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Unlocking the Value of Women in Semiconductor

Contents

Executive Summary

The semiconductor industry has more recognition than ever due to global events such as the chip shortage, government initiatives such as the CHIPS Act, and the vital role semiconductor devices play in our everyday lives. For decades, semiconductors have been the driving force behind many of the world's greatest technological innovations and that trend is only expected to accelerate in the future.

New semiconductor devices will be needed to not only power existing products, but also to enable emerging new technologies such as artificial intelligence (AI), 5G, cloud computing, Internet of Things (IoT), next-generation vehicles, the Metaverse, and more. These new innovations will continue to change the way the world lives, works, and plays.

Not only are semiconductor devices in everything today, but they are also essential to the global economy. According to Gartner, the semiconductor industry's total worldwide revenue contributed $595 billion in 2021, an increase of 26.3% from 2020, which was contributed by strong demand and logistics/raw material price increases.[1]

Investments in manufacturing expansion provide an opportunity to build a diverse workforce and narrow the gender gap
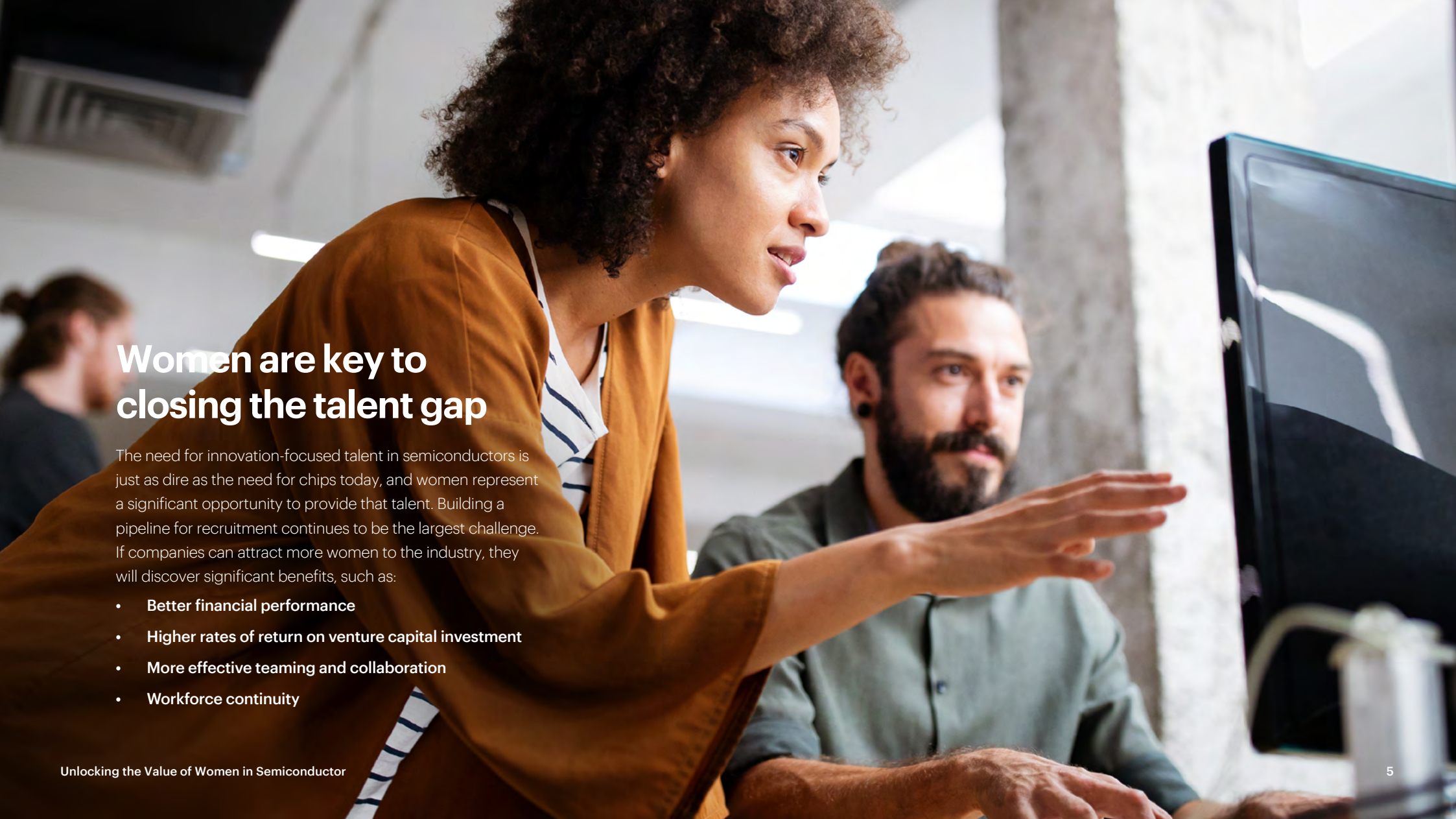
Leading semiconductor companies have been placing big bets on the domestic investment of semiconductor manufacturing. According to SEMI, semiconductor manufacturers worldwide are forecasted to expand 300mm fab capacity at a nearly 10% compound average growth rate from 2022 to 2025.[2]

As an example, Intel announced plans to build two new fabs in Ohio worth $20 billion, which are expected to generate approximately 3,000 Intel jobs and tens of thousands of long-term jobs in the area.[3] Micron also announced a historic investment up to $100 billion to build a mega-fab in Central New York.[4] This type of investment and the corresponding need to hire thousands of engineers and technical workers amid a labor shortage represents a weighty opportunity to fill these roles with diverse talent.

Specifically, it is an opportunity for women to fulfill these roles and a clear opportunity for companies to help narrow the existing and pervasive gender gap and unlock the value that women can provide.

According to the latest 2022 Semiconductor Gender Parity Study from the GSA, which highlights present-day leadership diversity (or lack thereof), much work still needs to be done to help close the gender gap. Women today only hold 16% of board positions and 13% of executive positions at public semiconductor companies.[5] Until this gender gap is closed, semiconductor companies will continue to miss out on a talent pool teeming with an innovation mindset.

Women are key to closing the talent gap

The need for innovation-focused talent in semiconductors is just as dire as the need for chips today, and women represent a significant opportunity to provide that talent. Building a pipeline for recruitment continues to be the largest challenge. If companies can attract more women to the industry, they will discover significant benefits, such as:

• **Better financial performance**

• **Higher rates of return on venture capital investment**

• **More effective teaming and collaboration**

• **Workforce continuity**

Increased representation of women in the workforce drives better business outcomes

Better financial performance

According to an Accenture report "I&D: It's time to show, not just tell", three-quarters of companies with diverse teams in leadership roles exceed their financial goals, and more gender-diverse organizations outperform their more homogeneous counterparts by, on average, 50%.[6] A recent study by the Stanford Graduate School of Business found that greater gender diversity raises tech company share prices. In fact, a full 91% of the senior HR leaders and human resources officers (SHROs) in the survey said that attracting women with tech experience/education is critical for their company's success.[7]

Higher rates of return on venture capital investment

According to Forbes, "Though still small in amount—$54.8 billion—there was a whopping 138% rise in venture capital going to private companies with at least one female founder for 2021." They also found that "despite being less likely to raise follow-on funding, founder teams with women are more likely to exit and have a higher internal rate of return (IRR) — 112% versus 48%."[8]

Workforce continuity

According to company interviews, women tend to stay longer at companies compared to male counterparts, which is an important factor for a company, particularly in leadership roles. Consistency and longevity ensure that expertise is not eroded over time and can help with training and development.

More effective teaming and collaboration

Women have soft skills required to lead productive teaming and collaboration in the workplace. According to an article on LinkedIn, project management requires innate skills that are more natural in women (such as multi-tasking.) They also tend to have better communication and presentation skills, have an innate ability to motivate others, and are more effective at teamworking.[9]

Research from Goodwin University found that "more organizations are now looking to women to provide valuable leadership qualities related to communication, which is an essential component of successful business practice. Communication is just one soft skill that bolsters a professional's 'emotional intelligence'." Other components of emotional intelligence include critical thinking, a positive work ethic and strength in working with others. Emotional intelligence ultimately leads to better decision-making, which is a key skill for leaders. The steps of analysis, planning and then acting amount to a tactical, emotionally intelligent approach that produces thoughtful results."[10]

Gaining insight into the semiconductor industry

To understand the current state of the women in the semiconductor industry in 2022, the Global Semiconductor Alliance (GSA) and Accenture conducted its fourth annual study of women in the semiconductor industry. This paper will reveal findings from the research and present best practices for semiconductor companies to improve gender parity.

Insights for Unlocking the Value of Women in Semiconductor were developed based on 3 research efforts:

- Survey findings from the GSA: Women in the semiconductor industry 2022 survey. This survey explored the current state of the industry and measured the performance of programs and benefits that companies offer.

- Interviews with female semiconductor industry executives on the challenges and actions they are adopting to grow gender diversity.

- Accenture's Better to Belong research[11] which helped to identify actions for people to feel they belong in the workplace and to correct gender imbalances.

We will explore 3 key areas

1. Recruitment of women

2. Retention of women in the semiconductor industry

3. Advancing the careers of women

1 Recruitment of women

"If we are going to become a trillion-dollar industry, we cannot ignore half the population."

- Jodi Shelton
Founder and CEO, GSA

Recruitment strategies start with building excitement around STEM and semiconductor careers as early as high school

Creating STEM programs in high schools and universities is key to attracting future talent and building interest in the semiconductor industry. A key enabler of building interest is increasing women's and girls' access to continue their education in digital technology, especially in remote and rural areas, by investing in infrastructure, high speed connectivity and training to improve skills.

Recruitment is much more successful if the process starts early and companies stay connected with potential candidates throughout their education. AMD is very focused on making sure they stay connected to not only the university pipeline, but also the early stages of high school. "To help people touch the industry's tech is very important and something we need to do for the youth of today," said Ruth Cotter, SVP Marketing, HR and IR at AMD.

Programs such as the GSA WLI University Program (UP) are designed to help bring the story of the semiconductor industry to university students in STEM. UP provides student internships, industry speakers and sponsor opportunities, and university-hosted STEM events.[12] Another great example is the Dr. Lisa Su Innovating Equity Grant, which is a multi-year grant given to the GSA's Women's Leadership Initiative (WLI) to fund unique programs designed to encourage female engineering students to consider a career in the semiconductor industry. This grant enables the GSA WLI to host compelling university events in the US and abroad with robust curricula that includes impactful keynote speakers and panelists, as well as career guidance and networking for students with leading companies in the semiconductor ecosystem. These activities help encourage collegiate STEM students to join the industry and play an active role building the future.

Relationships with universities are key to building the pipeline of talent

Examples of leading recruiting practices and strategies

NXP: Partnering with new college graduates enables NXP to be connected to that population in order to focus resource group efforts. "Understanding the market context – and knowing where women are and how many - is helpful to know what's possible," said Elsa Zambrano, Talent and Culture leader at NXP. The company also always strives to have a diverse panel of interviewers to connect with candidates.

Intel: According to Intel, inclusion drives innovation and delivers strong business growth. Intel has an internal goal to double women and underrepresented minorities in senior leadership roles, and a goal to exceed 40% women in technical roles. To be successful, they partner with governments and universities to foster STEM across the globe and they have a strong internship program. They also believe a diverse interview panel is key for eliminating unconscious bias and they offer inclusive hiring training to help with this.

Cadence: The company continues to expand its robust university network by awarding scholarships for diversity, equity and inclusion applicants and giving guest lectures on latest industry trends. Cadence partners with leading industry associations such as IEEE (Institute of Electrical and Electronics Engineers) and GSA to raise company awareness and profile amongst potential candidates. Cadence's commitment on maintaining an inclusive culture with high performance, results in ranking consistently as one of Fortune and Great Place to Work's top 100 companies.

GlobalFoundries: College recruitment is critical since college graduates are an essential pipeline source as it provides the largest and most effective impact for bringing women into the company. To help these efforts, GlobalFoundries partners with organizations such as SUNY to participate in events highlighting STEM opportunities. They also focus on 'returnship' where they offer experienced veterans and women an internship to return into the workforce. Internally, they have a strong women's network called Global Women to keep women engaged.

Diversity and inclusion need to be systemically imbedded throughout the recruiting process

Create job postings with women in mind

Women tend to apply for job positions when they fulfill 80% or more of the job requirements, whereas men will still apply even if they only meet 30% of the requirements.[13] "If you have a long list of demands in a job description, you lower the likelihood that women will send in their resumes," Yael Sapir-Zehavi, VP, HR, Tailor Brands says. "If you want to get more CVs from women in the mix, you have to loosen the demands from the beginning."

Systemically imbed diversity and inclusion

Be intentional about recruiting (for example, widen sourcing pools by inviting employee research groups to participate in the process) and hold leaders accountable for welcoming, progressing and valuing the contributions of all people at all levels. This will create new opportunities to infuse diversity, equity and inclusion into every aspect of the business — from development to retention to growth and beyond.[11] PCAST (President's Council of Advisors on Science and Technology) is a great organization to tap into where members advise on topics such as representation of women and minorities and science and engineering hiring programs.[14]

Utilize metrics to set recruitment goals and measure success of recruiting and hiring diverse candidates

According to the GSA WLI Best Practices Playbook, companies should track the gender of candidate submissions, interviewees, interviewers, and new hires. Using the information tracked, companies can measure and assess their year-over-year progress towards diversity.[15] For example, to meet its goal of increasing representation of women in technical roles to 40% by 2030, Intel is implementing targeted programs and workforce development initiatives including a recruitment goal of hiring at least 30% women for technical entry-level roles.[16]

Multiple strategies should be used to build a pipeline of qualified women candidates

- **STEM programs -** Build interest and attract talent through STEM programs in high schools and university programs.

- Technology Access - Increase women's and girls' access to digital technology, especially in remote and rural areas, by investing in infrastructure, high-speed connectivity and training to improve skills.

- **Job fairs -** Reach women through face-to-face recruitment.

- **College outreach -** Work with colleges directly to reach educators and students.

- **Internal programs -** Design corporate development programs that organically grow the candidate base.

- **Visibility –** Use social media to enhance perceptions; show potential candidates not only what you do, but who you are and how you value women in your organization.

- **Gender diverse interview panel -** Ensure perspective diversity to remove unconscious bias from recruiters and hiring managers.

2 Retention of women in the semiconductor industry

"We need to encourage women to pursue careers in technology and ensure that our workplaces foster their development and ability to contribute."

- Tina Jones

Senior Vice President, Global HR, Cadence

Women were disproportionately affected by the COVID-19 pandemic and the economic fallout continues today

The COVID-19 pandemic disproportionately affected women in the workforce as caregiving while working from home led to a mass exodus. Even as the pandemic eased, many women did not return to the workforce.

In partnership with the W20, Accenture surveyed the direct and indirect impact of COVID-19 on people's lives and livelihoods. In this report, we first explore the dangers of doing nothing by highlighting the disproportionate impact of the pandemic on women. Findings confirm that the pandemic has had a negative impact on most people—but women have consistently been hit harder across countries, age groups, and lifestyle indicators. For example, we find that:

- Women have seen their earnings decline almost two-thirds more sharply than men, dropping by 17% on average since the pandemic began, compared with a drop of 10% for men.

- The proportion of women with easy access to healthcare, including maternal and reproductive services, has dropped by more than half—from 69% pre-pandemic to just 32%.

- Half of the women say levels of tension and stress in their household are high, up from just 15% pre-pandemic.

- 42% of female respondents believe their government has failed to account for the impact of the crisis on women.

- 44% believe women will suffer more than men from the economic fallout. And looking to the future, 31% percent of female respondents believe the pandemic has set progress towards gender equality back by at least 10 years.

This highlights the need to prevent disruptive events such as COVID, births and deaths from reducing/removing women's place and progression in the workplace. As Melinda Gates, Co-Chair of the Bill & Melinda Gates Foundation stated about the COVID-19 pandemic, "As diseases infect societies, they expose and exploit existing forces of marginalization, seeking out fault lines of gender, race, caste, and class."[17]
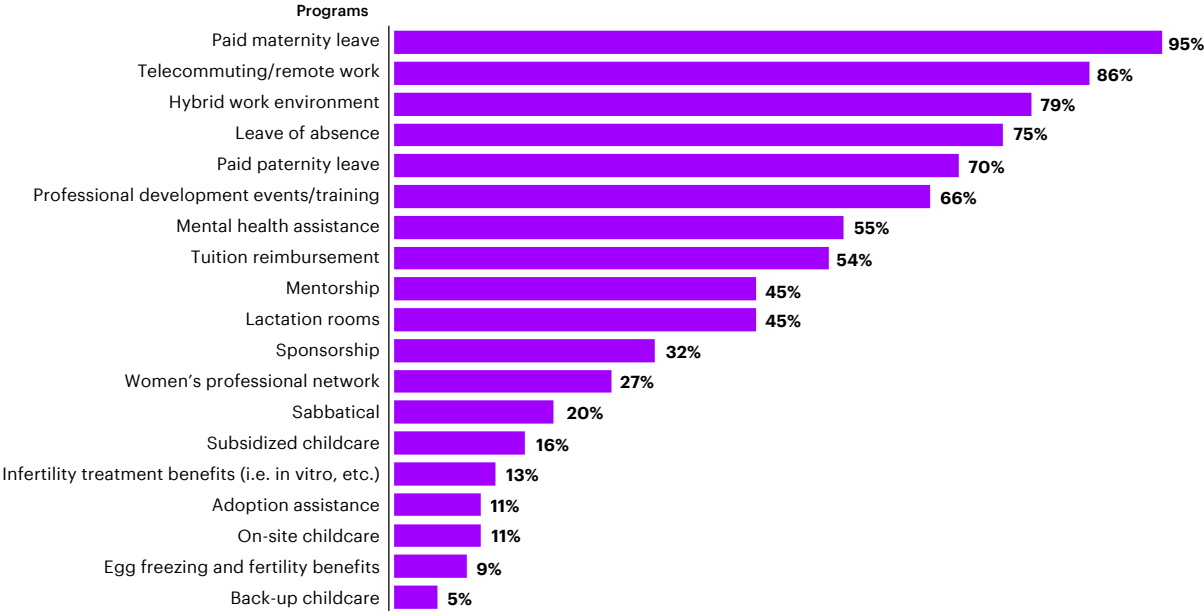
Workforce flexibility and benefits are key to retaining women in the semiconductor workforce

Many working women are mothers or caregivers and access to childcare services and eldercare is an important, if not essential, benefit. Availability of childcare continues to be a challenge with demand for childcare outpacing supply. One of the goals of the CHIPS Act is to build a skilled and diverse workforce. To further this objective, funding applicants receiving more than $150 million will be required to submit plans to offer affordable, accessible, reliable and high-quality childcare.[18]

When it comes to retaining women, workforce flexibility is a key consideration. There is no one-size-fits-all approach. Flexible work schedules including flexible start and stop times, part-time or reduced workload, compressed or expanded work weeks, or no meeting days are options that should be considered. The good news is according to respondents of the GSA: Women in the semiconductor industry 2022 survey, flexible work arrangements were provided by the majority of companies.

Karla Blanco, External Affairs Director for Global Diversity, Inclusion and Social Impact at Intel said, "Women have traditionally been caregivers of the family. That is also changing and any employee regardless of the gender can be a caregiver. At Intel, we take into account the different workforce needs to continue to evolve employee benefits."

Percentage of Respondents

Programs

Program	Percentage
Paid maternity leave	95%
Telecommuting/remote work	86%
Hybrid work environment	79%
Leave of absence	75%
Paid paternity leave	70%
Professional development events/training	66%
Mental health assistance	55%
Tuition reimbursement	54%
Mentorship	45%
Lactation rooms	45%
Sponsorship	32%
Women's professional network	27%
Sabbatical	20%
Subsidized childcare	16%
Infertility treatment benefits (i.e. in vitro, etc.)	13%
Adoption assistance	11%
On-site childcare	11%
Egg freezing and fertility benefits	9%
Back-up childcare	5%

Source: 2022 GSA survey, n=56
Note: Hybrid Work Environment is a program newly added to the 2022 survey.

Semiconductor companies should consider programs that support women returning to the workforce

Acclimation

Support is needed for women who take leave and want to rejoin the workforce. This includes increased communication from managers and empathetically and transparently encouraging women that they have a job to come back to after taking leave or time off. A perfect example is Intel, which works with its managers and leaders to ensure that women that come back are properly reintegrated into the workforce. As part of this effort, they assign a buddy to check in and assist with acclimation for the employee.

Income Protection

It is important to establish income protection mechanisms for individuals to secure regular income for women during maternity, health or disability leave. Alternative work models like part-time, full-time and flexible work are important to ensure appropriate coverage to all workers. This shows women that they are valued and leads to lower turnover and higher morale. This requires special attention for essential workers, part-time workers, self-employed and vulnerable groups, particularly those in low-income countries.

Returnship

Targeting women who resign from the company or have been out of the workforce for years, a returnship program can help individuals reacquaint themselves with their role, the company and the industry while refreshing their skillset. As an example, Cadence has instituted a returnship program for employees that have left the workforce for 10 years. These employees have the option to come back part-time and they are also given the tools and training needed to do their job effectively. NXP also has returnship programs that they adjust depending on the region. For example, in some countries, it is normal to leave the workforce at a common point in a woman's career where they completed higher education college, got married and are starting a family. To help those mothers who have been gone for five years or more, NXP offers support including flexible schedules and part-time roles.

3 Advancing the careers of women

"Understanding the market context – and knowing where women are and how many - is helpful to know what's possible."

- Elsa Zambrano
Talent and Culture leader, NXP

Competitive and equal pay is key to women's advancement

Insuring competitive and equal pay for women is a critical component of women's advancement. Women that are better educated are more likely to participate in the formal labor market and earn higher incomes which can contribute to helping households, communities and countries elevate out of poverty.[20]

NXP established the role of compensation lead. Using an algorithm together with compensation data, the compensation lead works to ensure that there is pay equity and that women are not adversely impacted.

Sponsorship and development programs are critical to the career advancement of women

Mentors/coaches/sponsors

One-on-one development gives women the confidence and guidance to rise through the ranks, making them feel that they have the autonomy to support advancement. Sponsorship pushes for leadership roles where sponsors put a woman candidate's name out there for promotions and speak on their behalf.

Allyship or advocacy programs

With a formalized ally or advocate program, participants would commit to ally-conscious behavior in the work environment which can offer significant support to women. For example, offering educational allyship and advocacy training would help participants recognize systematic inequalities and the impact of microaggressions while also developing advocacy skills to become actionable allies to women.[15] According to an article on Indeed.com, fostering community among underrepresented groups provides access to a higher level of support which can reduce stress levels and heighten engagement at work. [21]

Female role models

Women need to see visible female leaders. Having female role models for new hires and junior employees is highly effective and motivating. In the case of AMD, having a woman CEO serves their brand well when it comes to retention and career advancement.

Development programs

Formalized high-potential programs such as mini MBA offerings can provide training that women need to advance in the ranks. Instead of searching for the perfect candidate with the perfect experience internally or externally, Cadence looks for certain skillsets within the company and then develops the leader the company needs. Availability and accessibility to training can help provide the expertise needed for women to build the relevant skills needed to advance in their careers. When employees take advantage of these opportunities, they can bring more value to their roles and encourage others to pursue growth.

Training/development programs should be implemented to provide opportunities for skill building. Companies such as AMD currently have 90% of their women in development programs and their goal is 100%. This may be an indication of why they have 4% lower attrition rates than men. They also put a lot of focus on Employee Resource Groups (ERG) to help foster a diverse, inclusive workplace. These employee led groups are designed to bring together employees who share common interests, backgrounds and guidance around navigating their careers. Today, 75% of AMD employees participate in one ERG with the goal of reaching 100% participation.

Summary

The time has come for the industry to make significant progress and build a new-age model of gender diversity, equity and inclusion for generations to follow. This represents not only an opportunity for companies to unlock the value women can bring to their organizations, but it also helps women secure more jobs and rise through the ranks in ways that were not possible in the past.

Once the challenges are acknowledged, then the effort to correct previous behaviors in recruitment, retention and career advancement to decrease the gender gap can begin. To start, connect early and often with applicants, evaluate the programs and benefits that are offered to employees and continue to measure the rates of diversity in leadership and promotions.

Semiconductor companies can benefit significantly from having more women in their workforce. However, they need to keep taking steps to help narrow the gender gap. It's not just about having people from diverse backgrounds to meet quotas and goals, instead it's leveraging and valuing what a company's diverse talent can bring to the table.

Next Steps

What can companies do?

Building a positive, women-friendly brand is critical for attracting and retaining women employees. With a female CEO, AMD has elevated their brand as an inclusive company to work for. Here are key actions that companies can take to recruit, retain and advance women in the semiconductor industry.

• **Recruitment –** It is important to start building the pipeline of semiconductor talent starting as early as high school. Companies should partner with the GSA, universities and government organizations to foster women's interest in STEM careers. Diversity and inclusion should be considered throughout the recruiting process starting with job postings designed with women in mind.

• **Retention –** Semiconductor companies need to create a women-friendly culture with attractive benefits and flexibility. Organizations should look to build programs that support women returning to the workforce after short-term or long-term leaves of absence.

• **Career Advancement –** Women need to see a clear path towards career advancement, and even more important, be able to see themselves in those higher roles. Sponsorship and development programs are critical to the career advancement of women including mentoring, formal leadership development programs and education.

Next Steps

What can women do?

Narrowing the gender gap not only requires action from semiconductor companies, but also from women themselves. They can be their own advocates by taking the following steps:

- **Seek out mentors and coaches** who can support women's growth and development.

- **Create or join a women's ERG** to participate actively throughout the company and build a culture that supports women's growth and success.

- **Build their own brand** and seek internal and external platforms to build their skill set and network. Women should set a goal to make their expertise known.

- **Continue to build skills and expertise** through continuing education and development programs.
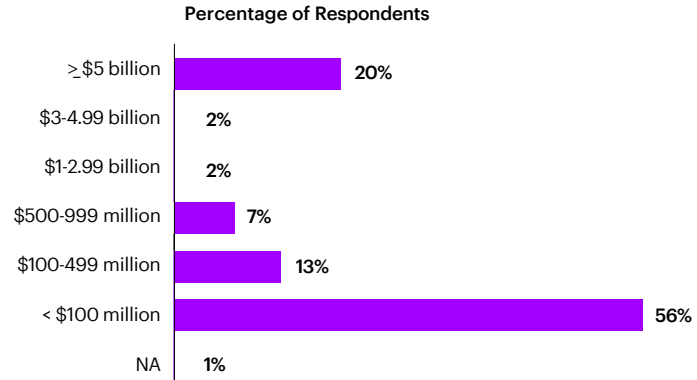
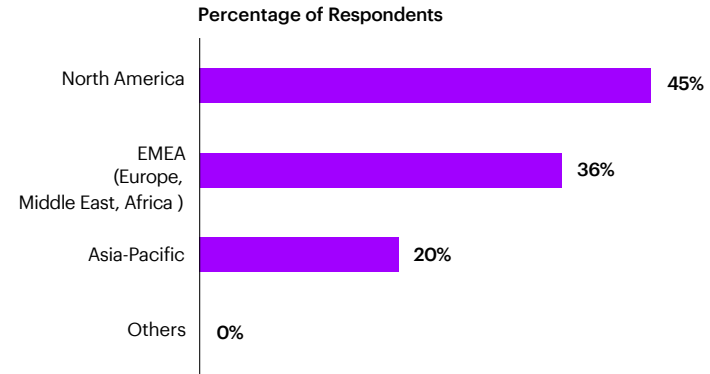# Appendix

Survey Demographics
References
GSA Women's Leadership Initiative

Survey Respondent Demographics

By revenue size

Percentage of Respondents

Revenue	Percentage
≥ $5 billion	20%
$3-4.99 billion	2%
$1-2.99 billion	2%
$500-999 million	7%
$100-499 million	13%
< $100 million	56%
NA	1%

By HQ region

Percentage of Respondents

Region	Percentage
North America	45%
EMEA (Europe, Middle East, Africa)	36%
Asia-Pacific	20%
Others	0%

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GSA's Women's Leadership Initiative

The goal of GSA's Women's Leadership Initiative is to "apply the spirit of Moore's Law which catapulted innovation by doubling the performance of electronics to double the number of women in leadership roles in the industry, double the capital dedicated to women-led start-ups and double the number of STEM-focused women candidates joining the industry."

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Contact: jolie.leblanc@accenture.com

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