S&P Global
Ratings

The Changing Face Of Tech

March 5, 2020

AUTHORS

Alison Sullivan
+212-438-3007
alison.sullivan
@spglobal.com

Michelle Abraham
+602-472-3101
michelle.abraham
@spglobal.com

Marion Amiot
+44-20-7176-0128
marion.amiot
@spglobal.com

Beth Burks
+44-20-7176-9829
beth.burks
@spglobal.com

Osnat Jaeger
+44-20-7176-7066
osnat.jaeger
@spglobal.com

Azadeh Nematzadeh
+212-438-1314
Azadeh.nematzadeh
@spglobal.com

Melanie Posey
+646-839-9944
melanie.posey
@spglobal.com

Lindsey White
+434-951-4527
lindsey.white
@spglobal.com

Rose Marie Burke

See complete contact list on last page(s)

Key Takeaways

- Gains by women in technology companies worldwide were most visible on boards, but less so in executive positions.
- It will take decades of change to reach gender parity on boards and generations to attain that throughout companies—unless companies dramatically accelerate their efforts.
- There is no single solution to achieving gender parity in technology, which we believe instead involves creating positive environments for all employees at tech companies and cultural shifts in some countries. Regulation has led to more diversity on boards, but not at other levels.
- Gender diversity appears to raise the financial performance of tech companies. Our analysis suggests that a move to parity among executives could boost their financial performance (market capitalization to total assets).

Growth in women's representation on boards and in C-suites at tech companies has increased worldwide in the past 10 years, but there's still a long way to go.

This article is part of S&P Global's #ChangePays campaign that explores the benefits of increasing the participation of women in the workforce for the capital markets and world economy. Our research about women in technology brings together experts and data throughout S&P Global's many businesses – Market Intelligence, Ratings, Indices, 451 Research, and Kensho – to bring insights to the market under the umbrella of the company's recently created Women's Research Council. For this report, we compare and contrast our analysis of several datasets, the largest of which is a global set of about 1,280 technology companies for which we examined detailed people data for 2010 to February 2020.

Not surprisingly, women now occupy less than one-fifth of spots on the boards of directors at tech companies, and the share is lower for women executives. Both shares are less than for the financial or industrial sectors but about the same as in the energy industry, according to our 2019 study "The Changing Face of Energy."

What's encouraging are trends this decade showing strong growth on both counts. The share of female board members nearly doubled since 2010 for the technology sector on average and rose about 60% for women executives. There are meaningful regional differences, with the U.S. ahead and Asia-Pacific behind.

Assuming an optimistic exponential growth rate, technology boards would attain 50-50 gender parity in about a decade. We also assume that countries with very low rates accelerate progress, especially in Asia and particularly Japan. U.S. boards would reach parity sooner because of their faster current growth rates. However, at current growth rates, we see board parity by 2050 globally and by 2038 for the U.S.

We project that time to parity would take longer in the C-suite and throughout companies because of lower current growth rates than in the boardroom. At current growth rates, we see executive parity by 2070 globally and by 2050 for the U.S.

Looking more closely into about 90 public technology companies rated by S&P Global Ratings, the share of female employees also ranges widely and averages about 30%, with growth averaging an annual 1%-2% in 2016-2018. The share is lower, at 1 in 5, for technical positions than the general employment rate, implying that women in technology companies tend to occupy

more administrative and support roles. We see higher rates of women in technical roles at innovative, higher-growth companies such as Adobe, Intel, Intuit, Google, Salesforce, and Uber.

Examining the IT departments in 550 companies worldwide, just under half of them said women accounted for less than 25% of staff, according to a survey by 451 Research. However, 9.5% reported no women, zero, in their company's IT department.

Why is gender diversity an important factor? Companies with more women in the IT department tend to be further along in digital transformation. Much more broadly, our economic modeling suggests that greater gender diversity is linked to stronger financial performance. More study is needed on this point and the other conclusions in our report, which would benefit from better people data from technology companies.

Regulation has translated into more diversity on boards, but not on other levels, which indicates there is no single solution to achieving gender parity in technology. Best-practice technology companies seem to take a holistic approach that includes attracting more women into science and engineering studies, internal programs and work-life policies, external partnerships with nongovernmental organizations, and diversity standards for suppliers. “There's an increasing appetite for seeing real change in diversity," said Erin Cummins, chief financial officer at ThoughtWorks, one of five female executives we interviewed for this article.

Part 1 –More Women Find A Place In The Boardroom And C-Suites

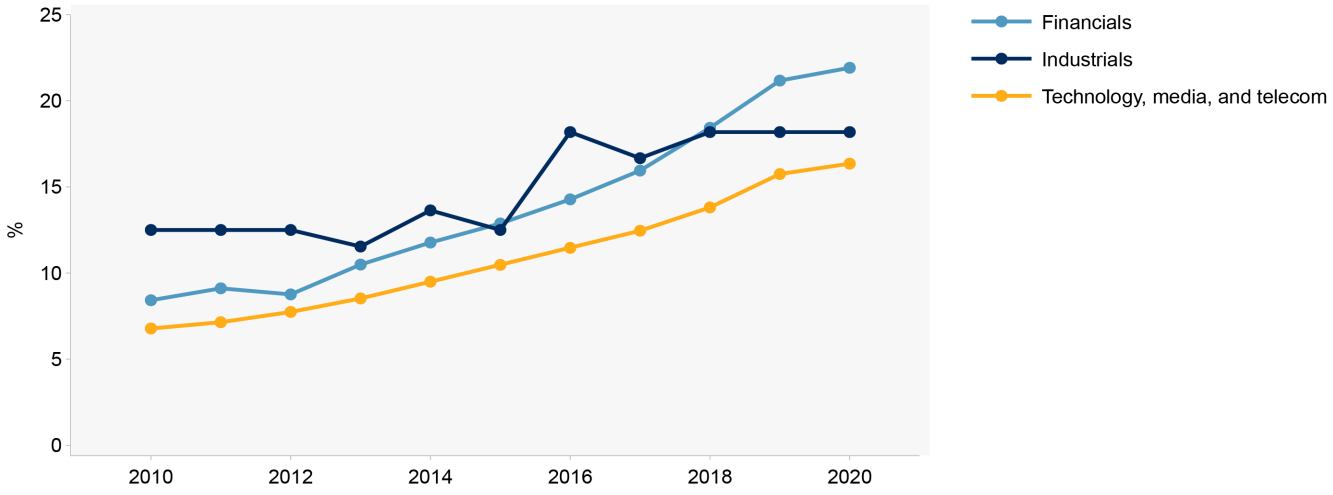
We have found that gains by women in technology companies were most visible on boards, but less so in executive positions. Our analysis of about 1,280 technology companies across the world shows women hold on average 16.6% of board seats. For the broader technology, media, and telecommunications (TMT) sector, the share of women board members has been lower than other broad sectors such as financials and industrials in the past decade (see chart 1).

What's more, women on boards at tech companies have more than doubled their presence in the past decade, moving from just 6.8% in 2010. We noticed an uptick in growth in 2016 in the U.S., where from 2010 to 2015 growth was similar to that of other countries. Currently, the U.S. share stands at 21.5%. For the rest of the world the figure is 14.5%, the difference mostly due to the large number of tech companies in Asia with no women board members (see charts 4 and 5). As Inhi Cho Suh, general manager of global strategic partnerships at IBM, notes, “As an industry, we've progressed. But we’re still not where we need to be.”

Chart 1

Board Representation Makes Gains In Tech

TMT growth is lower than in the financial or industrial sectors



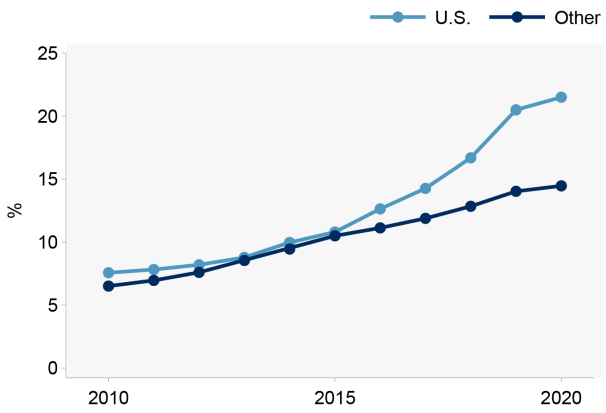
Source: S&P Global.

The ratio of women executives, at 15% in 2020, has also grown rapidly, at about an average annual 1.6% or 61% over the last 10 years, from 9.1% in 2010. The U.S. showed stronger growth over the decade than the rest of the world, to 19.5% versus 11.3%. The rest of the world grew to 12% from 7.5%. Again, the U.S. growth rate accelerated, this time in 2017, compared with that of the rest of the world.

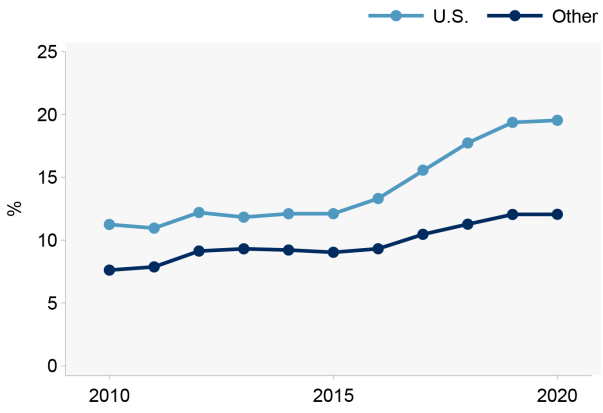
Charts 2 & 3

U.S. Tech Shows Stronger Growth In Women On Boards And In C-Suites

Boards



Executives



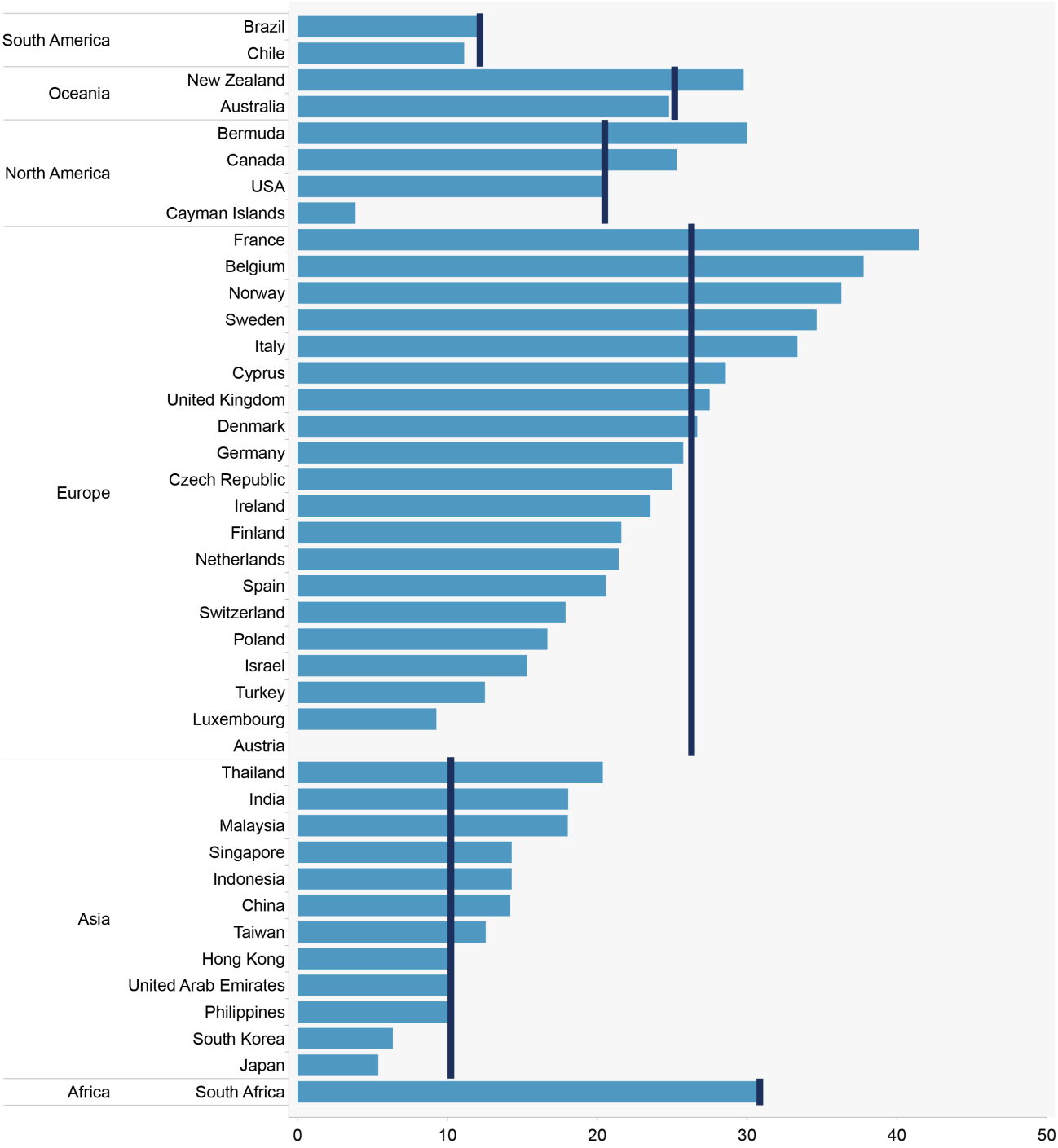
Source: S&P Global.

It's not just in Asia where tech companies have zero women on boards. Of all of the companies in our dataset, 30% have no women board members. Although a large number of those companies are based in Asia — 62% Japanese, 75% South Korean, and 41.5% Taiwanese companies — in

the U.S., 8.5% do not have women on their boards.

Chart 4

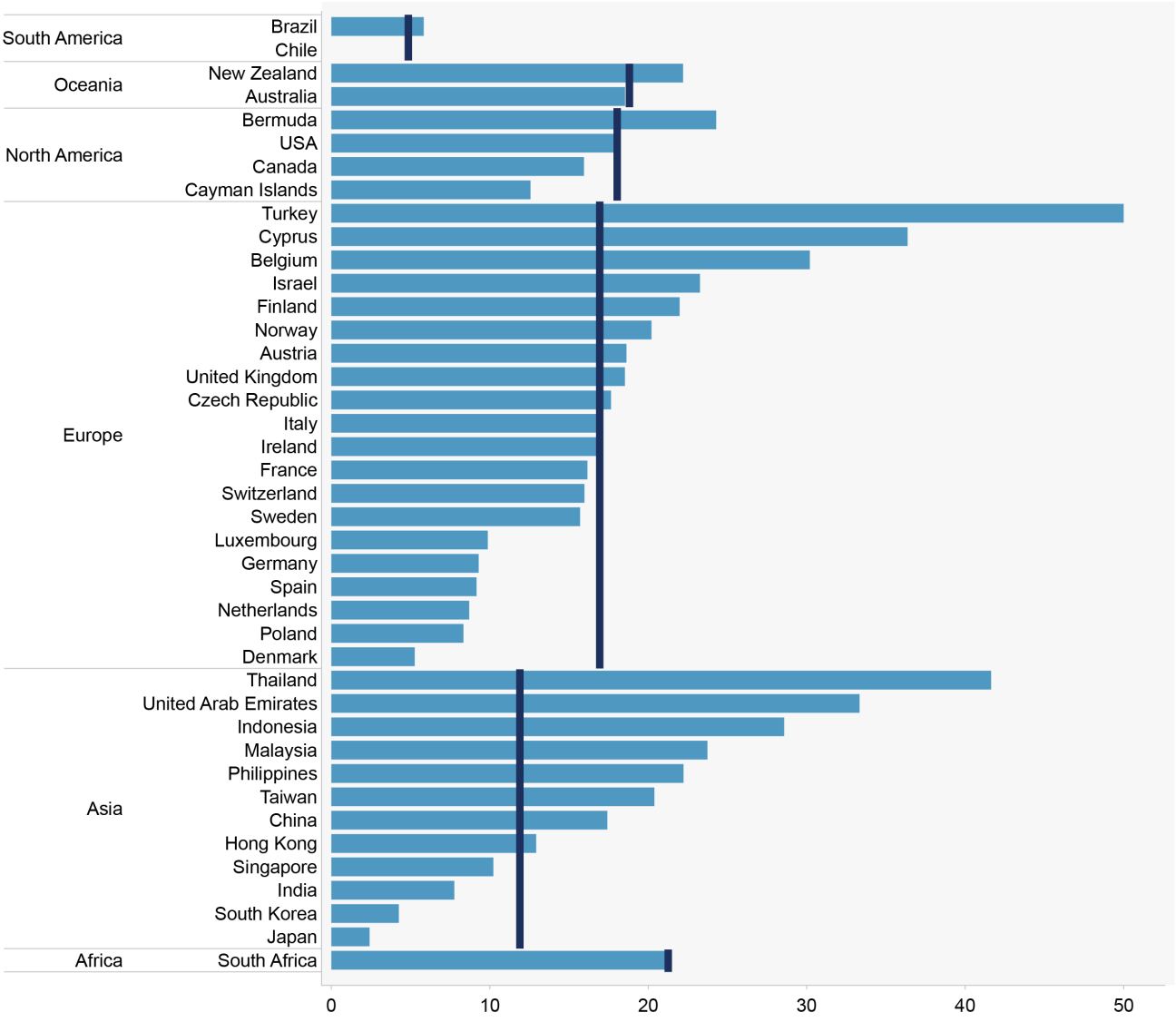
Share Of Women Board Members, By Country



Note: Navy vertical bar represents the average for the region. Source: S&P Global.

Chart 5

Share Of Women Executives, By Country



Note: Navy vertical bar represents the average for the region. Source: S&P Global.

Striking geographic differences

Countries with over 30% of women board members in our dataset are mainly in Europe where several countries have regulatory minimums for boards of directors of public companies. France, Spain, Belgium, and Norway are among the countries with mandates. As a result, France averages 41% for 14 companies. Belgium is at 38% for six companies, Norway at 36% for five companies, Sweden at 34.6% for 10 companies, and Italy at 33% for eight companies. However, these countries have about half as many women executives, which indicates that regulation at the board level is not spilling over as quickly to the C-suite. South Africa also has stronger regional representation at about 31%, in part due to regulatory requirements.

The countries with the largest number of technology companies in the analysis had shares of women board members averaging 20.6% for the U.S., 5.4% for Japan, 12.6% for Taiwan, and 14.2% for China. California in September 2018 passed a law requiring publicly held companies with an executive base in the state to have at least one female board member by the end of 2019. The minimum is set to increase in 2021 depending on the size of the board. The state requirement could reverberate to other IT companies in the U.S. since a number of them are based in Silicon Valley, though it faces a legal challenge.

The lower percentages for Asian countries fit with lower rates of workforce participation, which was 44.5% in Japan in mid-2019. And then, 55% of the women at work in Japan are not in career-track jobs, according to a Nikkei Asian Review news article citing data from the country's Ministry of Internal Affairs. Taiwan shows a women's workforce participation rate at 51.4% for 2019, according to the country's Statistical Bureau. And in China 60.6% of women are in the workforce, according to the World Bank, but only 28.4% of managers there are women, according to OECD data. Our data indicate Thailand has a higher share of women executives, which may be the result of a number of efforts by the government to support women.

Regulation at the board level has not lifted the share of women executives in the technology sector. In other words, there is currently a weak correlation between the ratio of women on boards and women executives in Europe. In France, only 16% of executives are women. The shares are 30% for Belgium, 20% for Norway, and 9% for Spain (see chart 5).

More of a presence in software than in hardware

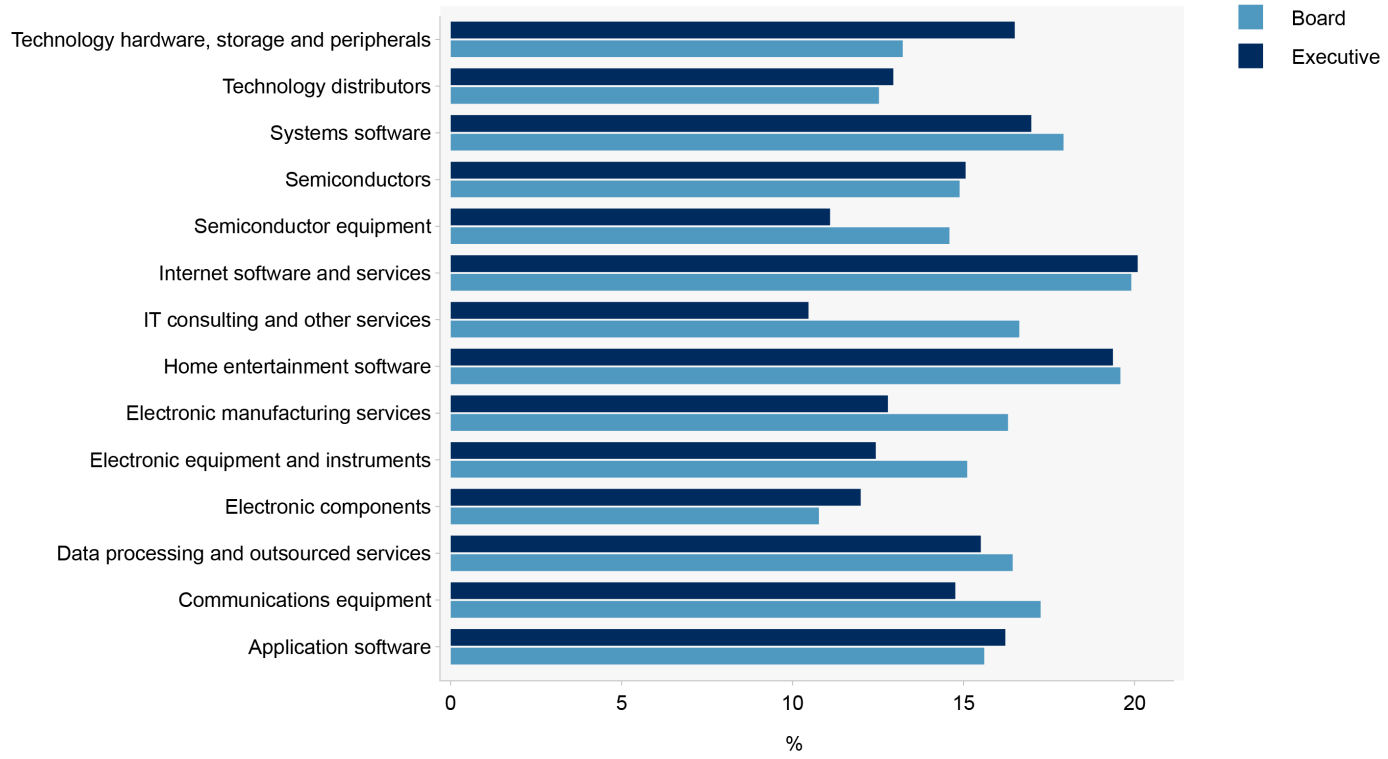
Women in leadership positions have more of a presence in software than in hardware. The shares of women board members (17.1%) and executives (15.4%) is greater in the software and services subsector than in the technology hardware and equipment subsector (14.1% for boards and 13.5% for executives). These two subsectors account for 95% of technology companies in the study.

Looking more closely, the subsectors with the highest percentages are internet software and services subsector (19.9%) and then home entertainment software (19.6%; see chart 6). Electronics components companies have the lowest shares at 10.8% which makes sense because 74.6% of them are headquartered in China, Japan, and Taiwan, which feature lower shares of women board members.

For executives, the lowest subsector is IT consulting at 10.5%, followed by semiconductor equipment at 11.1%, and electronic components at 12.0%.

Chart 6

Share Of Women On Tech Boards And In C-Suites Varies Widely By Subsector



Source: S&P Global Ratings.

Approximately 20 tech companies stand out with gender parity on their boards, with seven having a greater number of women than men. Those with gender parity are almost evenly split between hardware and software companies. About half are headquartered in Europe, with the remainder split between Asia and the U.S. The companies range in size from Germany's SAP with 100,000 employees and €27.6 billion in revenue to Sweden's Sensys Gatso Group with a few hundred employees and Swedish krona 406 million in revenue.

Methodology: Part 1

S&P Global conducted this analysis based on S&P Global Market Intelligence people data for the constituents of the S&P Global BMI Information Technology (Sector) Index and S&P Global BMI Index, as well as IT companies included in the S&P Global 1200. The analysis classified companies using industry categories as defined by S&P Global Market Intelligence. Approximately 1,280 technology companies were reviewed. We compiled the data on Feb. 20, 2020.

For the selected companies, the analysis identified board members, senior managers, and other key executives. The latter two categories included more than five dozen roles tracked in the S&P Global Market Intelligence database. Researchers identified the gender of the individuals covered in the analysis based on several factors, including honorifics, pronouns, and first names. Less than 1% were classified by matching names to external sources such as company websites and LinkedIn. Financial data and other metrics for the companies included in the analysis was sourced from S&P Global Market Intelligence.

The analysis excludes companies for which researchers were not able to apply gender categories to all relevant individuals. For example, if gender classification was only possible for nine out of 10 of a given company's board members, that company was excluded from our board-focused analysis. If a board member or executive left one company and joined another in a given year, researchers counted that individual for both companies for that year.

The following table shows the number of companies included in the final analysis, broken down by geography and industry.

Table 1

Number of companies analyzed from S&P Global BMI Information Technology (Sector) Index and S&P Global 1200 (IT companies only)

		Scope of analysis			
		Current board	**Historical board**	**Current executives**	**Historical executives**
By geography	Africa	4	4	4	4
	Asia	709	649	701	601
	Europe	133	146	134	143
	North America	402	401	399	401
	Oceania	26	26	26	26
	South America	6	6	6	6
By second-level industry	Software and services	448	444	432	436
	Technology hardware and equipment	766	724	775	676

Part 2 – Innovative, Higher-Growth Companies Show Bigger Gains

Looking closely at 92 listed technology companies rated by S&P Global Ratings that also have data about women employees, the trends are somewhat stronger.

S&P Global Ratings assigns ratings to approximately 210 publicly traded technology companies globally in addition to well over 100 privately held companies. Of the rated public companies, 92 entities publish metrics outlining women in the workforce, leadership positions, and/or technical roles, and more than half of these entities are based in the U.S. Here, we reviewed the wide range

of data, information, and context they have made public, whether they are diversity and inclusion, sustainability, or corporate responsibility reports, or postings to websites.

On average, the share of women in the companies increased by about 1-2 percentage points each year from 2016 to 2018. This indicates that diversity is clearly on the agenda, but that change takes a long time. Companies often highlight that new hires tend to be more diverse than current staff. Proponents believe that an inclusive workforce can help drive innovation and growth. Diversity is particularly a focus for consumer-oriented tech companies that want to reflect the diverse needs of their users.

About 1 in 3 workers on average at the companies are women, but only about 1 in 5 for technical employees. This means that a much higher percentage of women are in functional roles such as administration, sales, marketing, legal, and finance.

Interestingly, the percentage of women in senior positions is in most cases not much lower than their overall presence — and even higher than their presence in technical positions. This suggests that women have a proportionate chance of promotion into senior leadership and board positions (for which the definitions vary by company). Furthermore, it suggests that gender parity on the frontlines could translate into overall gender parity.

These averages mask a wide range of women in the U.S.-based companies, from 17% to almost 60% of global positions, over the last two years. Reviewing companies by market capitalization did not reveal a meaningful difference in gender diversification.

Innovative, sometimes higher-growth companies such as Apple, Intel, Intuit, Google, Salesforce, and Uber have stronger female participation in technical roles. At Intuit, more than 1 in 4 technical employees are women. These companies state they want to have the best talent pools from both genders and have created strategies to increase women staff to achieve that. It may be that these companies generally are faster to adapt because they operate in a more dynamic environment than legacy tech companies.

Reflecting the results from the 1,280 dataset (see chart 6), there is a lower share of women working in the semiconductor equipment subsegment, with Applied Materials, Lam Research, and ASM International at 15%-17% of total workforce. However, other areas of the semiconductor segment have a higher degree of female participation, with companies like Texas Instruments, Infineon, NXP, and STMicroelectronics all at more than 35%.

By region of the world, the share of women at companies in Europe is lower than in the U.S., although we note that our sample size is rather small. At first glance, this is surprising given that European countries tend to have better social benefits than the U.S., including longer legal maternity and annual leaves. By contrast, Europe has a relatively high share of women in leadership positions, similar to the U.S., indicating that once they are in the firm they may stand a better chance of promotion.

In APAC, the share of women in the workforce is comparable to the U.S. figure, but is much lower for senior leadership positions, whether in management or on the board. In most cases it's less than 5%. This could be due to a number of factors, including lack of support for women employees that would keep them long enough for promotion (less flexible working hours, cultural expectations to take responsibility for household activities, lack of supportive family policies, job security after maternity and paternity leave, for example).

In Japan, the government has taken action, such as the Act on Promotion of Women's Participation and Advancement in the Workplace, which took effect in 2016. This requires companies to set numerical targets and create action plans for female employment. As a result, the Japan-based companies in our study have publicly stated goals for women in leadership

positions. They have also created action plans to support career development, improve recruitment, and expand family leave.

What has been successful to increase women in tech?

These 92 companies, through their various disclosures, also show the way forward to increased gender diversity. Similar to how tech companies foster ecosystems of internal and external applications to support their products, they appear to build human ecosystems to support gender diversity. Solutions range from early education initiatives outside the company through to workplace development inside each company.

Some companies support educational outreach efforts to attract women to science, technology, engineering, and mathematics (STEM). Others companies partner with external organizations to fund coding camps or create their own programs to support women in computer science. “Literally you have to go from before college,” said Jean Hu, chief financial officer at Marvell Technology Group, “then encourage the women to study engineering, then you have a pool you can draw from."

And it looks like these tech companies have become more open-minded about recruitment. The hiring process can involve looking beyond traditional paths for candidates. As a best practice, job postings are reviewed to minimize bias and attract a wider range of candidates. The hiring process may formalize a diverse candidate slate by requiring at least one woman for consideration. Including other women in the hiring and interview process can help remove unconscious bias.

Next, companies may offer a number of tools to support and advance the new hires. Two of the most commonly cited efforts include internal training to remove unconscious bias and employee resource groups (ERGs). Often linked with executive sponsors, ERGs create the conditions to enable advocacy, networking, peer, and in-person support. Learning and development programs, and formal sponsorship and mentorship programs are often an offshoot. A smaller segment of the population hosts women leadership events to raise visibility and inspire female role models. “One of the things that I've learned throughout my career is to make sure that you have the support system, both in terms of your management team, but in terms of the colleagues, both inside and outside the company, said Suh, “to make sure you have an opportunity to talk through situations, that you have guidance, that you have an outlet.”

These structures are complemented by work-life policies, flexibility, and employee benefits to support a "return to work" after a break. Many companies themselves argue that managers influence the daily work environment, and as a result, retention. For that reason, leaders are trained to support diversity and inclusion, help women manage their careers, advocate on their behalf, provide direct feedback, and role model the right behaviors. Sponsorship by men or women can also open up new opportunities. In addition, “You have to make sure that you’re giving the women the tools to be successful in themselves —this isn’t about their skills, it’s about their self-belief,” said Emma McGuigan, senior managing director of technology at Accenture. Finally and of utmost importance, companies should uphold fair pay practices.

Externally, some companies partner with nonprofits (such as AnitaB.org) to develop policies or support efforts by intergovernmental organizations (like signing the UN Women’s Empowerment Principles). Some companies take the issue beyond their own doors and require suppliers, marketing agencies, law firms, and other business partners to meet minimum diversification standards.

Diversity In The IT Department

451 Research is a global research and advisory firm that provides intelligence, expertise, and data covering high-growth emerging technology segments. The group has been part of S&P Global since December 2019.

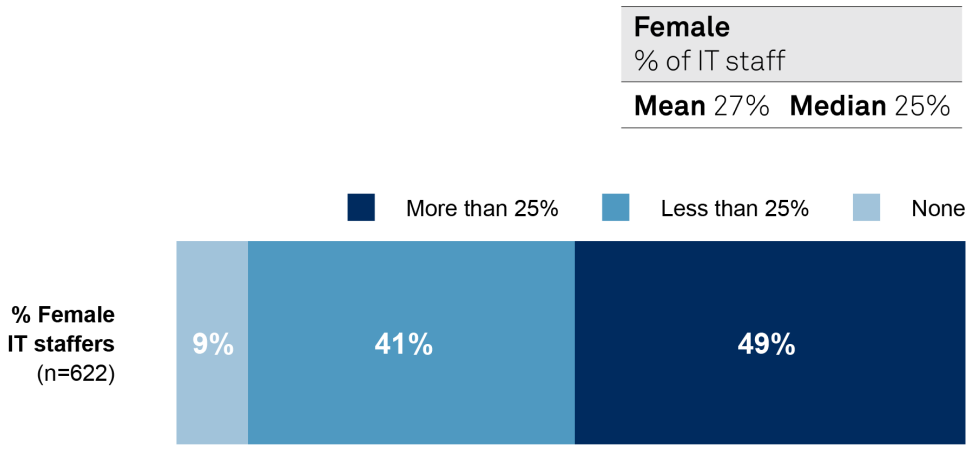
The typical corporate IT department is predominantly male. According to 451 Research's 2019 survey, "Voice of the Enterprise: Digital Pulse, Organizational Dynamics," just under half of respondents reported that women accounted for less than a quarter of their company's IT staff. And 9.5% of respondents said there were no women at all working in their company's IT department (see chart 7).

Our research suggests that workforce diversity is good for business. For example, organizations with a greater share of women in the IT department tend to view IT as more strategic and tend to be further along with their digital transformation initiatives.

In recent years, some of the big tech vendors made strong commitments to improve workforce diversity. Dell Technologies, for example, says women will account for half of its workforce (up from 30% today) and 40% of managers, by 2030. As ESG (environmental, social and governance) issues continue to weigh more heavily in strategic planning and procurement, we expect to see more signs of progress in IT through 2020 and beyond.

Chart 7

Gender Diversity In Corporate IT Departments: Mostly Male?



Source: 451 Research's Voice of the Enterprise: Digital Pulse, Organizational Dynamics 2019.

The "Voice of the Enterprise: Digital Pulse, Organizational Dynamics," survey was conducted in April and May 2019. The survey represents approximately 914 completed interviews from prequalified IT decision-makers. In addition to regular quarterly topics, this survey also focuses on the role of application developers in organizational IT and perspectives on IT skills gaps. Approximately 67% of respondents were based in North America, 22% in EMEA, 8% in Asia-Pacific, and 3% in Latin America and the Caribbean.

Part 3 - A Positive Link With Financial Performance?

S&P Global Ratings carried out statistical and economic modelling that suggests that low gender diversity could hold back companies financial performance (see chart 8). Indeed, our model establishes a direct, positive link between gender diversity and financial performance for 2018 for 617 companies, for which both gender and financial data was available, from our dataset of global tech companies. Moreover, a greater share of women in the executive ranks seems to matter more for financial performance than on the board. We calculate that a move to gender parity among executives would raise financial performance, measured as Tobin's Q, by 12.5%. That is, an increase in the Blau Index of Gender Diversity to 1 from an average 0.35 for the companies in our dataset would raise Tobin's Q, the ratio of a company's market capitalization to total assets, to 0.29 from an average of 0.26 (see the Methodology box below).

Methodology: Part 3

Variables:

Similar to other studies on gender diversity, we measure this factor with the so-called Blau Index, also used in Chart 8 to picture the gender diversity distribution in our sample. It is computed as follows:

$Blau\_Index_i = 2*(1 - (share\ of\ women)_i^2 - (share\ of\ men)_i^2)$, where i refers to firm i

The Blau Index ranges from 0 to 1, with 1 corresponding to gender parity and 0 to no gender diversity at all. We construct an index for the board and one for executives using the 1,280 company dataset described in Part 1.

To measure financial performance, we use an approximation of Tobin's Q as follows:

$Tobin's\ Q_i = Total\ market\ capitalization_i / total\ assets_i$, where i refers to firm i

This ratio gives us information on investors' expectations of the firm's financial performance. A higher value points to better performance. It has been used in other studies that look into the link between gender diversity and financial performance.

The model:

$D(Tobin's\ Q_i) = c + Blau\ Index\ Board_i + Blau\ Index\ Executives_i + Control\ Variables_i$

To link financial performance to gender diversity, we seek to explain the annual change in Tobin's Q in 2018 (D(Tobin's Q)) with the Blau indices, constructed using a static panel regression approach (that is, we only use data for 2018). The table of results shows that a higher Blau Index for the executives is associated with higher increases in Tobin's Q. Interestingly, the Blau Index for the board is not significant, suggesting that gender diversity on the board is less relevant for financial performance than among executives.

Finally, to check that our results are robust to different changes introduced to the model, we add control variables. We find that accounting for industry trends (we have 14 different industries), revenue growth, and changes in EBITDA margins of the companies in our sample does not affect our results, even if it adds to the explanatory power of our model. We also tested for specific country trends, age of the companies, and their number of employees, but those were not significant and did not improve the model properties in our view.

Table 2

Our Model Suggests Gender Diversity Raises Financial Performance

Dependent variable: Change in Tobin's Q in 2018

Independent variables	Model 1	Model 2	Model 3
Constant	-0.08 ***		
Blau Index - board, 2018	0.03	0.03	
Blau Index - executives, 2018	0.05 **	0.04 *	0.04 **
Control variables			
Industry level 4		significant	significant
Revenue growth, 2018		significant	significant
Change in EBITDA margins in 2018		significant	significant
Observations	617	541	536
Adj_Rsquared	0.8%	7.5%	9.4%

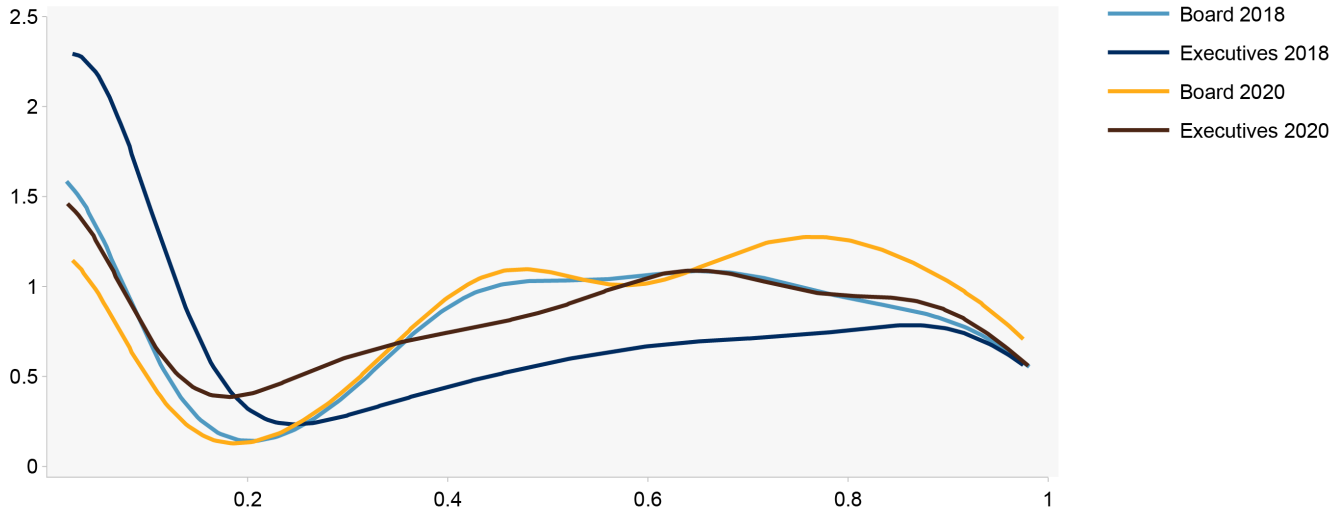
Significance levels: *10%, ** 5%, *** 1%.
Source: S&P Global.

Importantly, the introduction of control variables in our model doesn't affect the results. That said, our model remains incomplete because it explains less than 10% of the variation in firms' financial performance. Our dataset also doesn't allow us to test robustly for reverse causality — whether better-performing firms might just attract more women — but other studies show that performance tends to follow hiring, which supports our finding that diversity boosts financial performance in the tech sector. Furthermore, as our analysis is static, a next step would be to check whether these results hold across time.

Other researchers have also found a link between an increase in gender diversity and financial performance, specifically market value and revenue (see "Research: When Gender Diversity Makes Firms More Productive," Stephen Turban, Dan Wu, and Letian Zhang, Harvard Business Review, Feb. 11, 2019).

Chart 8

From Zero To Better: Tech Companies' Gender Diversity Is Improving, But Still Skewed



Note: The chart shows the distribution of the gender diversity indices in our sample; 0 means there is only one gender (mostly male), and 1 means the share of each gender is perfectly equal. Source: S&P Global.

Part 4 – The Voice Of Tech: How Company Culture Has Changed

We interviewed five female executives in senior roles at tech companies around the world about their careers and what made a difference. They all talked about recognizing that at some point they were the only woman in the meeting, or the elevator, or the boardroom. As keys to their success, they said they didn't let being in the minority deter them, while highlighting support they received from family, mentors, and their companies as they climbed the career ladder. Here we present a summary of their remarks (see S&PGlobal.com for fuller versions of the interviews).

Most of the women we interviewed said they have seen improvements in gender diversity in the tech industry over the past two decades — in terms of company culture, support networks for women, and particularly family leave policies.

Inhi Cho Suh is the general manager of global strategic partnerships at IBM, where she has worked for over two decades. She described cobbling together solutions when she had her two sons years ago. “I had to rethink what it meant to be a working mom because there wasn't a script for that,” Suh said.

Now, she said, IBM has improved the infrastructure to support new moms and parents. The company increased paid family leave to 20 weeks for moms and 12 weeks for dads, partners, and adoptive parents.

“As an industry, we've progressed. But we’re still not where we need to be,” she said.

Several women we interviewed spoke about the important role support networks played in their careers — in the form of mentors, sponsors, coaches, and role models.

Erin Cummins relied on this kind of support when she took on her first CFO role in 2014 at ThoughtWorks, a privately held global software consultancy — a transition she described as “overwhelming” at times.

Cummins worked with her mentor and coach on a biweekly basis for an hour at a time. The coach helped her stay clear and organized; she also helped Cummins understand that she didn’t have to be “perfect all the time.”

“My biggest piece of advice for a woman who is looking to be in a C-level role or just a senior leadership position would be to surround yourself with role models in an environment that will allow you to thrive,” she said.

Mary Gendron, chief information officer at semiconductor company Qualcomm, said she was able to focus on her career because her husband took a step back in his to become a stay-at-home dad to their three young children. “There came a crossroads where my career was taking off faster than his,” she said. “He just made way for me and supported me in my pursuits. And then I ended up going down the path of being the primary wage earner in our house and he is the primary caregiver.”

“When I was coming up through my career I had a total lack of awareness of my privilege,” she said. “Having that support and family background I kind of took it for granted and didn’t realize how important that was for me to be able to embrace these new opportunities, take risks, reach out, and change jobs or do whatever I had to do to advance in my career. And I know I underestimated those foundational elements.”

A number of executives said that company culture plays an important role in attracting and retaining women — and that culture doesn’t change overnight. Instead, as Accenture’s senior managing director of technology Emma McGuigan noted, it has to be deliberate, intentional, and

methodical. McGuigan said IT consulting firm Accenture has recognized that if you want a diverse workforce, you have to build repeatable, measurable processes.

"The culture relies on a number of key pillars — like having strong role models, having leaders who will have difficult conversations, having processes that make sure that we are deliberate about looking at whether we are promoting on equal numbers," she said. "When you've got specific pools of talent who are leaving, you've got to be deliberate and purposeful about how you're going to engage with that group."

Again and again, executives highlighted the importance of the pipeline — getting women in the door, and then retaining them and promoting them.

Jean Hu, CFO of semiconductor company Marvell Technology Group Ltd., called the lack of women in the pipeline "a key challenge" for the tech industry.

Marvell is focused on building that pipeline starting at the internship level. The company works with different universities and organizations trying to promote coding for young girls to encourage them to get into engineering.

"You have to go from before college, then encourage the women to study engineering, then you have a pool you can draw from. That's the very beginning point of the whole conversation and the dialogue that we're having with different organizations," Hu said.

Girls begin to self-select out of STEM fields at a young age, and Accenture's McGuigan talks passionately about changing outdated stereotypes.

"A lot of what we're looking at in the world of STEM is hugely creative, hugely exciting," she said. "When you start to help girls understand how they can change the world with technology and empowered by technology, then you start to change the discussion."

From Zero To 50-50

Optimistically, assuming exponential growth, it would take a decade to achieve gender parity at the top in the tech world. And unless technology companies exponentially accelerate their efforts, it might take a couple of generations to achieve gender parity at all levels. It won't naturally become easier, especially since the technology skills shortage is only increasing. Regulation has translated to more diversity on boards, but not on other levels. This suggests there is no single solution to increase gender parity in a sector traditionally dominated by men. Best-practice tech companies indicate that what's needed are human ecosystems to provide holistic and positive support for women to learn about tech, find jobs in the sector, and have opportunities for career growth. Mary Gendron, chief information officer at Qualcomm, notes that over the past few years she has seen much greater awareness of the opportunity for improvement and a sincere desire among leadership to address the issue. Assuming linear growth, that is, at current growth rates, we see much slower progress: board parity by 2050 globally and by 2038 for the U.S., and executive parity by 2070 globally and by 2050 for the U.S.

In the U.S., 2016 appeared to be an inflection point: women started to make greater gains in in C-suites and the boardroom than in other countries around the world. Understanding why might provide clues to faster gains for women. However, that progress needs to accelerate in the U.S. and run ever faster in companies and countries with low participation by women. There's a lot at stake, including reputational risk, digital strategies, and financial performance—not to mention the potential of one-half of the people on the planet. On the other hand, diversity is found to attract talent, foster creativity and innovation, and signal good management for investors. Yet, as we have seen in this report, the link between diversity and its benefits depends on context, especially industry and country norms about inclusion. Nevertheless, we echo researchers who

think that investment in gender diversity is worthwhile—or as S&P Global says #ChangePays. Indeed, this study reinforces the view that tech companies worldwide are generally becoming more supportive of women and their importance in economies. Indeed, firms that support gender diversity stand to capture the benefits earlier, leading a competitive advantage. Lastly, if companies publish more information and data about gender diversity, it could boost awareness about progress, for example with studies like these, and provide a further catalyst for change.

This article collects thought leadership research and data from five S&P Global divisions about women working in technology sector around the world. We feature contributions from S&P Global Market Intelligence and S&P Dow Jones Indices (Parts 1 and 4), S&P Global Ratings (Parts 2 and 3), and 451 Research (Diversity In The IT Department), along with contributions by Kensho. Though the contributions reflect each division's own separate perspectives and requirements, together they reflect S&P Global's current thinking on this important topic.

Authors

Alison Sullivan
Analytical Manager
S&P Global Ratings
+212-438-3007
alison.sullivan@spglobal.com

Michelle Abraham
Senior Research Analyst
S&P Global Market Intelligence
+602-472-3101
michelle.abraham@spglobal.com

Marion Amiot
Senior Economist
S&P Global Ratings
+44-20-7176-0128
marion.amiot@spglobal.com

Rose Marie Burke
Senior Writer
S&P Global Ratings

Beth Burks
ESG Analyst
S&P Global Ratings
+44-20-7176-9829
beth.burks@spglobal.com

Katie Darden
Research Director
S&P Global Market Intelligence
+434-951-7422
katie.darden@spglobal.com

Osnat Jaeger
Credit Analyst
S&P Global Ratings
+44-20-7176-7066
osnat.jaeger@spglobal.com

Azadeh Nematzadeh
Senior Data Scientist
S&P Global Ratings
+212-438-1314
azadeh.nematzadeh@spglobal.com

Melanie Posey
Research Vice President
451 Research
+646-839-9944
melanie.posey@spglobal.com

Lindsey White
Senior Editor
S&P Global Market Intelligence
+434-951-4527
lindsey.white@spglobal.com

CONTRIBUTORS

Ashleigh Cotting
Assistant Manager Data Journalism
S&P Global Market Intelligence

Nathan Hunt
Head of Content Strategy
S&P Global
nathan.hunt@spglobal.com

Alexandra Krief
Project Manager
S&P Global Ratings

Kyle May
Associate Director, Enterprise Marketing
S&P Global
kyle.may@spglobal.com

Halie Mennen
Senior Digital Content Producer
S&P Global Ratings
halie.mennen@spglobal.com

Victoria Schumacher
Digital Content Producer
S&P Global Ratings
victoria.schumacher@spglobal.com

Michaela Shtilman-Minkin
Software Engineer
Kensho

EXECUTIVE SPONSOR

Alexandra Dimitrijevic
Co-Chair, S&P Global Women's Research Council
Global Head of Research, S&P Global Ratings
+44-20-7176-3128
alexandra.dimitrijevic@spglobal.com