLS AND WOMEN

We have synthesized the building blocks into an easy-to-use checklist with tangible tactics that investors can look for in the programs they fund and that they can use to inform the design of any programs they run in-house. The building blocks apply to both girl-specific and coed programs—although they are most often missing from coed programs.[96]

Not every program will be able to provide every building block. For example, a program that focuses on engaging families might not look at building a supportive peer network. But programs should incorporate these elements wherever they are relevant to their program design.

WOMEN AND GIRLS NEED ALL EIGHT BUILDING BLOCKS TO THRIVE

The striking successes that institutions of higher education have had in developing more diverse computing programs show the benefit of working simultaneously on all of the building blocks to effectively involve more women and girls. Both Carnegie Mellon and Harvey Mudd simultaneously implemented a bundle of reforms that embedded all of the building blocks into the computing experience for their students and saw game-changing results for women.

Harvey Mudd created on-ramps for beginners by splitting introductory classes to create distinct tracks. They launched early internship opportunities to increase girls' confidence in the subject. They created a social community among girls pursuing computing by sending them together to the Grace Hopper Celebration of women in computing early their first year. They also reformed their introductory curriculum to make computing classes more relevant to other disciplines that many students were already interested in.[97]

As a result of this package of reforms and several others, Harvey Mudd increased the percent of women entering their computing program from 10 percent to 50 percent.[98] Similarly, Carnegie Mellon went from 7 percent to 42 percent.[99]

However, a few schools that have tried to replicate some parts of this model have so far not had the same level of success, likely because one or more of the essential building blocks was missing.

CHECKLIST ✓

Gender-inclusion checklist

OFFER DIVERSE ON-RAMPS FOR BEGINNERS
· Create different classes for true beginners
· Remove any assumption of existing knowledge from introductory courses
· Actively welcome beginners into a program

CREATE A SENSE OF BELONGING
· Remove gender-specific materials that promote stereotypes
· Highlight role models who break stereotypes
· Provide access to role models from communities of color

BUILD CONFIDENCE IN ABILITIES
· Make it clear that everyone works hard in these subjects
· Create opportunities for early research projects or early internships
· Invite role models to talk about challenges, setbacks, and failures

CULTIVATE A COMMUNITY OF SUPPORTIVE PEERS
· Develop a cohort of girls going through the same experiences
· Create small groups so no one falls through the cracks
· Recruit friend groups
· Group a few girls together so no one is the only girl around

Providing only some of the building blocks will have limited effectiveness in promoting gender parity.

Companies should therefore work with the programs they fund and examine the design of any in-house programs to ensure they provide as many of the building blocks as possible. If programs only provide some of them, the girls they serve should be linked up with additional programs to provide the remaining building blocks.

Of course, some girls and women already begin with some of the building blocks squarely in place and do not need a program to provide them. For example, girls from more affluent communities are far more likely to begin with basic access to technology and computing. Programs need to be tailored to the communities they serve, understanding which building blocks are absent and designing their program model to fill them.

HOW TO GET THE BUILDING BLOCKS RIGHT AND MAKE PROGRAMS MORE INCLUSIVE

Best-in-class programs ensure girls have access to critical building blocks to propel them to success in computing.

To thrive in computing, there are eight key building blocks that all people need, regardless of gender, race, socioeconomic background, or zip code. At present, some children in the United States, disproportionately white and Asian boys from wealthy families, are far more likely to start out with access to these building blocks than girls are. This issue is even more acute among girls from underrepresented racial and ethnic groups and underserved communities.

This section describes what good looks like when providing each of the eight building blocks. Companies can use this section as a guide when designing their programs, choosing programs to fund, and collaborating with programs they already support to help make them be more inclusive of girls.

01

Offer diverse on-ramps for beginners

Whenever someone first starts studying computing, whether in elementary school or in college, they will need an introduction that starts at the very beginning. Today, many introductory courses either start with an assumption that the class members have had some previous exposure to computing or lump together those with previous exposure and those without it in the same class.

According to a recent survey, 98 percent of current, mostly male, computing majors had exposure to CS in high school and were more likely than non-majors to have attended a high school where computing was offered.[100] Because more men have tinkered with computing earlier in childhood and are more likely to enroll in pre-college computing classes,[101] women are disproportionately the ones arriving at college not having had previous exposure to computing. ▶

"There are a lot of barriers to developing interest in computing right now. If you can lower some of those barriers, you can get much closer to gender parity."

Elizabeth Litzler, director of the Center for Evaluation and Research for STEM Equity and affiliate assistant professor, University of Washington

Effective approaches tend to do the following: ◀

Create classes for true beginners. One woman shared her reflections on her first serious exposure to computing, which came her first year in college. "The intro course was several hundred kids. You couldn't place out, so you had everyone who had been coding for ten years graded on the same curve as those for whom it was their first time." One prominent researcher studying the impact of various colleges' efforts to try to make their computing programs more inclusive for women found that one of the most effective things they can do is split out true beginners from those with some experience.[102]

Remove any assumption of pre-existing knowledge from introductory courses. The chair of one university's computer science department shared that, when their introductory classes took for granted that many of their students had substantial programming exposure, many women were led to feel "like they would never catch up."[103] Creating classes for beginners does not mean reducing the rigor of the class, and these beginners should go on to take the same sequence of classes as their peers with more previous exposure.

Eliminate prerequisites to enter a computing track in college. Many colleges cap enrollment in computing majors, reserving access only for those who had pre-college exposure to computing.[104] These policies reduce women's opportunities without resulting in better performing students.

Carnegie Mellon found that no link existed between having previous exposure and performing well in computing classes.[105]

Andresse St. Rose, senior director for research, evaluation, and policy at the Center for Collaborative Education and coauthor of the American Association of University Women's report *Why so few?* on women in STEM, concluded: "programs need to reexamine their requirements and think about why they have them. If they are only serving as barriers, they need to go."

Actively welcome beginners into a program. When Carnegie Mellon restructured its computing programs to be more welcoming and accessible to beginners, they spread the word that "experience is not a prerequisite" to make sure that beginners would feel welcome to apply.[106]

02

Create a sense of belonging

Everyone knows the stereotypes of computer programmers—geeky men in hoodies holding all-night hackathons in a basement. Men who identify with these stereotypes feel at home in computing. By contrast, women often do not feel like they fit or that they constantly have to prove themselves.[107]

Given that these stereotypes already make most women less likely to feel they fit in with computing, it is particularly important for computing programs to welcome girls and help them feel like they belong. When they do not make this effort, girls and women are less likely to sign up for computing activities. They are also more likely to interpret the inevitable bumps in the road that everyone eventually experiences, such as an occasional low grade, as signals that computing is not right for them.[108] ▶

"When you are asked, 'oh, you know how to code?' every time you walk into a meeting, you don't have much energy left to actually code."

Laura Sherbin, copresident, Center for Talent Innovation

Effective approaches tend to do the following: ◀

Remove gender-specific materials that promote stereotypes. Programs must ensure that the physical classroom environment and references in the curriculum (in other words, problem sets) do not focus on masculine stereotypes and are culturally relevant to a range of communities of young women (particularly women of color). For example, one study found that when college women entered a computing classroom that had *Star Trek* posters and generally fit the geeky tech stereotypes, they were less interested in studying computing than when they instead entered a "neutral" computing classroom with nature posters and magazines. For men, there was no difference in their interest between the two types of classrooms.[109]

Highlight role models who break stereotypes. Regardless of a young woman's interests, beliefs, or personality, she should be able to see a place for herself in computing. A female version of the classic male geek stereotype may be a less inspiring role model for some young women than someone who can excel in computing while maintaining various other outside interests.[110]

Provide access to women role models from communities of color. Doina Oncel, CEO and founder of hEr VOLUTION, a program to support girls from underserved communities in STEM, recounted what happened when she included many women instructors in her program but none who were underrepresented women of color. "One young woman of color came up to me and asked, 'Why do your teachers look like you but don't look like me? Is it because the teachers who look like me aren't smart enough?'"

03

Build her confidence in her abilities

Women tend to be less confident than men are when it comes to computing.[111] A comparison of groups of women and men with identical math ACT scores found that women who were majoring in computing were less confident about the subject than men who were not even majoring in it.[112] This confidence gap has real consequences for the number of women who persist in computing.

Rutgers University is tracking what causes both men and women to advance from their introductory computing class to the second class in the sequence. Among the students who get As, men and women are equally likely to advance. But among those who get Bs or below, men become more likely than women to advance. Rebecca Wright, professor at Rutgers University and director of the Center for Discrete Mathematics and Theoretical Computer Science, concludes, "We need to find a way to message that a lot of people find this hard, and you can still excel in computing with Bs." ▶

"So many of the women in my classes don't feel like they are good enough to be there even though they are excelling."

Professor of computer and information technologies

Effective approaches tend to do the following: ◀

Make it clear that working hard in these subjects does not signal a lack of talent. Cheryl Calhoun, the dean of access and inclusion at Santa Fe College, shared her experience teaching computing. She said girls in her class would occasionally come up to her and confide that they had to drop the class because they were convinced they just were not good enough to do computing. So, she publicized the grading curve, enabling the women to figure out that they were some of the best students in the class.

Create opportunities for early research projects or early internships. Early opportunities to work in computing, whether through internships or research opportunities after the first year of college, can boost women's confidence that they can be successful doing this work. Access to both research and internships have been shown to increase persistence and make women more likely to complete a major.[113]

Invite role models to talk about challenges, setbacks, and failures. One important way to build confidence is to feature role models who are relatable in their level of success and in the struggles they have overcome to get there. A report by the American Association of University Women found that "women experts portrayed as 'superstars' who are unique and exceptional have little impact—and sometimes have a deflating effect—on young women's views of themselves."[114]

Instead, girls and women need to see role models who faced the same stumbling blocks and challenges they did but who were nevertheless able to succeed.[115]

04

Cultivate a community of supportive peers

When friends go through a challenging experience together, it is often easier for the individuals to excel. However, since many friendships form within genders, the relatively low number of women in computing means that women are less likely to start with friends who are also studying the subject.[116]

In other words, "Computing is lacking in peers for anyone who is not white and male."[117] This reality is a significant disadvantage for women. Having a network of computing-savvy peers can help students when they are stuck with a problem in their code, need to contextualize a less-than-stellar grade, or are looking for tips on the best ways to get tech internships or jobs.[118]

Currently, peer pressure pushes girls away from computing instead of toward it. If a network of kids sees computing as more appropriate for boys, a girl who enrolls in it anyway may suffer negative social consequences.[119] This effect becomes stronger at puberty as gender roles become more salient. As a result, middle and high school girls can pay a high price with their friends if they break with the popular idea of how girls are supposed to act. This pressure highlights the need for strong networks of women who can support each other through computing. ▶

"One of the most important factors for girls and women is a supportive peer group in that intro class that they can go to with questions."

Linda Sax,
professor of education at UCLA and principal investigator for research on the BRAID project

Effective approaches tend to do the following: ◀

Create cohorts of girls. The best approaches create a peer group going through the same experiences who can provide each other with peer-to-peer mentoring and support. Relatively light-touch models include extracurricular clubs, such as Girls Who Code, and digital communities, such as NCWIT Aspirations in Computing. More intensive models include creating a strong cohort of girls going through an internship together, staging conferences like Grace Hopper, or putting together regional celebrations of computing.[120]

Create smaller groups within larger classes. Instructors can break large lecture classes up into small discussion groups or support networks so that no one falls through the cracks. This helps students, including a disproportionate number of girls, who do not start out with as many friends studying computing. As part of their successful efforts to attract more women to the computing department, Columbia University added small-group discussion sections to build a sense of community within the larger lecture class.[121]

Build critical mass for girls. Organizers should work to recruit at least 50 percent women for each program. When that is not possible, they can cluster the women so none of them end up surrounded only by boys, even if clustering means there will be some all-boys sections.[122] One study found that "most girls expressed an unwillingness to take classes where they would be one of a few girls."[123]

Recruit friend groups. Particularly when thinking at the K–12 level, it is important to focus less on recruiting one girl to a class or program and instead work to jointly recruit a full, pre-existing friend group to go through the experience together.

Jane Margolis, one of the architects of the Exploring Computer Science program, which has had success recruiting a large number of girls for its high school–level computing classes in the Los Angeles Unified School District, recalled a teacher persuading members of the girls' swim team to sign up together.

05

Ensure adult gatekeepers (family, teachers, counselors) are encouraging and inclusive

Family members, teachers, and counselors play a large role in helping girls and young women shape their interests. Girls often listen to their advice when deciding what career paths to pursue. Given the other negative messages they likely receive about their fit for computing, proactive support from adults is particularly important in enabling girls to pursue computing. Unlocking that adult support for girls and young women will be part of a broader cultural shift in the way society thinks about tech and gender. This transformation will be the result of the cumulative effect of many small influences that affect millions of homes, tens of thousands of schools, and thousands of colleges. ▶

"There is a lack of legitimate encouragement for girls and other underrepresented groups. It's a huge practice that's always overlooked. Girls need teachers and family members to encourage them, and all too often today that's just not happening."

Lucy Sanders,
CEO and cofounder, National Center for Women & Information Technology

Effective approaches tend to do the following: ◀

Recruit family members as champions. Family members have significant sway over shaping whether girls are likely to go into computing.[124] Family recruitment can be particularly helpful in underserved communities where families are less likely to know people who work in tech or what would be involved in a career in computing. For example, programs like TECHNOLOCHICAS, run by NCWIT and the Televisa Foundation, show public service announcements showcasing successful women in technology. They aim to show Latino/a families that, by succeeding in computing, their girls can live the kind of full, successful, balanced lives they dream for them.[125] A second method is to include family participation in elementary school computing introductions to make adults feel more comfortable with and supportive of computing, such as a Family Code Night.[126]

Help guidance counselors and teachers recognize that all students can succeed in tech, regardless of race or gender. While all women need supportive teachers, finding champions is particularly important for underrepresented women of color. Because of the stereotypes they face in terms of both race and gender, these girls will be more likely than others to encounter adults who do not believe they can excel in computing. Y-Vonne Hutchinson, founder of the diversity consulting firm Ready Set and founding member of Project Include, recounted, "I was sent a message that was reinforced throughout my education by many different teachers that I was expected to not do well."

One program that has been successful in achieving gender parity in high school computing in underserved communities did it by "shaking up biased beliefs systems and involving counselors and principals in a culture shift on which students they think will do well in computer science."[127] They visited school administrators and discussed the wide variety of students who had been successful in courses at other schools. Similarly, NCWIT produces a poster for guidance counselors showing the many different paths their students can take into tech to show that there is a path for all types of students.[128]

Provide additional, proactive teacher encouragement to women students. Teachers can influence girls to engage and persist in computing, whether that is encouraging them to sign up for a class or to stick one out.[129] One student at the University of Washington, reflecting on what caused her to major in computing and pursue a master's degree, said a key factor was that her professor reached out after her introductory class to computing to encourage her to enroll in the next class.[130]

06

Foster interest in computing careers

Girls can get excited about computing and joining the tech sector when they see how computing is a useful tool that can help solve problems they care about in areas they are interested in. Once that interest is there, an idea of what tech careers look like will enable them to aim for those careers. Knowing what steps they should take in the short term to set themselves up well for later, including the courses to sign up for and the extracurricular groups to get involved with, will help them achieve their goals. ▶

"It's one thing if you don't have a parent (working) in tech, but it's a whole other thing when you don't know a single person in tech. And that's a lot more common in black and Latino communities."

Rosanna Durruthy, head of global diversity, inclusion, and belonging, LinkedIn

Effective approaches tend to do the following: ◀

Exhibit what careers in the tech sector look like. Because of structural disadvantages, underrepresented women of color, as well as women from lower socioeconomic backgrounds, are less likely than others to have access to family members and family friends who work in tech or who routinely work with computers. For example, 53 percent of students in 7th through 12th grades with families making less than $54,000 a year said there was an adult in their life who works with computers or other technology, compared with 78 percent of those whose families made more than $105,000 a year.[131] Relatable role models will be particularly helpful for girls who cannot see what a career in the tech sector looks like by consulting adults they know.

Show girls the path as well as the ultimate destination. As one professor of education studies put it, "One of the biggest things for young girls and young girls of color is for educators or organizations to help them make the connections between what they are doing right now and how that can impact their future in computing."[132] Girls who do not have as much familiarity with computing through their families will benefit from extra guidance from teachers and counselors on which courses and programs to take to advance along their tech journey.

Make computing classes more relevant to girls' interests. Instructors can achieve this relevance by bringing a cross-disciplinary approach to the curriculum and by teaching introductory computing in a way that shows the breadth of the field. The University of Washington's reform effort that grew their percentage of women computing majors from 15 percent to more than 30 percent included "classes that connect software programming to philosophy or biology and an emphasis on real-world applications."[133]

Create opportunities for joint majors, double majors, and computing minors. Women who excel in STEM are more likely to also excel in other academic disciplines than men who excel in STEM.[134] Many women will be more attracted to computing if they do not think pursuing it means giving up a focus on their other interests. Joint degrees, often called "CS+X," have proven successful at attracting additional women. While Harvey Mudd's computing major is roughly at gender parity, their joint degree with computing and biology is now between 66 and 80 percent women.[135]

As with joint majors, opportunities to minor in computing while majoring in another field may be attractive to many women and can keep the option open to them of pursuing a job in the tech industry.

07

Create continuity between computing experiences

When a program is aimed at piquing the interest or building proficiency of younger girls, it is crucial to recognize that, as with most other endeavors, short experiences that are not connected to each other will cause relatively few girls to follow the subject all the way through to a career.

Young girls will become interested in and even develop proficiency in many different subjects over the course of childhood. Brief, punctuated exposure to computing—or foreign languages or music, for that matter—is not likely enough to translate interest and proficiency into persistence. As one expert put it: "A girl may really enjoy a weekend hackathon, but it's very unlikely that that will have a long-term effect on her staying in the field."[136] ▶

"We need to connect girls that have gone through one STEM program to the next step in an ecosystem of non-profits specifically targeting certain ages and skills, bringing girls along on a continuous journey of excitement and delight."

Carrie Varoquiers,
vice president of global impact at Workday Inc. and president at Workday Foundation

Effective approaches tend to do the following: ◀

Keep the next program in sight. As girls get close to graduating from a course or program, they should know what the next suitable in-person or online programs are for them to enroll in. If a girl goes several years between computing experiences, she will be likely to develop other interests in the meantime and may no longer be interested by the time another computing opportunity comes along.

Make it seamless to enroll in the next logical program after one is complete. Companies can work with organizations to recruit girls for the next experience before they graduate from their current program. Companies can facilitate connections between the programs they currently fund to ensure they are efficiently transitioning girls to the next program that makes sense for them.

Instead, programs must create continuity to help girls transition seamlessly from one experience to the next, keeping them on a pathway to tech.

08

Provide access to technology and computing experiences

It is of course difficult, if not impossible, to study computing without access to computers, the internet, skilled instructors, and relevant instructional tools. Access does not typically differ by gender, but it varies greatly by socioeconomic status. As a result, a major barrier for many girls and women—and men and boys—in low-income communities is lack of access. ▶

"One of the biggest barriers that many low-income women of color face when it comes to learning computer science is access to critical math and science courses in their secondary education, access to technology and reliable internet service, and exposure to computing opportunities and networks."

Nikole Collins-Puri,
CEO, Techbridge Girls

Effective approaches tend to do the following: ◀

Roll out inclusive computing education in schools that currently lack it. Lucy Sanders, CEO and cofounder of NCWIT, pointed out that children from underresourced families do not have as much opportunity to join extracurricular programs, so they "won't have any access at all if it's not in the schools." Despite the greater need for computing classes in underserved communities, there is a long way to go in providing them with access. In 2015, only 48 percent of students in 7th through 12th grades with lower household incomes reported having access to computing in their schools, compared with 69 percent of those with higher household incomes.[137]

When inclusive computing education is introduced, it will be important to create a path for continuity, so girls who have newly won access to introductory computing can continue on to the appropriate next courses and experiences as they begin to develop proficiency. Otherwise, brief and early exposure will not be likely to carry young women through to persistence in tech.

Pair access with targeted recruiting of girls. Access is necessary but not sufficient. Hadi Partovi, founder and CEO of Code.org, remarked on the challenge of reaching girls when bringing coding programs to schools and students who did not previously have it:

"For underrepresented minority boys, a large part of the problem is a question of access. But for girls in those communities, we had to work harder to attract them to our programs even when the access was there."
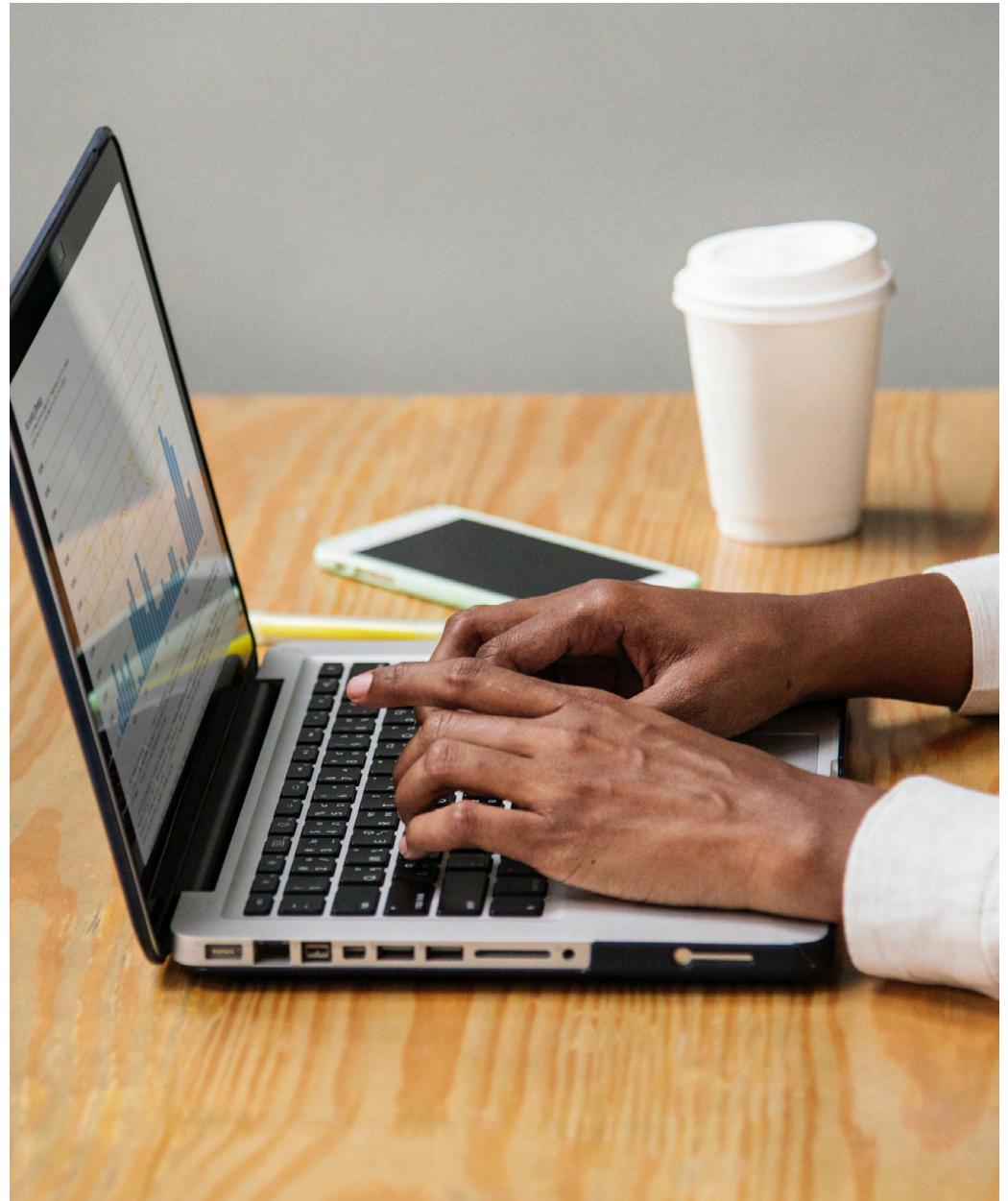
Students need access to begin their computing journey, but access is likely to attract far more boys than girls unless the other building blocks are supplied at the same time. Therefore, programs providing access should reach out to and connect with girls through their parents, other teachers, counselors, and peers to make sure they can make full use of the programs.

Provide children technology for computing education through their schools. Consider pairing tech with in-home internet connections or loaner devices to enable participation in computing programs at home. In 2015, only 75 percent of Latino/a kids, compared with 85 percent of black kids and 98 percent of white kids, reported that they had a computer at home connected to the internet that they could use.[138]

Companies can use the building blocks in this chapter to become more active and influential investors in the programs they support, encouraging these programs to incorporate best practices to set women and girls up to thrive in computing.

These companies can refer to the checklist of building blocks when deciding whether to back a program or when designing one in-house and should remember that women and girls need all eight building blocks in place to thrive. Thus, it is important that they take a portfolio-wide view and ensure all of the building blocks are somehow being provided by their and their partners' programs for the women and girls in the communities they focus on.

The next chapter will help companies devise or refine their strategy; these building blocks will be critical no matter which strategic direction a company takes.

05

Determining your company's philanthropic and CSR approach to gender diversity in tech

YOUR STRATEGY

This chapter serves as a practical guide to help you design or strengthen your company's philanthropic or CSR strategy to grow women's involvement in the tech sector. To create a strategy that maximizes impact, reflect on your company's aspirations for impact and customize one of the action opportunities laid out earlier in this report by harnessing the unique assets and capabilities of your company. This chapter covers the following:

How tech companies not only benefit from strengthening pathways for women into tech but also are uniquely situated to do so

What a best-practice approach to philanthropic and CSR strategy development looks like compared with the current state at many tech companies

A diagnostic strategy tool to inform the creation of the philanthropic and CSR strategy on gender diversity within your company, focusing on the following four critical questions:

?

- What is your company's core objective?

- What assets can your company contribute?

- What is your company's timeline for investment and expectations for when you will see results?

- What are your aspirations for impact?

TECH COMPANIES BENEFIT FROM STRENGTHENING PATHWAYS FOR WOMEN INTO TECH—AND THEY ARE UNIQUELY SUITED TO DO SO.

The business case for why tech companies should invest in women and girls is clear. Even beyond an obvious self-interest, tech companies have the skills and expertise needed to tackle this problem head-on.

Appetite for disruption

Tech companies pride themselves on the ability to "think different" and have stayed ahead of the curve by coming up with creative solutions to tough problems. The tech talent market is in need of significant disruption to expand and diversify it—a challenge ripe for the creativity of the tech sector.

Action amid uncertainty

Tech thrives on experimenting, launching, and iterating to innovate in situations with multiple unknowns. These skills align with the current need to tinker with dosage and duration of programs to find the perfect solution for women and girls in computing.

Skill identification
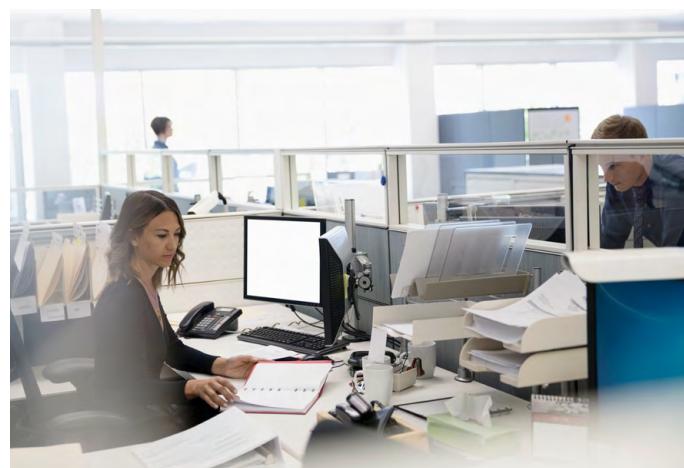
Tech companies are the ones defining what skills are necessary to succeed within the sector, and they have the strongest sense of how that skill set is evolving. You can bring that perspective to help build pathways for women and girls focused squarely on developing those in-demand skills.

Analytic horsepower

Tech companies lead the field on big data and advanced analytics capabilities—skills they can use in the area of gender diversity to get to the bottom of what works.

Influence on image

Companies can shape the perception of the tech industry by changing how their own company shows up—to employees, to customers, and to the general population.

There are many college majors—such as economics and psychology—that most students are exposed to for the first time in depth at the college level.

Anonymous tech-company leader

"We are on the cusp of developing a separate strategy for women in technology, so this research comes at the perfect time. We're excited about putting pen to paper to write a new cohesive strategy for the future that draws our disparate activities together."

Although tech companies clearly have the potential to create pathways for women into tech, many lack a strategy and operating model to ensure they maximize the impact of their philanthropic and CSR efforts. As one government official tasked with expanding access to computing put it, "The most harmful thing to this field over the past several years has been the flood of dollars—especially CSR and marketing efforts—that are not tied to a broader strategy or targeted at effective programs."[139]

This chapter will help you guide your company through the process of designing a strategy or refining the one you already have to increase the effectiveness of your investments.

Any strategy you develop will have greater impact if your company adopts the following three key practices:

What most tech companies do today	→	What best practices look like

AN ASSORTMENT OF GRASSROOTS-DRIVEN ACTIVITY:

One company leader candidly shared that, since so many groups can be involved with gender diversity, most of the company's philanthropic and CSR efforts had been "one-off and driven by interested employees who say, 'hey we should do something over here,'" instead of being part of a defined program that links the initiatives the functions across the company are undertaking.[140]

→ **UNITE ALL OF YOUR COMPANY'S ACTIVITIES AND INITIATIVES:**

Both internal and external initiatives should adhere to an overarching strategy about increasing the gender diversity in tech and be informed by all the relevant players in your company.

NO CLEAR LEADER:

One leader said that "everyone is a decision maker when it comes to investing in these initiatives at our company." But this approach ultimately means that no one is an owner who is held responsible for delivering results through these initiatives.[141]

→ **DESIGNATE A SENIOR EXECUTIVE SPONSOR:**

This person will be accountable for coordinating your company's comprehensive gender-diversity strategy across all four levers.

ABSENCE OF IMPACT EVALUATION:

Companies do not have systems to understand what is working and to use to design their strategies. One researcher described a common behavior: "I see tech companies focus on programs that seem exciting without researching or understanding why and when something might work and what the barriers are for specific subgroups of women—and designing and testing interventions before scaling them up."[142]

→ **MEASURE THE IMPACT OF YOUR CSR AND PHILANTHROPIC EFFORTS:**

Track both short-term performance-management indicators and long-term impact metrics with the same rigor you apply to your business.

Unite all your company's activities and initiatives

Companies that link their philanthropy and CSR efforts with their internal gender-diversity activities under a unified strategy are more likely to see success on both fronts. While this report focuses on CSR and philanthropy, there are four interrelated levers companies can pull—philanthropy and CSR, internal D&I, supplier diversity, and product offerings—to help advance gender equality. At most tech companies today, these four levers have different owners, budgets, timelines, expectations, and overall goals. As one corporate foundation leader shared: "I hear loud and clear from chief diversity officers that they have goals to meet in the here and now, whereas we on the philanthropy side can take a longer view."[143]

Having visibility into the range of gender diversity–related activities you are currently involved in across functions can help you create beneficial links. But it is challenging to achieve this visibility. As one leader at a large tech company shared with us, "I'm trying to create some greater connections across those initiatives this year, but as of now we have no central database of initiatives and don't even have a way to go collect the information on everything that exists."[144] Even simply compiling and mapping all your efforts can prove helpful, as one executive's experience on the survey for this report illustrates: "Filling out this survey was a wake-up call. I looked at the data we shared and realized that there's a lot of opportunity to collaborate, both internally and externally."[145]
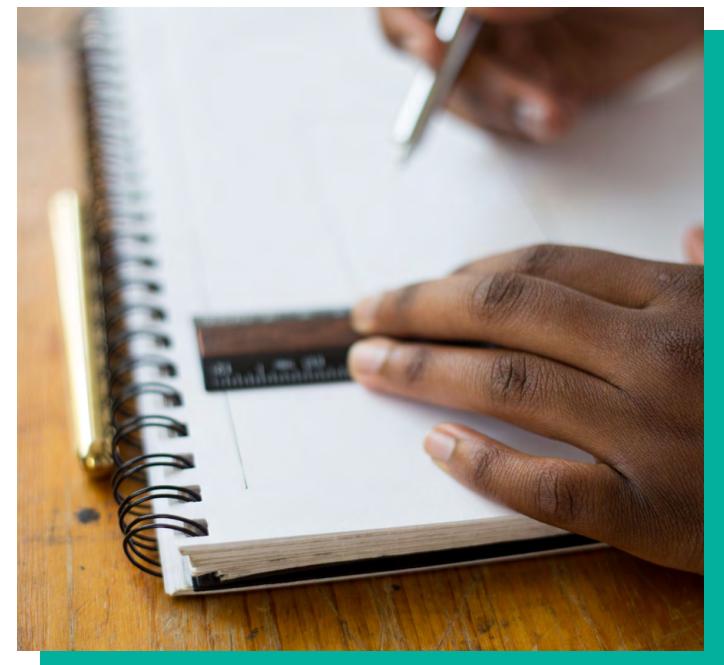
What you learn from your internal talent-strategy efforts, such as recruiting, can inform your philanthropy and CSR programs. For example, HR teams can help work with programs that the CSR and philanthropy groups are supporting to ensure that women and girls gain the right skills and pre-employment experience they need to land jobs in priority growth areas for the company.

One leader of a large tech company shared that by linking the strategies between its CSR and D&I offices, it has gotten a new perspective on its strategy: "We have embedded integration along programs for young people instead of having a start and a stop between CSR and D&I. In the past, it was different and there were walls. Now it's fluid. It's not perfect, but we are both able to look at things together and see how we are managing our company's umbrella."[146]

INTEL ADOPTED A UNIFIED D&I STRATEGY, CONNECTING MULTIPLE LEVERS

In 2015, Intel committed $300 million to increasing gender and racial diversity both within its company and across the sector. The company set a goal to increase the representation of women, black people, and Latinos/as in its workplace by 14 percent from 2015 to 2020. As part of its effort, the company set aggressive targets to increase its supplier diversity and dedicated millions of dollars to expanding the number of women and people of color studying computing, in addition to making internal talent-strategy efforts to recruit, retain, and advance women and underrepresented people of color.[147]

Levers for increasing gender diversity

- Developing an internal talent strategy: Working to recruit, retain, and advance women within the company by creating a more inclusive environment and removing bias from core processes.

- Leveraging philanthropy and CSR: Making philanthropic and CSR investments in the larger community to strengthen pathways for women and girls into tech.

- Influencing other companies in the value chain: Exercising the company's power in procurement and partnership decisions to require its suppliers and partners to meet certain standards pertaining to gender diversity.

- Shaping society through product and service offerings: Designing and delivering products that help to advance the status of women and girls. In tech, such offerings include toys and games targeting girls to spark early tinkering and computational thinking and debiasing software to help companies more objectively assess job candidates.

A range of functions that are typically housed in different corners of a company can all play a role in bringing expertise and resources together to create a philanthropic and CSR strategy for growing women's involvement in tech. These groups include your executive leadership, the corporate foundation, business units, CSR, brand and marketing, communications, and employee-resource groups for women and for underrepresented minorities.

By pulling together different functions, companies will increase the impact of their efforts.

HR / D&I	Ensure programs teach the skills needed in tech-sector jobs
BUSINESS UNIT	Harness tech-enabled solutions to drive social impact
PHILANTHROPY	Contribute grants and develop close partnerships with grantees
MARKETING	Make sure all marketing materials show a diverse representation of women in tech
CSR	Donate technology for educational programs
AFFINITY GROUPS	Volunteer as teachers and mentors
COMMUNICATIONS	Present an inclusive image of the industry

Unite all relevent players

To develop a unified CSR and philanthropy strategy that different parts of the company will be excited to collaborate on, get all the relevant functions involved from the strategy stage onward. First, you should identify and map the internal stakeholders. Then you can create opportunities for these functions to provide input into the strategic direction early and often, making sure to include the perspectives of employee-resource groups focused on women and underrepresented minorities. Once you have landed on an initial strategy, you can syndicate and socialize a lot to help each group see how it functions as part of the larger strategy. Some companies already consciously include many different functions in their strategy design. For example, an executive leader at Snap shared that it coordinates initiatives between its CSR efforts and its business units: "For my team, we don't consider something a successful program unless business units are involved."

Anonymous tech-company leader

> "Companies miss the mark because they put in programs that focus on race or on gender but don't figure out how to secure leadership buy-in to sponsor them."

Designating one senior executive sponsor who is ultimately responsible for delivering on the shared strategy will create accountability and increase coordination across your company's efforts to strengthen pathways into the industry for girls and women.

In interviews, several companies attributed their relatively limited philanthropic and CSR impact on gender diversity to date to not having a champion who could play this role. One leader at a medium-sized tech company shared that a big reason it has not yet invested in gender diversity through philanthropy and CSR as much as some employees would like them to is that no one person is tasked with driving its efforts forward, making decisions, and coordinating the approach.[148] Similarly, a leader at a large tech company reported that a major reason she thought they were "scattered on the question of gender diversity" is that they lacked one person who was in charge of overseeing programs across the various different functions touching the issue.[149]

A senior leader with a bird's eye view of all of the company's activities on this issue will be able to convene and influence all of the functions and groups involved and connect the dots across the teams. An effective sponsor will have the authority to move initiatives forward, remove barriers where necessary, and commit resources.

## Measure the impact of your CSR and philanthropic efforts
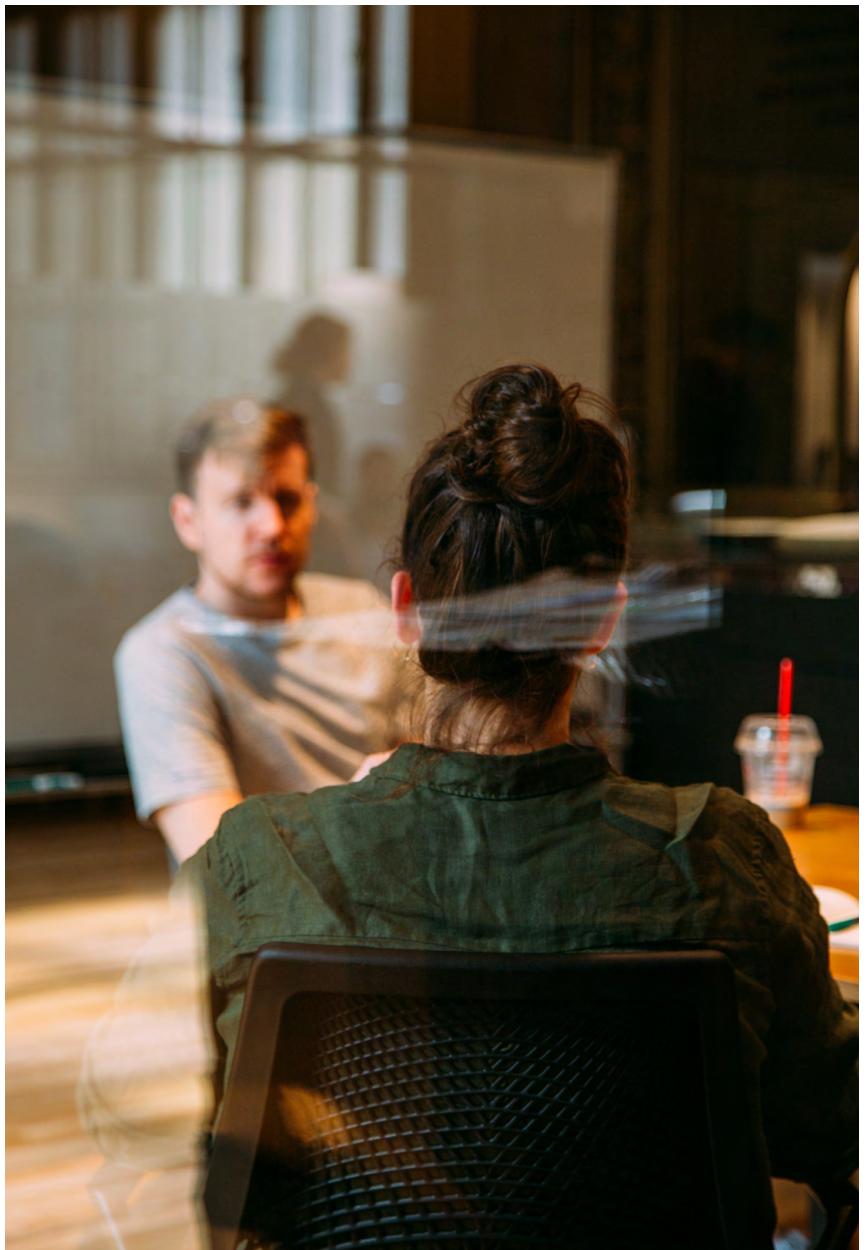
Rapid prototyping—the cycle of quickly developing a product then rigorously testing to improve it that is commonly used in the tech sector—should also be applied to gender-diversity initiatives. Similarly, you should also approach these initiatives with quantified targets, no different from how you approach the rollout of a new product offering. As one head of D&I said, "We all talk about wanting to make a difference in this industry through philanthropy and CSR, but we don't think, as we would with a business strategy, 'What's working versus what needs to be different?'"[150]

Just as with business investments, measure the impact of your CSR and philanthropic efforts. As Jennifer Fraser, the senior director of Data Center Engineering and chair of @TwitterWomen, put it: "We want to be able to hold up a mirror to reflect what the organizations we partner with are doing—really specifically, not just targeting girls, but minorities and underserved populations within that. We want to understand the scale and weight of their efficacy against the dollars that are being invested." That means measuring the cost per girl or woman you reached relative to the impact the program is having on those women or girls.

Effective evaluation requires understanding how your operating model is working by looking at short-term, performance-management metrics and looking at your strategic impact across initiatives by evaluating longer-term success indicators.
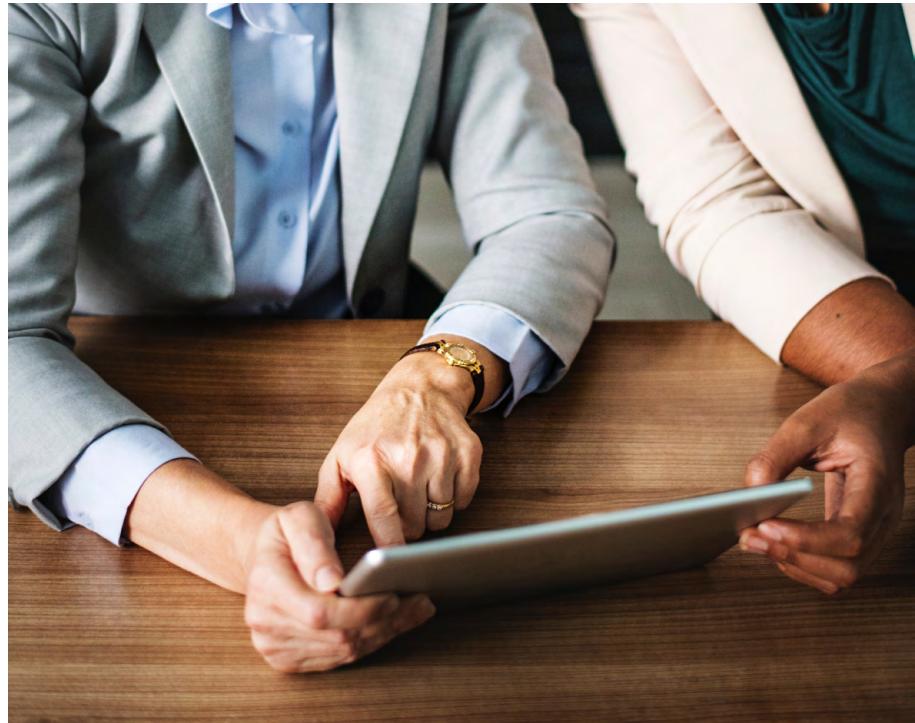
Ruthe Farmer, former chief strategy and growth officer, NCWIT

"Companies need to view these investments in the same way they would view a business investment. Today, companies aren't doing the same due diligence they would for a business investment, but they need to start."

Short-term performance management

On a quarterly basis, review operational metrics that will indicate if your CSR and philanthropic initiatives are being executed properly. Such metrics include number of grants given, number of employee hours volunteered, value of equipment donated, number of interim program reports received, number of girls and women enrolled in each program (disaggregated by race and ethnicity), number of days between grant decision and delivery of funds. This quarterly scorecard will enable your company to spot any implementation obstacles that need to be addressed and allow you to quickly correct your course.

Longer-term impact evaluation

Longer-term impact evaluation can let you know if you are meeting your goals and generating the desired outcomes for women and girls. As one company leader put it, "We need to better understand the return on investment of different interventions and develop long-term metrics against them."[151] Once a year, evaluate the impact for each of your programs and initiatives to determine what is working well and what should change—and take a broad look at efforts to see if your strategy is reaching its aspiration overall.

PROGRAM-LEVEL METRICS

Review the results of the metrics gathered as part of the dashboard on p. 52 and see if your programs and CSR measures are having the desired impact on women and girls' involvement in tech. While some of those metrics will take years to show results (for example, ultimate career outcomes for girls served in high school), others will show impact much more quickly (such as percentage of girls who go on to take a subsequent computing class).

BROADER IMPACT INDICATORS

You will also want to look across your portfolio—either by engaging in in-house measurement or reviewing outsourced data collection—to see if your efforts are moving the needle on your strategic goals. The exact metrics and breakdowns you use will depend on your company's unique strategy, discussed in greater detail below. Depending on your company's objectives for engaging on this issue, you may want to look at different measurements, for instance, brand health or employee engagement.

STRATEGY DIAGNOSTIC TOOL KIT

Your company can have impact at a far greater scale than the dollar value of your contributions if your philanthropic and CSR strategy on women's involvement in tech is well aligned with your company's DNA—your unique competitive advantages. This report describes five action opportunities that you can choose from as your strategic focus, outlined in chapter 03. Which action opportunity you select and the unique approach you design for tackling that opportunity will depend on your company's priorities, resources, and timeline and aspiration for impact.

Here, you will find a diagnostic tool kit that will help you structure conversations within your company to design or refresh your philanthropic and CSR strategy. The questions themselves are not difficult, but the process of aligning internal stakeholders on a clear, prioritized answer to each of them can be challenging and requires tough choices.

01

What is your core objective?

The first step in designing a philanthropy and CSR strategy to strengthen women's pathways into tech is for you to reflect on the single-biggest reason that your company is getting involved—whether it is to improve the company's general reputation and brand health, increase the talent pool for your workplace, or make as large of an impact for societal good as possible. The instinct will be to say, "All of these goals are important to our company." But the trick of effective strategy development will be to push the conversation further to align on a ranking of priorities. With this direction, you will be able to allocate resources more effectively and confidently say "no" to opportunities that are not strategically aligned.

Your top priority will determine what success looks like, and this priority will affect the design of your initiatives. For example, if your primary goal is to drive recruitment, then success would be defined as a substantial increase in the number of women hired to entry-level and lateral positions each year. A focus on recruitment could lead you to design a philanthropic and CSR strategy that revolves around partnering with the colleges you hire from to grow the percentage of their computing majors who are women—or to design a strategy that includes an internship program for underrepresented women of color.

TIPS FOR USING THIS DIAGNOSTIC TOOL

Making difficult strategic trade-offs will involve some honest conversations about what your company wants to prioritize and what no longer fits within your strategy. Be sure to include your executive sponsor and all the different functions that touch on women's involvement in technology. Of course, your colleagues' perspectives on these questions will be heavily influenced by how their interests and priorities relate to these initiatives.

The questions in the diagnostic tool have no right answer, and several answers to particular questions may be true for your company. What is crucial, and quite challenging, is to decide which of the multiple correct or relevant answers is your company's highest priority. Recognizing this priority will enable you to avoid spreading the company's resources too thin and ending up in a situation where you're trying to push on all fronts at once and are thus unable to achieve much impact on any of them.

EMPLOYEE ENGAGEMENT

Identifying a primary objective will help you think strategically about design and the measurements you will use to evaluate their impact

STRATEGIC OBJECTIVE

Employee engagement

Create opportunities to excite, engage, and retain your employee base—particularly, but not limited to, women.

"Our philanthropy program's purpose is to get employees involved in the community. Our employees love getting involved with coaching and brainstorming with the kids."

NETSCOUT representative

DESIGN CONSIDERATIONS

Design programs that provide opportunities for direct employee engagement, such as tutoring, mentorship, and role modeling.

EXAMPLE

The company eBay creates programs for employees to spend time in the community to get a firsthand perspective of students' perspectives. "[We are] working to get our employees to go out and spend time with talented students to see what experiences they face and what opportunities they do and don't have. And after doing that and talking to this student and realizing the hurdles, they don't leave that experience the same. While they may never fully understand that student's world, having that experience makes them a longer-term contributor to the cause."[152]

IMPACT MEASUREMENTS

Pride of current employees regarding company's involvement in this space

Increases in employee satisfaction among those who participate in the initiatives

Reduction in attrition of women employees among those who participate in the initiatives

Growth in employee donations to initiatives for women and girls in tech

RECRUITMENT

STRATEGIC
OBJECTIVE

DESIGN
CONSIDERATIONS

IMPACT
MEASUREMENTS

Recruitment

Expand your company's talent pool and increase recruitment of women by focusing on building the pipeline.

"We want to train and educate teens and get them ready for college and STEM-type majors and then funnel them back into our company to increase the pipeline for our organization."

Anonymous tech-company leader

Focus on programs and initiatives later in women's and girls' journeys into tech with college and workforce-development programs, working closely with D&I and HR to incorporate learnings on the skills necessary to succeed and linking women and girls into the sector.

EXAMPLE

The Adobe Digital Academy is an alternative and accelerated pathway into tech careers. As part of the program, Adobe sponsors career-switchers from non-traditional backgrounds, more than half of whom are women, to attend a three-month web development boot camp. Seventy-five percent of those who completed the boot camp went on to a technical internship at Adobe, and 75 percent of those interns went on to full-time, entry-level software engineering roles. During the Digital Academy, candidates are supported by a system of mentors, ongoing feedback, and a close community of fellow participants.[153]

Percent of women applicants for technical roles

Percent of applicants who participated in programs you funded or ran

Percent of new hires for technical roles who are women

REPUTATION AND PERCEPTION

STRATEGIC OBJECTIVE

Reputation and perception

Improve the image of your company or the sector on gender issues with customers, investors, and the general public and expand into new markets.

"We want to change the perception of the industry."

Rosanna Durruthy, head of global diversity, inclusion, and belonging, LinkedIn

DESIGN CONSIDERATIONS

Design and support programs that have high visibility and engage your target segments, working closely with marketing and communications departments to elevate successes and generate coverage to reach your key stakeholders.

EXAMPLE 01

Pixar leveraged their intellectual property to create computing-related activities on Khan Academy, reaching the same age group that their movies do to spark a love of computing.[154]

EXAMPLE 02

The company eBay, whose customers include the entrepreneurs who sell on their platform, is focused on growing opportunities for inclusive entrepreneurship.

IMPACT MEASUREMENTS

Improvement in brand reputation (both generally and on gender diversity specifically) among priority segments

Improvement in sales among targeted segments

LOCAL COMMUNITY

STRATEGIC OBJECTIVE

Local community

Give back to the communities where your company has offices or facilities, improving relations with local members and leaders.

"For us, it's about the communities we have our offices in, because we want our employees to be engaged with our communities and be able to see them—we want them to have some skin in the game and understand the importance of our efforts."

Expedia representative

DESIGN CONSIDERATIONS

Work on programs that have deep local connections nearby the company's offices, manufacturing facilities, distribution sites, and stores.

EXAMPLE

Intel partnered with the Oakland Unified School District, which is close to their headquarters, to expand access to computing in middle school. They used a gender-infused curriculum and worked closely with teachers to show them a path to success in computing for their students.[155]

IMPACT MEASUREMENTS

Improvement in brand perception within local communities

Improvement in outcomes for women in the local community who study computing, go on to pursue computer and information sciences degrees, and enter the tech sector in the local community

02

What assets can your company contribute?

Your company can use its unique assets and competitive advantages—whether it is big data capabilities, a powerful brand, a social-media platform, or the production of software—to substantially amplify the impact of your philanthropy and CSR strategy. Putting these capabilities to use through your gender-diversity strategy is also a powerful way to draw attention to them in a crowded marketplace.

"We can all bring our own strengths, and each company has a different way to contribute, whether it's cash or technology."

Tonie Hansen, senior director of CSR and sustainability, NVIDIA

Description of assets and examples of how tech companies have deployed them as part of their philanthropic and CSR strategies on women in tech

ASSET	DESCRIPTION	EXAMPLE
Products and services	Contribute your product and service offerings to help grow women's and girls' involvement in tech	Snap partnered with Google's girls-centered platform, Made with Code, to empower girls to design and code unique geofilters for their photos to gain early exposure to computing in a fun way.[156]
Knowledge and expertise	Apply your company's problem-solving capabilities and areas of expertise to issues of gender diversity; use big data capabilities to generate knowledge to share with the field	NVIDIA invests in organizations that use machine learning and AI capabilities (its own area of expertise) such as Curated Pathways to Innovation, which matches individual girls with relevant programs that help them along their STEM journey.[157]
Volunteer mobilization	Deploy members of your community as volunteers, role models, educators, and trainers to support programs across the value chain (employees, families, contractors)	Many non-profit programs, such as Iridescent, use employees from many different technology companies as volunteer faculty to teach girls about computing.[158]
Facilities	Make use of your physical space; bring girls to you to experience the environment inside a tech company	Many companies, including Amazon, AT&T, and Twitter, host Girls Who Code summer-immersion programs at their headquarters, allowing the girls who attend to get a feel for what life is like in tech while they are learning how to code.[159]
Voice and brand	Raise your company's voice among key stakeholders to amplify and push messages of change	Pinterest set public goals for itself to grow its representation of women and underrepresented minorities and published the learnings behind how they achieved their goals.[160]

Use your existing programs and structures in service of a new or improved strategy

Whenever possible, find ways to use programs and structures that your company already has in place to push your strategy forward. Not everything will be useful, but you can take an inventory of your current programs to see what could be amplified, continued, repurposed, or phased out.

This review should consider two types of initiatives. The first is internal company vehicles like corporate foundations and employee-engagement programs. The second is support for external partners, determining if their programs are aligned to the new strategy. For example, one leader reported that her company has shifted its support of programs to focus on ones that align with its strategy: "In the past, we funded programs earlier along the pipeline, but now we're focused on workforce development 100 percent—all our funding goes toward programs helping job seekers."[161]

When it comes to repurposing, consider how you can influence your current partners to incorporate a gender lens in their coed programming. The inclusion team at NVIDIA worked with the company's marketing organization to increase the number of FIRST Robotics girls' teams it sponsored to 30 percent. This action encouraged FIRST to promote its robotics championship to more girl- and minority-led teams.[162]

03

What is your company's timeline for investment and expectations for when you will see results?

The timeline on which your company wants to see impact will help inform which strategic direction is right for you. Certain opportunities for action—particularly those centered on work with younger children—present the possibility of transformative change. But you will not see the impact of such strategies in the workforce until the children grow up. As Ruthe Farmer, former chief strategy and growth officer at NCWIT, put it, "Girls getting jobs in tech is a long-haul investment. To commit to working [with younger girls], companies need to know if they are willing to invest long term in something."

For some companies, seeing results in a short time frame is essential. One company shared: "We don't have the luxury of time. It's hard for us to make a case to spend a lot of time, money, and resources into a pipeline we won't realize for another ten years."[163] A consultant in this space found that the need for quick impact was widespread, with many companies asking him: "What can I do to get people over to my company now? I can't care what's happening in kindergarten; I need people here as soon as possible."[164]

For companies looking to see a relatively rapid increase in the number of women entering the industry, a strategy that revolves around college-focused programs may make the most sense. Of course, depending on your core objective, you could see other types of impact quickly regardless of the age of the girls or women you are working with. For example, a company that prioritizes reputational effects could achieve its goal by working with girls and engaging in a multiyear marketing effort to maximize the near-term brand return on those efforts, even before any of the girls reach the age when they would join the workforce.

04
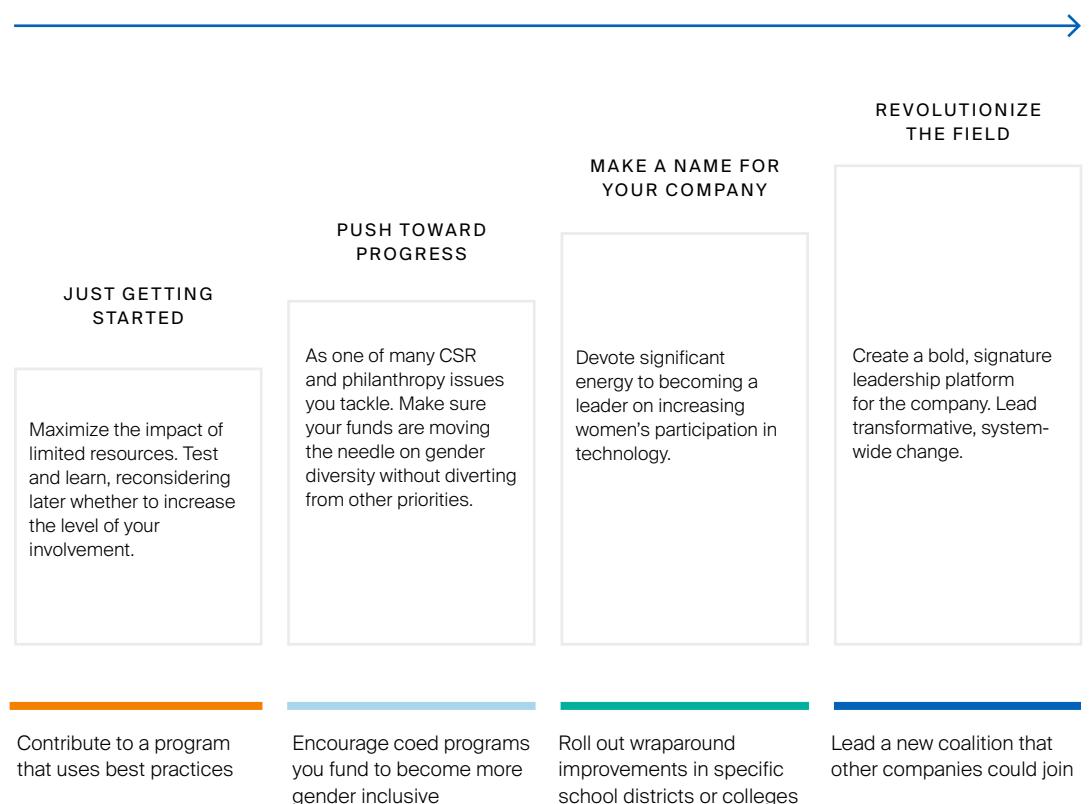
What is your aspiration for impact?

To determine the specific types of programs and interventions that your company should work on and clarify your goals, you need to first reflect on your primary objective, your unique capabilities, and your timeline for impact. The more specific you can be about the type and magnitude of impact your company aspires to achieve, the easier it will be to achieve alignment on the strategic plan.

For instance, Mary deWysocki, senior director of corporate affairs strategy and global problem solving initiative at Cisco, described her company's aspiration as follows: "We have a mindset of scale. We don't think it's a success to have a one-off—we want to see big successes. For us, that means a solution is both scalable and sustainable, reaching more and more women and girls over time."

In conversations at your company, think about and discuss what kind of impact you would like to have and then brainstorm if there is a way to reach those goals with the resources you can recruit from various functions. Remember that resources can come from many different parts of your company, given the range of functions involved in gender diversity. Your contributions do not have to be limited to cash alone, either—a cash-strapped start-up, for example, could still make a significant contribution and drive employee engagement through in-kind donations of expertise.

What is your company's aspiration for impact?

REVOLUTIONIZE THE FIELD

Create a bold, signature leadership platform for the company. Lead transformative, system-wide change.

MAKE A NAME FOR YOUR COMPANY

Devote significant energy to becoming a leader on increasing women's participation in technology.

PUSH TOWARD PROGRESS

As one of many CSR and philanthropy issues you tackle. Make sure your funds are moving the needle on gender diversity without diverting from other priorities.

JUST GETTING STARTED

Maximize the impact of limited resources. Test and learn, reconsidering later whether to increase the level of your involvement.

Contribute to a program that uses best practices

Encourage coed programs you fund to become more gender inclusive

Roll out wraparound improvements in specific school districts or colleges

Lead a new coalition that other companies could join

SELF-ASSESSMENT FOR INVESTING IN WOMEN IN TECH

What is your core objective?

CIRCLE ALL THAT APPLY

Employee engagement	Recruitment	Reputation and perception	Local community	Social impact and corporate citizenship

What assets can your company contribute?

LIST ASSETS IN THE FOLLOWING CATEGORIES

○ Products and services   ○ Facilities

○ Knowledge and expertise   ○ Voice and brand

○ Volunteer mobilization

What is your company's timeline for investment, and expectations for when you will see results?

ADD MILESTONES FOR DEPLOYING INVESTMENTS AND NOTE WHEN YOU EXPECT TO SEE IMPACT
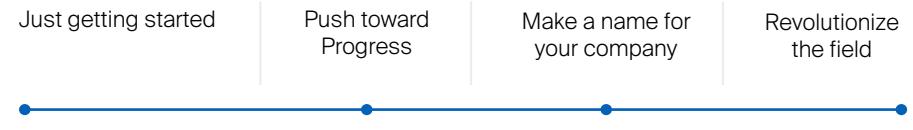
This quarter ⟶ End of year ⟶ Next 2–3 years ⟶ 5+ years

What is your aspiration for impact?

Just getting started	Push toward Progress	Make a name for your company	Revolutionize the field

Discussing the questions laid out in the strategy diagnostic within your company will help you zero in on which of the five action opportunities laid out in earlier chapters is the right choice for your company to focus on. The factors you identify through the diagnostic will inform how you approach a particular action opportunity, allowing you to design a unique approach based on your priorities, the assets you can contribute, and your timeline and aspiration for impact.

06

Opportunities for transformative change

BANDING TOGETHER

"We've made siloed efforts to increase the pool of women entering the sector, but the most interesting piece to me is how do companies in our ecosystem actually band together to make sure we're investing collectively in this space? We've never done this before—that's the big opportunity."

Danielle Brown, vice president and chief diversity
and inclusion officer of people operations, Google

Coordinating efforts can lead to better results.

A look at the tech sector's current approach to improving the gender diversity of the industry reveals that companies could generate greater returns through coordinating efforts. For instance, one tech-company executive reflected that many different companies are involved in supporting the Oakland school district. "But we've never come together and said, 'what's the sum total of our impact in Oakland?' It's interesting because if you go on the ground in Oakland, their frustration with tech companies is that everyone's doing different things, and there's a lot of noise, and sometimes it's a flash in the pan."[165] By coordinating their actions and formulating a shared strategy, companies would get more from their investments in supporting girls in school districts like Oakland.

Tech as an industry has the potential to move beyond incremental change to radically transform the number of girls and women studying computing and create on-ramps into the sector. As covered in chapter 05, an individual company can make a major contribution toward advancing women's representation, informed by its unique goals, resources, and capabilities. These efforts are critically important if the sector is to make progress on increasing women's participation in tech. Significantly accelerating the rate of progress, however, will require bold action at a scale that no single company alone could achieve.

Together, tech companies have the scale to test many different approaches. By taking a large portfolio view in the same way venture-capitalist firms do, companies can work together to test innovations that individual companies might shy away from. Companies can also raise their voices together in a powerful coalition to champion initiatives that would be difficult to push for alone.

Growing women's and girls' involvement in tech is an area ripe for partnership. Tech has a long-term stake in building and broadening the talent pool for the sector and in making tech "the place to be" for talented individuals of all backgrounds. If tech can unlock what works to involve those who are most marginalized—particularly underrepresented women and girls of color—interventions will benefit a broader set of groups and create more equal access for everyone.

THE TECH SECTOR HAS A TRACK RECORD OF POWERFUL PARTNERSHIPS ON ISSUES THAT AFFECT THE INDUSTRY

Tech companies have banded together before to tackle vital issues facing the sector, recognizing that some risks and challenges are so threatening to the growth and health of the sector that they must act quickly together to push for at-scale change. Tech has seen major returns on these collective investments. Below are a few illustrations of the progress the tech sector has made through partnerships.

The Responsible Business Alliance

Under this alliance, more than 110 tech and electronics companies work to make electronic supply-chain practices more ethical and to hold one another to an ethical code of conduct in their manufacturing.[166] The Alliance is comprised of various issue-specific working groups and task forces. Different companies take leading roles based on their unique assets and expertise, bringing the best of the sector to the ethics problem.[167] In 2016, members conducted more than 500 verified audits and more than 4,400 self-assessments of their supply-chain practices.[168]

The Internet Watch Foundation

This partnership of about 130 tech companies scrubs the internet for child sexual abuse.[169] Partners harnessed Microsoft's analytical and technical capabilities to develop a new tool called Microsoft Photo DNA to identify images of child sexual abuse wherever they appear.[170] The companies then used their respective platforms to achieve at-scale penetration online, enabling rapid identification of such images. In 2017 alone, they identified more than 75,000 websites that hosted, linked to, or advertised child sexual abuse.[171]

FWD.us

The tech community, motivated by a shared interest in accessing top talent, came together to create this group that advocates for comprehensive immigration reform. The founders of some of the largest tech companies, including Facebook, LinkedIn, and Microsoft, created the partnership. It is championed and supported by dozens of industry leaders, both from tech companies and from venture capital.[172]

These examples show the power of collective action and how partnerships allow the tech sector to bring together the best of each company's capabilities to create an initiative that can be scaled through their combined resources. An exciting opportunity exists to bring these same tools to bear in creating more pathways for women and girls to enter tech.

Tech companies can band together in a range of ways to change the game for women and girls in tech.

"Radical collaboration will be key to making any real progress. Tech culture accelerates some while diminishing others—our companies need to come together to rapidly share and scale what's already working, prioritize iteration, and fuel innovation on persistent challenge areas, especially inclusion. This effort needs to be led with urgency from the top by executives and VCs."

Megan Smith, CEO of shift7 and former chief technology officer of the United States

Tech companies can meaningfully partner on any of the opportunities for action laid out in this report to tackle the underrepresentation of women and girls in tech. We have outlined a few "game changers" with the potential to have transformational impact at scale both for the tech sector and for women and girls.

Scale proven changes in higher education nationwide

Tech companies can work together with hundreds of colleges to introduce proven initiatives, such as additional classes for true beginners, more early research opportunities for women, groups to create a strong sense of community, woman-led peer mentoring, and exposure to the tech sector during or immediately following freshman year. Collective action would form strong links between host colleges and employers in the tech sector and significantly increase the number of women who major in computing.

Develop a comprehensive system of measurement and evaluation to zero in on what works best

Companies should consistently measure progress to see which types of programs have the greatest short-, medium-, and long-term impact for women and girls. They can develop a single scorecard of metrics to track their impact on involving more women and girls and publicly disseminate results to foster shared learning in the field. They should also evaluate the situation for women and girls in tech today and measure changes against that baseline through a nationwide data-collection mechanism. As part of this effort, companies can focus on the knowledge and research agenda and fill the evidence gaps on what works.

Create a one-stop-shop community within computing for girls and women that connects girls to programs and to one other
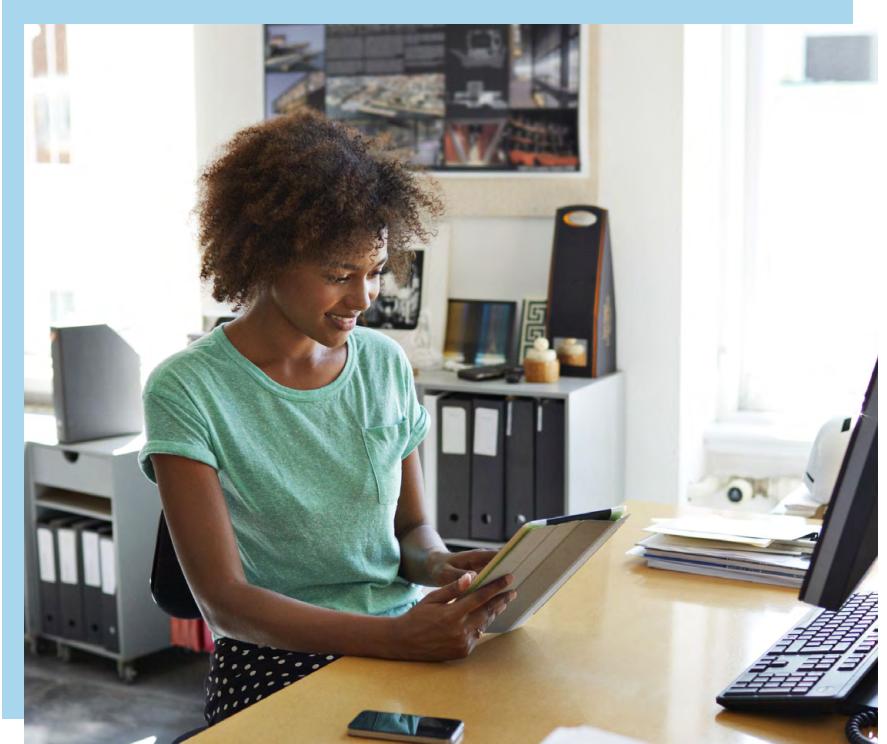
Companies can expand NCWIT's Aspirations in Computing program to develop one community for girls interested in computing that stretches across different programs, touchpoints, and transitions. This coordination will provide continuity between computing experiences for women and girls. Tech-company employees can also provide mentorship and act as role models for members of the community.

Strengthen pathways for those who face multiple barriers—underrepresented women and girls of color.[173]

Each of the action opportunities can be approached with the goal of benefiting underrepresented women of color. Companies can focus, for example, on identifying and scaling college-level reforms that have proven most effective with underrepresented women. We know that it is essential to reverse the downward trend in underrepresented women of color's participation in tech, and focusing on those who face multiple barriers helps us design all-around better programs. If we can design a solution to include the *most* underrepresented communities, we will have developed approaches that will have a positive impact on *all* underrepresented groups in tech. This is an approach that many tech companies have shared they are eager to form a partnership around.

All tech companies have a strong interest in growing the available talent pool of women they can draw from. One tech leader shared that "companies need to stop thinking about this as competitive. The talent pipeline is so small today, but it can't just be that we're all vying for the same small number of women. We need to work together to grow the pie."[174]

Working together, companies can bring their unique skills, interests, and assets to the table to expand the number of women and girls with pathways into the tech sector and thus maximize the impact each company has. Tech companies are eager to find opportunities to partner on these issues. "Because this is such a long-term challenge," a tech-company representative shared, "this is the area where we can come together to partner with other tech companies."[175]

CONCLUSION

There is no question that the tech sector has the chance to create a brighter future for women and girls in computing. Tech companies have the motivation, the opportunity, and the capabilities to increase and strengthen on-ramps for women and girls into tech. Through philanthropic and CSR initiatives and collective action, you can reverse the downward trends in the representation of women, and particularly women of color, studying computing and entering the sector. You can transform the talent pool for tech, which will benefit not only women but also your individual company and the entire sector. Tech companies are already expressing interest in coming together to partner on strengthening paths into tech for those facing the greatest barriers—underrepresented women of color—which has the potential to be a game changer for the sector.

Changing the trajectory of women's representation in tech is not easy, but tech companies are experts at using rapid prototyping and innovative solutions to solve incredibly complex issues. It may require some disruption of the current way of operating, but, after all, disruption is tech's specialty.

If tech companies rise to this challenge, we could see a dramatic increase in the number of women studying computing in the next five years. These companies have the potential to reshape the whole ecosystem, until girls are studying computing in equal numbers as boys, from kindergarten through graduate school. Women will then enter tech companies at the same rate as men, and once there, they will thrive, advance, and lead.

These best practices can help companies maximize the impact of their philanthropic and CSR efforts.

01 Keep a focus on women and girls. Support either girls-only programs or coed programs that put a strong focus on being inclusive of girls, including through proactive steps to recruit them. Keeping this focus is the only way to avoid replicating the same gender ratios we see today. Coed programs should be at least 40 to 50 percent girls and women—and this data should be transparent and trackable.

02 Solve for those facing the most barriers—underrepresented women and girls of color. Eliminating the barriers that the most marginalized groups face is a way to create access and strong pathways for all underrepresented groups in technology—including white and Asian women, as well as men of color.

03 Provide the eight critical building blocks for success. Girls and women need all eight critical building blocks discussed in chapter 04 in place for them to excel in computing. When a program provides some of them (such as access to computing through the introduction of new computing classes), it should work with other programs in that same community to ensure the others are also provided so girls and women are set up to thrive.

04 It is never too late—consider multiple on-ramps. Remember that girls and women can begin their journey into tech at many different points in their lives. Because girls are less likely than boys to have previous exposure to computing, on-ramps later in life, such as higher education interventions, are an opportunity to make up lost ground and involve women and girls with minimal previous exposure to computing.

05 Connect programs to each other. Make programs as effective as they can be by connecting with other programs. Linking the steps toward proficiency provides additional support for current students and prepares graduates for the next steps in their computing journey.

06 Measure impact. Measurement and evaluation are critical to understanding when programs are working and helping you meet your strategic goals. Review your operational metrics on a quarterly basis to make sure everything is running smoothly, and take stock of your longer-term impact metrics once a year. Work with the programs you support to finance measurement of the metrics on the dashboard on p. 78, and consider the cost per student served compared with the outcomes achieved.

By developing a cohesive and unified philanthropic and CSR strategy to strengthen pathways for women and girls, individual companies and the tech sector overall can dramatically expand the available talent pool.

Of course, girls' and women's desire to enter the tech sector will also depend on the experiences they see other women having inside tech companies, so internal inclusion efforts will continue to matter a great deal. This is especially true for those who face multiple barriers—underrepresented women of color. Focusing on improving the experience for all women working at tech companies will make the sector a more attractive place for top women talent.

You can use this report to help your company become a leader in creating and strengthening pathways for women and girls to enter the tech sector. Take stock of your current CSR and philanthropic efforts in these areas, develop a unified strategy across all the levers your company can pull to improve opportunities for women— based on what research shows really works—and consider ways to band together with your peers in industry-led partnerships to drive transformational change. Developing these pathways is not a question of charity—it is imperative for the future success of everyone in the industry.

Together, tech companies have the opportunity to dramatically shift the trajectory of women and girls entering the industry and make tech an exciting career opportunity for all. Getting this right will result in women participating in the tech workforce in equal numbers as men. Achieving greater equality in the sector is a business imperative for tech companies—but the benefits will spread far beyond the tech sector. Tech-company action today will create opportunities for women to lead innovation tomorrow.

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Pivotal Ventures is an investment and incubation company created by Melinda Gates. We partner with organizations and individuals who share our urgency for social progress in the United States. Together we grow understanding, expand participation, encourage cooperation, and fuel new approaches that substantially improve people's lives. We also believe an inclusive tech industry will result in greater innovation, more prosperity, and a society that benefits everyone. We therefore invest in broadening and creating new pathways into tech for women and girls, fostering supportive tech environments, and enabling women entrepreneurs.

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