Book summary: "Invisible Women: Exposing Data Bias in a World Designed for Men"

By Caroline Criado Perez

In *Invisible Women: Exposing Data Bias in a World Designed for Men*, author Caroline Criado Perez argues that many of the products and services that are used by everyone, have inadvertently been designed with male biases to the detriment of female users of those products and services. The book has won wide praise (including the Financial Times and McKinsey Business Book of the Year Award for 2019) and provoked controversy.

Criado Perez illuminates numerous hidden ways in which women have been forgotten, from public policy and the workplace to medical research and product design – and the stark implications. The book provides a compelling argument for more data to be collected on how different groups use products and services, and for increased female representation in leadership: "Women simply don't forget that women exist as easily as men often seem to."

Through a collection of wide-ranging examples, she makes the case that the world continues to be built for the "average man" – that is, a 70kg white male with a stay-at-home wife. This construct of the "average man" as the "default human" in society means that women's needs are routinely being ignored and underrepresented. The consequences of this range from annoying inconvenience (for example, bulky smart phones that don't fit in women's hands or bullet proof vests not designed to accommodate breasts) to life-threatening (for example, higher female mortality rates from car crashes and misdiagnosis of medical conditions).

Criado Perez argues that women are not being deliberately excluded from design and research, but instead are 'invisible' because men continue to be a dominant influence in government, business and our wider culture: "Male bias just looks like common sense to them."

The solution is for companies and governments to collect more sex disaggregated data to understand the different ways that men and women use and respond to products and services. She argues that this will help organisations better serve the needs of everyone.

The best way to understand Criado Perez's thesis is through the many examples she cites in the book. Below we have picked out some of the most striking case studies:

The life threatening

Crash test dummies: When a woman is involved in a car crash she is 47% more likely to be seriously injured and 17% more likely to die than a man. This is because of the widespread use of "average male" crash test dummies – in the US, car manufacturers only started using "average female" crash test dummies in 2011. Differences in women's bodies, particularly their height, mean they typically sit in different driving positions to men, usually closer to the steering wheel and higher up. These driving positions are considered to be "non-standard" and are not tested for in the EU (except for in passenger seats), which means that car manufacturers have no incentive (or understanding of how) to make cars safer for female drivers.

Snow ploughing: The local authority of Karlskoga in Sweden traditionally cleared snow from major roads before tackling smaller local streets. In 2011, the town asked researchers to start collecting data about male and female travelling patterns. They found that women were more likely to walk, often with pushchairs, through the thick snow, and conducted more errands on smaller side streets, such as picking up and dropping off children at school. Men were more likely to drive along major roads, most often to and from work. The researchers also found that travelling on foot was typically more

dangerous than driving on major roads through a few inches of snow. So the city then started clearing snow from pavements and side roads before the big roads – leading to a decrease in hospital admissions from falls in the snow, particularly among women.

Heart attacks: Women in the UK are 50% more likely to be misdiagnosed following a heart attack and more likely to die during a heart attack than men. A key reason is that women often don't have chest or left arm pain – typical symptoms of a "Hollywood" male heart attack. Women are more likely to have stomach pain, breathlessness, nausea or fatigue. Doctors often don't recognise these as symptoms because they do not fit the typical male heart attack pattern and don't feature on some NHS guidelines. The British Heart foundation estimates that 8,000 women in England and Wales have died from heart attacks in the last 10 years because they did not receive the same standards of care as men.

Drugs testing: Women make up just 22% of stage one medical trials despite drugs having a very different effect on male and female bodies. In a study of "female Viagra" released in 2015, the manufacturer recruited 23 men and two women for the trial and did not sex disaggregate the data. Some researchers even argue against including women in trials believing that female bodies are not different to men but can be "too variable" due to changing hormone levels throughout their menstrual cycles.

The annoying

The size of pianos and iPhones: Many consumer products that are supposedly gender neutral are designed around the size of the average male hand, making them difficult for women to use. The average piano keyboard is about 1.2 metres long, which is more challenging for people with smaller hands, particularly women. One study found that the standard size keyboard disadvantages 87% of female pianists (a smaller 7/8ths keyboard, which eliminates this large hand bias, has been designed but has yet to be widely adopted). Similarly, many modern smart phones are too large for women to comfortably hold and take photos on using one hand.

With serious consequences for women in the workplace

Pensions: Pensions in the UK are calculated based on the number of years an individual has made national insurance contributions, but this fails to take in to account the years many women spend out of the labour force, for instance on maternity leave or caring for elderly parents. Criado Perez argues that this has happened because of a data gap, with unpaid labour not recognised in official government statistics.

Childcare at work: Criado Perez argues that women are disadvantaged by workplaces that are designed for the "mythical unencumbered worker", effectively a man who has a stay-at-home wife, and does not need to cook, clean, care for children or family. When Apple opened its US headquarters in 2017 it called it the "best office building in the world". But the best for who? The office had a doctor's surgery, a dentist, a wellness centre but no childcare facilities. And, if an employee attends an evening event or travels for work, they are likely to be allowed to expense food or a hotel, but again not childcare. Why is a meal an allowable expense but not a babysitter?

Hiring algorithms: Use of predictive tools and algorithms in recruitment have become a common way for companies to screen candidates. Yet many of the databases that algorithms learn from are riddled with biases. For example, online tech recruitment platform Gild predicted that users of a particular Japanese manga site would likely be better coders and awarded them a higher rank or score on their recruitment database. Is this a good predictor of coding abilities or simply reinforcing the fact that most of the individuals on this database are male?