Tuesday, June 20, 2017 - 09:04

Target

Decision Makers [1]
Government and Public Health [2]

Topic

Gender [3]
Human Rights [4]
Mutual Learning [5]
Policy [6]
Prevention [7]
Stakeholders [8]

Tags

gender [9]
gender issues [10]
science and society [11]
clinical trials [12]
Horizon 2020 [13]
research [14]

Gender is considered a main issue in Horizon 2020, the largest ever EU Research and Innovation programme, with €80 billion worth of funding available over seven years. The European Commission has identified seven priority areas of societal challenges, with the goal targeting investment in research in these fields. They are:

1. Health, demographic change and wellbeing
2. Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy
3. Secure, clean and efficient energy
4. Smart, green and integrated transport
5. Climate action, environment, resource efficiency and raw materials
6. Europe in a changing world - inclusive, innovative and reflective societies
7. Secure societies - protecting freedom and security of Europe and its citizens.

Gender is relevant across all the seven challenges, and has been mainstreamed into each of the different parts of the work programme. In support of gender integration in Horizon 2020, the European Commission have published a paper to highlight the applicability to gender integration in all of the Societal Challenge areas, and the benefits it will have on research and innovation. We took a look at this document, to see what this means in practice for research and innovation and general, and the issues of the ASSET project in particular.

Rationalisation for gender integration

There are three main objectives with Horizon 2020 gender equality activities:

- Fostering gender balance in Horizon 2020 research teams
- Ensuring gender balance in decision-making
- Integrating gender/sex analysis in research and innovation content

While the first two objectives are more concerned with ensuring that there is an equal gender representation at all levels, the third goal is focused on gender within the research. Gender integration, in other words, is not about the gender composition of decision makers or the research team, but rather about including gender in the research itself.

Gender in research

Including gender in research is obvious in many areas ? for example, while researching issues around domestic violence, or poverty in single parenting households. However, there are very few, if any, areas of research where gender is not relevant, even in ?hard science? areas.

In the area of Smart, green and integrated transport, the issue of transport safety has a strong gender component. The document cites the fact that in consumer and legal evaluations of transport safety, the average male respondents have represented the whole population. If this were corrected to also include females, data would now show a more accurate picture of transport safety, and not continue to portray a situation where only males use transport. Another example is statistics - gender tends to be divided up in very simplistic categories in transport data and statistics, mainly only binary female/male categories. However, this creates data that lacks more specific information in terms of age, class, ethnicity, disability, sexuality, and so on. Using these two examples, it is clear that in both transport safety and transport statistics, there is room for much improvement.

Another area that at first glance does not seem to have any room for gender integration is the Internet of Things ? the connectivity between virtual objects and humans. Designing these smart devices, a part of information and communications technology that can greatly improve the lives of people, needs to include the gender differences of people that will use them and the effects they will have on the everyday lives of people. For

instance, the paper uses the example of a project designed to help older people by providing mobile emergency assistance. It was designed with adherence to the body of the user, however only a male user was kept in mind ? men predominantly carry things in pockets, and the female preference of carrying devices in bags was overlooked. This might seem to be a trivial issue, but if the objective is to create a device that will actually be used, such issues must be kept in mind.

In societal challenge 5, Climate action, environment, resource efficiency and raw materials, there is also a gender dimension. Research on climate action generally tries to understand how societies are impacted by major climate events ? and reactions to disasters have been shown to be gendered, as are migration behaviours and poverty. Also, daily activities affected by climate change, such as hunting, fishing, and agriculture, also have a strong gendered element. In research trying to find nature-based solutions to Nature-based solutions, such as urban issues and urban spaces, which would seem to be fairly sexless, are actually very gendered.

In researching specifically urban issues, the population inhabiting any space is taken into account. Poverty, a main issue in such research, is highly gendered as the risk of poverty is significantly higher among single parents, who tend overwhelmingly to be women.

Gender integration in health research

Societal challenge 1, Health, demographic change, and wellbeing, is the most relevant in terms of ASSET. It would come as no major surprise that there exists a gendered dimension within health research, however this dimension is not only social but also biological. Both sex differences and gender aspects jointly determine the eventual health outcome of an individual. In terms of sex differences, these biological determinants are well documented but not widely researched or understood, as we have seen in the continued lack of research into what constitutes a

sufficient dose of influenza vaccination for women.

Including sex in research will lead to more efficient and targeted approaches for the individual patient, as sex determines cellular pathophysiology and the connection between the organism with the environment. Also, sex and gender determine stress responses of isolated cells, meaning that coping strategies of women and men, which tend to be different, should be included in all research.

Chronic diseases and gender integration

The fact that there is often a difference between women and men in how they react to the same illness is slowly becoming more well known. For many of the major chronic diseases, such as cardiovascular disease, heart failure, and diabetes, the manifestations are different ? for example in heart attacks, women tend to have symptoms that differ greatly from men. These symptoms are nevertheless classified as ?unusual?, as they differ from that of men (EIWH 2014).

This is not down to any form of active discrimination, but simply the fact that most research is done on men. Extrapolating research findings from studies involving primarily men on women is not suitable, and health professionals are left assuming that interventions and medication that have a certain effect on males will have similar effect on women, which is not always the case. More targeted and therefore more efficient treatment strategies for such chronic diseases will improve disease prevention and healthy life expectancy.

In terms of chronic diseases, lifestyle factors are often an influence on the development of disease. Lifestyle factors are influenced by gender norms, which determine differences in diet, nutrition and exercise patterns between women and men. By adopting gender-sensitive approaches in research, and integrating how sex and gender influence risk factors for chronic diseases, public health policies can be made much more effective and

interventions can save both lives and money.

Data collection and clinical trials and gender integration

Collection of data is also an issue, as data for understanding disease pathways and for identification of risk factors should be conducted in a sex and gender sensitive manner. As an example, the Horizon 2020 document cites GWAS, the genome-wide association study, where inclusion of women is low and sex chromosomes are frequently excluded from the analysis. Also, data collection in basic and preclinical research should take sex differences into account. For example, the National Institute of Health (NIH) in the U.S. decided in 2014 to address the over-reliance on male cells and animals in pre-clinical research. They did this as translating male sex-biased preclinical research to improvements in human health could result in adverse consequences for women?s health. In this initiative, the NIH also committed to educating scientists on connects of sex and gender, and various ways to implement those concepts into the design of preclinical research. Another aim was to increase the use of female cells and animals in preclinical studies to expand the pool of data derived from females (McCullough et al 2014).

Some argue that while sex differences in biology exist, most drugs are similarly effective in both sexes, and physiological and pharmacological mechanisms are shared between women and men. Conducting experiments on both men and women therefore result in unnecessary duplication of data and add limited knowledge, and doubling cells and animals to include both male and female will increase costs and slow down progress due to the added workload. Nevertheless, the NIH argue that it is necessary to understand the physiology and pathophysiology of females in the same details as that of men, to avoid situations where a drug has to be withdrawn from the market due to adverse side effects in women. Drugs that are apparently efficient in both

males and females may not be using the same mechanisms, or perhaps the dosage of the drug should not be the same for women. Therefore, the risk of not studying women in equal measure to men is too much of a gamble (McCullough et al 2014).

Conclusion

The Horizon 2020 document contains many more examples of where a gendered dimension in research is overwhelmingly beneficial. Including gender as a key category is crucial for addressing societal challenges in Europe ? these challenges must be met in an intersectional way in order to build inclusive, innovative and reflective societies. ASSET?s focus on Science in Society and Mutual Learning and Mobilisation goes a long way to address these challenges in respect of pandemics/epidemics and vaccination, and the inclusion of gender issues as a cornerstone in ASSET ensures that problems long ignored will be addressed.

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ASSET

Action plan on **S**cience in **S**ociety related issues in **E**pidemics and **T**otal pandemics
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Links
[1] https://www.asset-scienceinsociety.eu/target/decision-makers
[2] https://www.asset-scienceinsociety.eu/target/government-and-public-health
[3] https://www.asset-scienceinsociety.eu/topic/gender
[4] https://www.asset-scienceinsociety.eu/topic/human-rights
[5] https://www.asset-scienceinsociety.eu/topic/mutual-learning
[6] https://www.asset-scienceinsociety.eu/topic/policy
[7] https://www.asset-scienceinsociety.eu/topic/prevention
[8] https://www.asset-scienceinsociety.eu/topic/stakeholders
[9] https://www.asset-scienceinsociety.eu/tags/gender
[10] https://www.asset-scienceinsociety.eu/tags/gender-issues
[11] https://www.asset-scienceinsociety.eu/tags/science-and-society
[12] https://www.asset-scienceinsociety.eu/tags/clinical-trials
[13] https://www.asset-scienceinsociety.eu/tags/horizon-2020
[14] https://www.asset-scienceinsociety.eu/tags/research