Women in data science: changing the rules of the game

Why and how we must balance the gender ratio

"The world's most valuable resource is no longer oil, but data," trumpeted a dramatic headline in The Economist, heralding the crucial role data science now plays across all domains, from medicine and marketing to consumer goods and transport. Accordingly, companies are striving to expand and elevate their data science teams—a task that will become increasingly difficult as demand for data science talent outstrips supply.

Why then do we go on limiting the scope of this strategically vital talent pool?

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Senseless exclusion

Half of the world's potential data science talent is senselessly excluded as women are implicitly (and often explicitly) steered away from data science careers. This vast structural constraint significantly impedes efforts to scale enterprise data science programs to the next level.

Limiting access to strategically essential talent is only part of the problem. Many algorithms have been shown to be compromised by male bias. As nearly all data scientists are men, male thinking inevitably shapes the systems they create. Algorithms output what they learn, and if only one gender is involved in training them, then output cannot be balanced. Women are essential to developing unbiased algorithms that yield balanced insights.

All the essential skills required to be a successful data scientist—critical thinking, structured approach, creativity, intuition, and big picture business view—are gender neutral. This is evidenced by women who've reached the pinnacles of the profession (despite the obstacles), such as Emily Glassberg Sands, head of data science at Coursera; Yael Garten, director of Siri Analytics at Apple; and Cassie Kozyrkov, chief data scientist at Google.

Yet the larger truth remains: data science offers shockingly few female role models.

Deep-rooted bias

This pronounced gender imbalance stems from deep-rooted societal bias. Children are conditioned to think of certain traits as being masculine or feminine. Girls and boys are expected to play different games and to pursue different interests and hobbies. Gender stereotypes are reinforced at home, in school, and through the media. When household personal computers first became available in the market, for example, they were targeted toward boys with a "techie culture" narrative. Not having an early introduction to computer skills put girls at a disadvantage.

"A girl child faces so many questions growing up. Be it teachers, mentors, family, even peers—nobody gives you enough confidence. This deters women from taking up STEM."

Ramyani Basu, Kearney partner and UK lead for the Digital Transformation Practice

Ingrained cultural predispositions clearly alter women's choices as they chart their paths through university and career. While up to 74 percent of middle school girls express interest in STEM (science, technology, engineering, and mathematics)-related topics, only 0.4 percent of high school girls end up pursuing STEM degrees, suggesting these are the years when women interested in STEM feel most deterred. The proportion of females in STEM studies is lowest in South and West Asia at almost 19 percent, while Central Asia has the highest proportion at 47 percent, followed by South America and the Caribbean at 44.3 percent.

Women who do enroll in university STEM programs often face a lack of encouragement and may be made to feel intrinsically inferior in a male-dominated academic arena. This can discourage even those who overcame earlier psychological dissuasion from pursuing careers in STEM fields, as they logically expect a similar culture will prevail in a STEM-defined workplace.

Women who persevere to enter STEM careers may subsequently find themselves viewed as "masculine" and "not nice to work for" when they negotiate for higher salaries, prioritize career over having children, or make other choices that are often not only tolerated but also expected from their male peers. By comparison, women are implicitly expected to make "softer" personal and professional choices. This bias is prevalent in society at large, among both men and women, and can be traced back to the early stages of human evolution, when women were considered caregivers while men were viewed as providers and protectors.

This ancient bias carries a modern-day price. A study by HBR reveals that women with eight years' coding experience show the same level of confidence as men having just one year's experience. A study using Implicit Association Tests (IATs) across 3,618 participants (male and female) from 78 countries found that five out of six traits associated with brilliance were attributed to men more than women.

Data science, a distinct STEM subculture, is often overtly non-inclusive of women, which compounds the broader societal obstacles that discourage females who might otherwise be very successful data scientists. This in turn results in a lack of female role models, a scenario that suggests we're caught in a vicious circle.

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> **"Women have great analytical capabilities, even if the world doesn't see it that way. We need to open more doors for women."**
>
> **Katherine Black, partner in Kearney's Consumer and Retail Practice**

Simple steps

To break free, we must fully accept that we're all subconsciously shaped by gender bias (which we instinctively resist, despite all the objective evidence to the contrary), so we can decisively act to counter its corrosive effects.

Most of the required steps are relatively simple. For example, girls should be actively encouraged to pursue their areas of interest and be introduced to all fields of study, irrespective of parents' or educators' presumptions. Primary and secondary educational institutions could offer gender bias awareness programs to parents and educators to help them understand cultural conditioning from a more conscious and objective perspective. Organizations might also conduct tests such as the IAT to sensitize both men and women to their subconscious and conscious biases and how those presumptions affect their decisions—from the nurturing guidance they offer young children through how they recruit, evaluate, and reward talent. These small corrective steps, widely applied, could have tremendous positive effect.

Authentic image

Students are often introduced to data science in theoretical terms that lack a practical base and fail to convey what a powerful force data science is in the real world. It's all too easy for young, inquisitive minds to equate a career in data science with a dreary existence of writing code. This perception is reinforced by the image data science typically projects—for example, by promoting hackathons, which represent just a slice of what data scientists actually do.

Corporations can coordinate with educational institutions to paint a much fuller, more textured, and more authentic image of data science. For example, they can highlight the varied career paths available within data science (such as data science consultant, data engineer, data analyst), while shedding light on the diverse experiences each path might offer. Most large organizations have women inclusion groups. Engaging female students through such channels would bring them into the business world before they graduate, create mentorship opportunities, and open more tangible paths into a data science career.

> **"We can't ignore half the world's genetics. The barriers around women in data science need to be shattered if we're to create more impactful technology."**
>
> **Suketu Gandhi, Kearney partner and global product leader, Digital Supply Chain**

Real work

At the same time, students would benefit from an altered course approach that places greater emphasis on real-time project work. Currently, relatively few institutions offer recognized and quality data science courses, which means many students have to learn through online courses. Although the latter may be taught by established experts in the field, they cannot wholly compensate for the absence of hands-on, face-to-face learning. This affects both men and women, but women may be seen to suffer the greater loss due to the compounding effect of other factors, described above.

A logical extension of this thinking is to actively expand internship opportunities, particularly for female students. Internships help students to directly experience the integral business value of data science instead of viewing it abstractly as a stand-alone technical field. They also allow organizations to get an early peek into talent they may want to recruit.

Game changer

Companies understandably favor candidates who already have the basic technical skills needed for the job, which is customarily evidenced by a degree in data science or some other STEM discipline. However, this filtering process drastically reduces the scope of potential recruits, particularly the already limited number of female applicants.

> **"I believe in disproportionately pushing for women. I urge hiring managers to find women who fit the role. They're out there. We need to work harder to recruit them."**
>
> **Ramyani Basu, Kearney partner and UK lead for the Digital Transformation Practice**

Doing away with a technical filter to instead testing whether candidates have the aptitude, ability, and right mindset—irrespective of degree—could be a game changer for attracting more qualified women to data science.

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Perfect match

, and we need women to play a much bigger part in shaping the future of the field. In many ways, this is a perfect match. Data science needs women's skills, insights, and perspectives. And data science careers often allow for flexibility in working style, which should appeal to women at all stages of life, including those who want to split their focus equally between home and profession.

The obstacles before us are deep-rooted, but far from insurmountable. The rising popularity and immeasurable importance of data science will energize our efforts to change the rules of the game. The results will benefit not only women, but all of data science, and society at large.

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