

PB25 - Statistics and methodology: gender and science¹

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This policy brief provides evidence-based, concrete recommendations for national level policy makers and institutional science leaders on how to conceive, produce and disseminate gender statistics in Science, Technology and Innovation.

Why is this important?

Producing gender statistics is important as a means to reflect the realities of the lives of women and men relating to gender equality in a given society². Gender statistics are important because they make visible disparities for example in the distribution of resources or access to power – often countering wide spread bias and stereotypical beliefs that underestimate existing discrimination. In the launch in 2002 of the EU Report on “National policies on women and science in Europe: A report about women and science in 30 countries”, by Teresa Rees, Hilary Rose famously said “No statistics, no problem, no policy. Statistics help identify problems and can monitor the effectiveness of remedies”³. The ability to document gender hierarchies in numbers provides evidence of inequalities and thus helps to promote change, formulate and prioritise policies and evaluate the results of the interventions. As such, it relates to all fields of statistics and the increasing proliferation of all forms of data. In developing more gender-aware statistics, the work of the Helsinki Group on Gender in Research and Innovation, comprising experts on gender and statistics in science, is central⁴.

There are some areas of inquiry related to gender and science that definitely require good quality statistics and indicators. An obvious one is pay. The gender pay gap persists in science, as elsewhere, and is remarkably slow to change. To study this, you need reliable statistics. Another area where statistics are essential is monitoring what actually happens in recruitment, appointments and promotions. This is partly about who is appointed at the end of the recruitment process, but it is also about the question of who applies, how do people hear of jobs, who is shortlisted, who does that shortlisting, who is interviewed and by whom, who is offered jobs, who accepts, and then of course on what conditions, and with what pay. To keep track of this, science organisations need to have monitoring systems, at different organisational levels.

There are many further, more specific areas where gender and statistics are important and are becoming more so. One is the use of bibliometrics in evaluations, of individuals, research groups, even whole universities. These kinds of statistics have a very uneven usefulness. They may be more indicative of quality and impact in some disciplines, especially STEM, natural science and medicine, and far less in humanities and social sciences. Using one set of metrics in isolation, such as Web of Science, Scopus, Google Scholar, is very dangerous indeed. This is not least because some metrics focus only or mainly on journals to the neglect of chapters and books, and also have limited coverage of some

disciplines, including those where women are well represented. The study of these metrics, their reliability across disciplines, and their gendering and frequent gender bias, has become a specialist area of scientific research in itself.

What is the extent of the problem?

Despite the importance of gender statistics for social justice concerns, several problematic issues have been highlighted. These concern not only the persistent lack of data, the continuing confusion of “sex” and “gender”, but also the production and consumption of statistical “evidence” itself⁵.

First, collecting gender statistics goes beyond disaggregating data by sex. Even though important in its own right and still often lacking⁶, measuring social reality by producing gender statistics is a more complex process. It involves discerning and understanding gender issues in society, the formulation of corresponding indicators, the methods for data collection and finally analysis and dissemination. Engendering statistics implies to be aware that each of these steps can be subject to gender bias perpetuating equally biased results.⁷

Second, since statistical measures condense large amounts of information into single numbers, producers and consumers alike have to make an effort to recognise the multi-layered and complex nature of gender and gender equality behind the data. These kinds of debates on gender and statistics can be located in relation to basic questions on the nature of social categories, and how categories including gender categories intersect with others. Gender statistics often only deal with women and men, girls and boys, and often do not deal well with further gender positions, such as transgender, intersex, non-binary, and queer, with sexualities, or with intersections with other social divisions, such as age, class, and ethnicity.⁸ What is more, since quantitative indices are taken for granted to represent “reality” truthfully, these simplified, numeric accounts are taken as clear cut “evidence” and objective reality blending out their constructed nature.

A third problematic aspect concerns the emerging forms of governance connected to statistical data. This refers mainly to the comparative use of indices in benchmarking exercises carried out for example in country rankings of Gender Equality Policies⁹. Benchmarking however de-politicises gender equality agendas by “translating political problems of collective action into statistical issues of quantification”, embedded in a matrix of competitiveness and efficiency that lose track of the complex and contested nature of social injustice¹⁰.

What are the options?

Producing gender statistics is an ongoing process. Tools and indices need to be revised for bias and adapted to the changing social realities affecting women and men. She Figures, for example, has expanded throughout its consecutive editions from data on horizontal and vertical segregation towards discrepancies in scientific productivity and the incorporation of gender into research content. Improved methodologies have been devised – such as the time use surveys – to measure traditionally “hard to capture” areas of non-remunerated work and gendered resource distributions¹¹.

On the institutional level, several tools have been developed to monitor gender equality more precisely and effectively. For example the Data Monitoring Template by the FP7 INTEGER project¹² facilitates the repeated collection of sex-disaggregated data on the representation of women and men in different staff categories and decision-making bodies in the organisation. It is embedded into a whole set of self-assessment tools that steer practitioners through the process of data production and usage for gender equality in academic institutions. The Athena Swan Charter programme in the UK has developed a list of measurements needed when developing gender equality plans (<http://www.ecu.ac.uk/equality-charters/athena-swan/>)

On the national level, rich experiences are available from development work on how to setup or reform national statistical systems¹³. Most importantly, as the experiences in Sweden, India, Nepal or Chile demonstrate, a continuous dialog with civil society organisations and interest groups is essential for defining gender issues, developing the adequate indicators and understanding how gender equality intersects with various other issues of social justice¹⁴.

Recommendations

- Make relevant selected indicators by verifying they are up-to-date from a content/ policy perspective¹⁵
- Ensure comparability of data collection by aligning reporting systems and classifications used with existing official classifications, manuals and international standards¹⁶
- Acknowledge that disaggregated data by “sex” - although still dearly needed in many cases - is not enough to produce gender statistics
- Involve gender experts and collective efforts to define the changing realities of “gender issues” to engender statistics.

*Further Reading & Resources*¹⁷

There are many kinds of resources to be considered. Let's start with those at a very general contextual level. These, amongst others, provide broad gendered societal statistics and more focused gendered statistics on education, science, technology and related fields, for example horizontal occupational and disciplinary distributions, and vertical, hierarchical distributions, by gender. Key institutions here are the United Nations Statistics Division, and UNDP, UNECE, FAO, ILO, and the World Bank, both in general and in relation to 'women and science'.

Then of course there are the various sources from the EU member states and the EC¹⁸.

One of many EC reports that addresses this in terms of research funding is The Gender Challenge in Research Funding. Two further major particular EU resources need to be mentioned here.

First, there is the work of EIGE, and its 'Gender Statistics Database' and 'Gender Equality Index'¹⁹.

The second is the She Figures reports which summarise the state of gender distributions in science. The She Figures have been a spur to national comparisons. There is, perhaps unsurprisingly, very great variation in the extent national authorities have given full attention to gender statistics in science, technology and innovation²⁰.

In addition, it is important to note the resources available at country level in Europe. A good example here is the Norwegian web site kifinfo.no²¹.

Outside Europe, useful sources are: Gender differences in science, technology, engineering, mathematics and computer science (STEM) programs at university, by Darcy Hango²², produced from Statistics Canada in 2013; and Gender Differences in Science, Technology, Engineering, and Mathematics (STEM) Interest, Credits Earned, and NAEP Performance in the 12th Grade, published by the US National Center for Education Statistics in 2015²³.

Historical lack of attention to gender statistics means that important gender indicators are missing from the UN SDG Index²⁴, and from the Lancet Countdown on Health and Climate change²⁵.

Engendering Statistics and Critical Approaches

Useful sources here are: Birgitta Hedman, Francesca Perucci, & Pehr Sundström (1996). *Engendering Statistics: A tool for change*. Stockholm: Statistics Sweden²⁶; Westbrook, L., & Saperstein, A. (2015) *New Categories Are Not Enough: Rethinking the Measurement of Sex and Gender in Social Surveys*. *Gender & Society*, Vol. 29, No. 4, 534–560²⁷; Bruno, I. (2009). The “Indefinite Discipline” of Competitiveness Benchmarking as a Neoliberal Technology of Government. *Minerva*, Vol. 47, No. 3, 261–280²⁸; and Merry, S. E. (2016). *The Seductions of Quantification. Measuring Human Rights, Gender Violence, and Sex Trafficking*. Chicago; London: The University of Chicago Press²⁹.

Bibliometrics

Useful sources here include: Cameron, Elissa Z., White, Angela M., & Gray, Meeghan E. (2013). Equal Opportunity Metrics Should Benefit All Researchers. *Trends in Ecology & Evolution*, Vol. 28, No. 1, 7-8³⁰; Maliniak, Daniel, Powers, Ryan M., and Walter, Barbara F. (2013). The Gender Citation Gap in International Relations International Organization, Vol. 67, No. 4, 889-922³¹. and Sabaratnam, Meera, and Kirby, Paul, and 200 signatories (2014). *Why Metrics Cannot Measure Research Quality: A Response to the HEFCE Consultation*³².

- [1] This Policy Brief builds on the work of a blogpost written for GenPORT by Jeff Hearn, please see the original blogpost with active links to resources here: <http://www.genderportal.eu/blog/gender-sti-and-statistics>
- [2] United Nations, Economic Commission for Europe (UNECE). (2010). Developing gender statistics: a practical tool. Geneva, UNECE; World Bank Institute. p.7
- [3] See <http://www.genderportal.eu/resources/national-policies-women-and-science-europe-report-about-women-science-30-countries>
- [4] See http://ec.europa.eu/research/swafs/pdf/pub_gender_equality/new_mandate_helsinki_group_FIN_25%2004%202013.pdf#view=fit&pagemode=none
- [5] Please see the bibliometrics section of Further Reading and Resources for useful sources of information.
- [6] In addition, monitoring progress is challenged by a severe lack of comparable data of high quality. Many countries are still not producing regular statistics that are of critical importance for gender equality such as time use, asset ownership, women's participation in decision-making at all levels, or data on gender-based violence and poverty". See Debusscher, P. (2015). Evaluation of the Beijing Platform for Action +20 and the opportunities for achieving gender equality and the empowerment of women in the post - 2015 development agenda. Brussels.
- [7] Hedman, B., Perucci, F., & Sundström, P. (1996). Engendering Statistics. A Tool for Change. Stockholm, Statistics Sweden.
- [8] Westbrook, L., & Saperstein, A. (2015). New Categories Are Not Enough: Rethinking the Measurement of Sex and Gender in Social Surveys. *Gender & Society*, Vol. 29, No. 4, pp. 534–560.
- [9] European Commission, (2008b). Benchmarking policy measures for gender equality in science. Science. Luxembourg, Office for Official Publications of the European Communities.
- [10] Bruno, I. (2009). The "Indefinite Discipline" of Competitiveness Benchmarking as a Neoliberal Technology of Government. *Minerva*, Vol. 47, No. 3, pp. 261–280
- [11] United Nations, Economic Commission for Europe (UNECE). (2010). Developing gender statistics: a practical tool. Geneva, UNECE; World Bank Institute, p.33
- [12] See <http://www.genderportal.eu/resources/integer-toolbox>
- [13] Hedman, B., Perucci, F., & Sundström, P. (1996). Engendering Statistics. A Tool for Change. Stockholm, Statistics Sweden.p.34
- [14] Liebowitz, D. J., & Zwingel, S. (2014). Gender Equality Oversimplified: Using CEDAW to Counter the Measurement Obsession. *International Studies Review*, Vol.16, No. 3 pp. 362–389.
- [15] European Commission, (2015b). She Figures, 2015, Handbook, Luxembourg, Publications Office of the European Union, p116.
- [16] Ibid.
- [17] For a wide range of resources on Gender and
For example see http://ec.europa.eu/eurostat/statistics-explained/index.php/Gender_statistics
- [18] European Commission, (2009) The Gender Challenge in Research Funding: Assessing the European National Scenes, Luxembourg, Office for Official Publications of the European Communities. See https://ec.europa.eu/research/swafs/pdf/pub_gender_equality/gender-challenge-in-research-funding_en.pdf
- [19] <http://eige.europa.eu/gender-statistics/gender-equality-index>
- [20] For the latest edition of She Figures see: European Commission, (2016). She Figures, 2015: Gender in Research and Innovation, Statistics and Indicators, Luxembourg, Publications Office of the European Union. Available at: <http://bit.ly/1P8V5T4>
- [21] <http://eng.kifinfo.no/c62415/seksjon.html?tid=62420>
- [22] Please see: <http://www.statcan.gc.ca/pub/75-006-x/2013001/article/11874-eng.htm>
- [23] Please see: <https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2015075>
- [24] Please see: <https://sustainabledevelopment.un.org/index.php?menu=1300>
- [25] Please see: [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(16\)32124-9/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(16)32124-9/fulltext)
- [26] Please see: http://www.scb.se/statistik/_publikationer/le0202_1996a01_br_x930p9601.pdf
- [27] Please see: <https://sociology.stanford.edu/publications/new-categories-are-not-enough-rethinking-measurement-sex-and-gender-social-surveys>
- [28] Please see: https://www.jstor.org/stable/41821498?seq=1#page_scan_tab_contents
- [29] Please see: <http://press.uchicago.edu/ucp/books/book/chicago/S/bo23044232.html>
- [30] Please see: <http://mfkp.org/INRMM/article/12527520>
- [31] Please see: https://www.wm.edu/offices/itpir/_images/trip/Cambridge-IO-Gender-Gap-in-IR.pdf
- [32] Please see: <https://thedisorderofthings.files.wordpress.com/2014/06/response-to-the-independent-review-of-the-role-of-metrics-in-research-assessment1.pdf>