

# WHERE IS GENDER? A MISSING VARIABLE IN SCIENTIFIC RESEARCH

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## Abstract

Gender Equality in science and research has become increasingly relevant within the European Union (EU) and within the European Research Area (ERA). In recent years, significant efforts have been made to achieve the three objectives set by the ERA on gender equality: increasing gender balance in research teams, increasing gender balance in decision-making, and strengthening the gender dimension in research. The work that has been performed at EU level and across ERA countries has brought some improvements, but the objective of strengthening the gender dimension in research has received little attention in several countries and, overall, the number of publications that incorporate the gender dimension remains low (EC 2019). In some countries, such as Portugal, gender in/equality continues to be seen (and handled) as an issue of (under)representation of women in research; the gender dimension in research seems thus to be side-lined. This work, carried out as part of an international H2020 funded research project (CHANGE – CHalleNging Gender (In)Equality in science and research), seeks to bring this issue to the centre of the debate. Through a comparative perspective, this study aims to explore, characterise and analyse, how a Portuguese university (University of Aveiro – UAVR) has been involving the gender perspective in their research outputs since its foundation. In order to achieve the purpose of the research, the annual percentage of SCOPUS publications incorporating a gender perspective in the UAVR (i.e. publications which have gender, women or sex in the title, abstract or keywords) is determined and its evolution along the last decades analysed. The analysis reveals that in each year analysed, the percentage of UAVR SCOPUS publications with a gender focus is always below 3.5% before 2021. The first UAVR publication that meets the requirements of our SCOPUS database search appeared in the year 2000 and – as with most Portuguese public HEIs analysed in the framework of this study – progress in recent years has been slow and oscillates between advancements and setbacks. Between 2000 and 2019, the percentage of UAVR SCOPUS publications incorporating the gender dimension increased only two percentage points approximately. Taking that Gender Equality is one of the 17 Sustainable Development Goals, universities and academics need to reflect on the need to increase the integration of the gender perspective in research.

Keywords: European Research Area, Gender dimension, Higher Education Institutions, Portugal, Research.

## 1 INTRODUCTION

In recent years, the integration of the gender dimension in research has received increasing attention from the European Commission, the European Research Area (ERA), researchers and from various research funding agencies and institutions.

The European Commission, a pioneer and global leader in integrating gender into Research & Innovation (R&I) content [1 p36], has set this dimension as a priority in the framework of Horizon 2020. The ERA has also defined 'gender equality and gender mainstreaming in research' as one of its six main areas [5]. The efforts and measures adopted and recommended by these institutions seem to help to encourage researchers to include the gender dimension in their proposals/projects and progress seems to be underway. According to a European Commission Report [1 p36]:

“The proportion of ‘gender-flagged’ topics – i.e. topics that explicitly require sex and/ or gender analysis in funded projects – has increased in every successive work programme, expanding from 16.1 % of topics in 2014–2015 to 36.4 % in the 2020 work programme”.

However, as in other areas related to gender in/equality [3] [4] [13], progress is slow and difficult despite the advantages it brings as will be seen in detail in the next section. According to the European Commission, the execution of the policy of integrating the gender perspective in research “has been lagging” and “[t]he interim evaluation of gender as a cross-cutting issue revealed that fewer than expected research proposals funded under gender-flagged topics successfully incorporated sex and gender analysis” [1 p36].

It is in this context that the strengthening of the integration of the gender dimension into R&I emerges as one of the gender equality priorities set in the new European Union funding framework, the Horizon Europe.

In some countries, like Portugal, gender in/equality continues to be seen (and handled) as an issue of (under)representation of women in research; the gender dimension in research seems thus to be sidelined [5]. This work, carried out as part of an international H2020 funded research project (CHANGE – CHallenging Gender (In)Equality in science and research) [6] [7] [12], seeks to bring this issue to the centre of the debate. Accordingly, through a comparative perspective, this study aims to explore, characterise and analyse how a Portuguese university (University of Aveiro – UAVR) has been involving the gender perspective in their research outputs in the last decades. In order to achieve the purpose of the research, an essentially quantitative forum approach is used to determine the annual percentage of SCOPUS publications incorporating a gender perspective in the UAVR (i.e. publications which have gender, women or sex in the title, abstract or keywords). Furthermore, the analysis of this evolution is deepened by a comparative analysis between UAVR and the other Portuguese public universities in the last decades (considering the whole period since the first SCOPUS publication of each university).

The work is structured as follows: the next section (2) is dedicated to the theoretical framework integrating the gender dimension in research and aims to clarify the concept, to explore its advantages and identify some examples in different fields. Section 3 presents the methodology and data (from the UAVR and other Portuguese public universities) followed by the analysis and discussion of the results in section 4. Finally, a brief conclusion of data analysis and discussion is presented.

## **2 INTEGRATION OF THE GENDER DIMENSION IN RESEARCH**

### **2.1 The relevance of gender in research**

Notwithstanding the debate around the 'gender' concept – not only in general terms [11], but also in research settings [2] –, taking into account the gender dimension in scientific research implies to ensure that the sex (i.e. biological characteristics) as well as the gender (i.e. the social and cultural features, behaviours and needs of both women and men) are taken into consideration [1 p5]. In fact, sex and gender play an important role in research in multiple ways, even when its significance is not easily and/or immediately perceptible [2]. Thus, a gender dimension in research is present when gender and/or sex “are part of the research design and systematically controlled for throughout the research process”, even without necessarily being the principal focus of the study [2 p12]. In addition – and generally speaking – it can be said that:

“integrating the gender dimension involves questioning gender norms and stereotypes and investigating both genders’ needs, attitudes and behaviours. It enhances the societal relevance of the knowledge, technologies and innovations produced (European Commission 2014-2020)” [2 p13]

In this context, the integration of the gender dimension in academic research is a way to ‘tackle’ the androcentric approach that has dominated the academy throughout history and that tends to invariably take man as a normative reference. It should therefore be stressed that the inclusion of the sex/gender dimension in research is not the same thing as the gender balance in research groups, i.e., it is not equivalent to counting the number of women and men in the work team and it is not just a matter of placing especial emphasis on the differences between men and women [2]. Despite the importance of gender balance in research groups, the inclusion of the sex/gender dimension in research is somewhat different; however, both are relevant and (perhaps) complementary – as we will see later in subsection 2.3.

Another point that should be stressed is that gender perspectives may not always be relevant (or appear not to be) and, furthermore, they “may involve different theoretical and methodological approaches” [2 p54]. At the EU-28, they have been integrated mainly in the medical and social

sciences and in interdisciplinary research [8] [2], but research that takes the gender dimension into account is important in practically all fields and it is already present in most scientific disciplines [8]. The advantages/benefits that trigger are diverse and of various order and its importance is starting to be increasingly acknowledged – as evidenced in the next subsection. It should be noted, however, that properly integrating a sex and gender-based analysis into R&I implies bearing in mind not only that gender relations vary according to context, but also that it is crucial to try to adopt an inclusive and intersectional approach that contemplates or considers other social categories or variables such as age, education, income level, geographical position, disability, ethnicity, and so on [2] [1 p5].

## **2.2 Advantages and/or benefits**

Taking into account the gender dimension not only adds value to research in terms of excellence, creativity and business opportunities [1 p8], but it also fosters innovation. In fact, it even strengthens equality, understood in a broader sense, if it ensures that the results, products and programmes apply to all citizens and society as a whole [1 p36]. Consequently, integrating gender and/or sex analysis into research and innovation has (or can have) many positive effects and, according to the European Commission [1 p8], it also:

“[H]elps researchers and innovators question gender norms and stereotypes, and rethink standards and reference models; leads to an in-depth understanding of diverse gender needs, behaviours and attitudes; addresses the diverse needs of citizens of the European Union and thereby enhances the societal relevance of the knowledge, technologies and innovations produced; contributes to the production of goods and services better suited to new markets”.

The adoption of a gender perspective (inclusive and intersecting) improves the societal relevance and quality of research (and also innovation) and thus stimulates the production of excellent research, capable of benefiting all European citizens. But the advantages of adopting this perspective are not exhausted here and integrating sex and gender analysis into R&I is also “crucial to secure Europe’s leadership in science and technology, and to support its inclusive growth” [1 p7].

It can therefore be said that the adoption of a gender perspective in research (inclusive and intersecting) does not only bring benefits/advantages for researchers and innovators, it extends to the whole society and to the various different countries. In fact, gender, as one of several dimensions, can help to improve the quality of research in very diverse fields such as health, agriculture, transport, environment and climate, etc. (see, for example, [1] [2]). As a result, not only it helps to meet the societal challenges identified by the European Commission but it also contributes to the achievement of the UN's Sustainable Development Goals.

## **2.3 Some examples that illustrate the importance of integrating the gender perspective into research**

To inspire researchers, several case studies have been presented to illustrate how the gender dimension can be included in research in very diverse areas - such as health, transport/mobility, agriculture, energy, environment and climate, among others [1] [2].

In relation to health, the importance of adopting a gender perspective in research is increasingly recognized as we can see by the growing number of studies with this preoccupation – related for instance to cardiovascular disease, cancer and osteoporosis, prescription drugs or with chronic pain, among others. For instance, in relation to research on cardiovascular diseases, until the 1990s, it was usual to assume that men and women had the same symptoms of heart attack – as the idea of the male body as the norm predominated, it was assumed that the male heart and the female heart were alike. However, the symptoms of heart attack in female and male often differ, and instead of the typical male symptoms (of chest and left arm pain), women may experience pain differently (in other parts of the body, such as stomach or back, as well as dizziness, nausea, extreme fatigue, dizziness or fainting). Thus, women's symptoms and the “non-specific” (male) symptoms they present tend to be interpreted by doctors as being caused by other problems (namely psychological distress), leading to underdiagnosis of a heart attack in female patients - which has translated into the death of numerous women and/or in receiving the wrong treatment [2 p11]. Drug development has also followed a “one size fits all” model throughout history, with drug tests being carried out mainly on men. One of the consequences of not incorporating a gender perspective in this area is that unwanted and sometimes deadly side effects can affect women more [1 p20].

The relevance of this approach is similar in many other areas, such as urban planning and transport. For instance, transport planning - for both modes of transport and infrastructure - often fails to take account of the diversity of people needs and it is well known that the need for safety may restrict mobility opportunities for specific groups, particularly women [1 p26].

Another area that needs to be highlighted and which has been gaining relevance due to the actual situation is the different impact of the covid-19 pandemic on men and women:

“Although infectious diseases can affect everyone, sex and gender can have an impact on immune responses and the course of the disease in the human body. Biological impacts of the pandemic intersect with broader social and systemic challenges, such as limited healthcare and economic and logistical resources. Current worldwide statistics on COVID-19 show more men than women dying of acute infection, while women are projected to suffer more than men from the health, economic and social consequences of the pandemic in the long term. Innovative solutions beyond health, such as economic re-entry strategies, product development and AI solutions, also need to consider sex and gender.” [1 p34].

As mentioned above, in addition to integrating the gender dimension in research, we believe that gender diversity in teams is also important. This issue is well illustrated by the advances made in the area of birdsong research: for over 150 years scientists have considered that bird song to be a male trait but over the past 20 years, research has shown that both males and females in many bird species sing; the role of women scientists in this recent paradigm shift has been crucial [9].

### **3 METHODOLOGY AND DATA**

One of the most relevant documents in monitoring gender issues in the research and innovation field is the She Figures Report. The She Figures Report, published every three years since 2003, provides a range of indicators on gender equality in R&I at pan-European level [8 p6] [10 p4]. One of the indicators included in the most recent version of this report, from 2019, is precisely the ‘percentage of a country’s publications with a sex or gender dimension in their research content’. According to She Figures in the 2013-2017 period only 1.79 % of all research in the EU-28 included a sex or gender dimension in its research content. In Portugal, for the same period, the percentage was also very low, although slightly higher (1.84%) [8 p176]. However, as far as we have been able to ascertain from this study, the information provided in the report is that the indicator used – ‘percentage of a country’s publications with a sex or gender dimension in their research content’ – was computed by Elsevier using Scopus data (and for this reason we cannot replicate the analysis with the same criteria since there is a lack of clear information on the process used).

Thus, through a comparative perspective, this study intends to deepen and perhaps complement existing work. We seek to explore, characterise and analyse how a specific Portuguese university (University of Aveiro – UAVR) has been involving the gender perspective in their research outputs in since its foundation in 1973. In order to achieve the purpose of the research, the annual percentage of Scopus publications incorporating a gender perspective in the UAVR (i.e. publications which have gender, women or sex in the title, abstract or keywords) is determined and its evolution along the last decades analysed. Therefore, to achieve the study objectives, an essentially quantitative approach is used. We also try to characterise the general Portuguese situation in this field considering data from all the 14 public universities in the country. In the following subsection, the data used in this analysis are presented and discussed. In the first phase the data from the University of Aveiro is presented in order to characterise its progress in this field and its current situation (3.1) and in a second phase the study focuses also on the remaining 13 Portuguese public universities (3.2).

#### **3.1 University of Aveiro data**

In order to explore, characterise and analyse how the UAVR has been involving the gender perspective in their research outputs since its foundation, the annual percentage of Scopus publications incorporating the words ‘gender’, ‘women’ or ‘sex’ in the title, abstract or keywords (in both Portuguese and English) has been determined. The data were extracted on 16 December 2020.

The first UAVR Scopus publication appeared in 1975. Only 25 years later the first Scopus publication with ‘gender perspective’ (i.e. a publication containing ‘gender’, ‘women’ or ‘sex’ in the title, abstract or keywords) appears in 2000. From 2004 on, the number of publications with ‘gender perspective’ starts to increase, with a maximum of 72 publications in 2016. Between 2000 and 2010 there was an

increase of 1,13 percentage points in this 'typology' of publications' and this increase was 1,03 percentage points in the following decade (table 1).

Table 1 - Annual percentage of Scopus publications with 'gender perspective'

Year	Total Scopus publications	N	%
2021	122	5	4,10
2020	2852	71	2,49
2019	2790	67	2,40
2018	2551	68	2,67
2017	2374	56	2,36
2016	2267	72	3,18
2015	2289	38	1,66
2014	2305	38	1,65
2013	2212	42	1,90
2012	1955	25	1,28
2011	1761	27	1,53
2010	1505	22	1,46
2009	1332	28	2,10
2008	1287	10	0,78
2007	1090	5	0,46
2006	1057	2	0,19
2005	881	4	0,45
2004	707	2	0,28
2003	640	-	0
2002	493	-	0
2001	416	-	0
2000	297	1	0,34

### 3.2 Portuguese public universities data

Following the same criteria, we also determined the percentage of Scopus publications that incorporate the "gender dimension" for all Portuguese public universities. All publications featuring/listed in Scopus including the year 2021 were included. Data, extracted on 16 December 2020, are presented in table 2.

Table 2 – Publications listed in Scopus incorporating the 'gender dimension' in each Portuguese public university from 2000 until 2021

	Total Scopus publications	N	%
Universidade de Aveiro	33445	583	1,74
Universidade de Coimbra	44857	2083	4,64
Universidade do Porto	80091	6040	7,54
Universidade do Minho	32662	1206	3,69
Universidade Nova de Lisboa	25982	845	3,25
Universidade da Beira Interior	8586	404	4,71
Universidade de Trás os Montes e Alto Douro	5934	325	5,48
Universidade do Algarve	9794	405	4,14
Universidade dos Açores	2834	128	4,52

Universidade de Évora	6873	237	3,45
ISCTE - Instituto Universitário de Lisboa	16286	1123	6,90
Universidade Aberta	1421	66	4,64
Universidade da Madeira	3451	139	4,03
Universidade de Lisboa	94804	3166	3,34

## 4 RESULTS AND DISCUSSION

The data presented in the previous subsection reveals that in each year analysed, the percentage of UAVR Scopus publications with a gender focus is always below 3.5% before 2021. The first UAVR publication that meets the requirements of our Scopus database search appeared in the year 2000. Progress in recent years has been slow and oscillates between advancements and setbacks. Between 2000 and 2019, the percentage of UAVR Scopus publications incorporating the gender dimension increased by two percentage points, approximately. Although this is a higher value than in She Figures Report [8], it is still a rather low value.

Regarding the results of the various Portuguese public universities, we can see that the national average of publications from Portuguese public universities that include a 'gender perspective' (data until 2021) is 4.43%. The University of Porto and ISCTE - Instituto Universitário de Lisboa have the highest percentage of Scopus publications with 'gender perspective' (7.54% and 6.90% respectively). At the opposite side are the UAVR with 1.74% and the Universidade Nova de Lisboa with 3.25%. At the same time, the analysis carried out showed that, as with the UAVR, the progress in recent years has been slow in most Portuguese public universities analysed in the framework of this study.

These results therefore demonstrate the need to promote a national debate on this issue and the importance of adopting measures to stimulate further progress in this field. At the same time, these findings seem to confirm the need to encourage researchers to incorporate a sex/gender perspective into their research and projects, which can be achieved through, for example, training and/or information in this area [1].

In any case, it is important to clarify that the inclusion of the words 'sex', 'women' or 'gender' in the title, abstract or keywords of Scopus publications does not in itself mean that a gender dimension has actually been adopted in the research. As the authors did not read all the publications listed, i.e. a qualitative content analysis was not performed, this actually is one of the main limitations of our analysis.

In the future, further discussion is needed on the most appropriate metrics to measure and monitor the integration of gender dimension in research – because, as we have seen, also in the She Figures Report this is an aspect which seems to be unclearly demonstrated [8]. This discussion is critical to ensure that proposals/projects/publications are not limited to merely mentioning sex and/or gender or using these categories of analysis as a variable. It must be ensured that integrating the gender dimension into research effectively results in scientific, social or economic impact with the potential to provide a return on investment [1].

## 5 CONCLUSIONS

The integration of a gender perspective in research has been widely recognised as relevant taking into consideration the potential impact it may have to improve societal and economic impact of the knowledge produced. Since the creation of the European Research Area, gender equality in research has been assumed as a main target translated in the gender balance in research teams, in placing more women in assessment committees, in the increasing participation of women in decision-making processes and in the integration of gender in research. Several empirical studies have been demonstrating the relevance of including a gender dimension in research. However, analysis developed at the European level reveals that the inclusion of gender in research measured by the presence of the words gender, sex and women in the Scopus publications is still very low and challenging to measure.

In this case, the specific case of a Portuguese university was presented – the UAVR. Data analysis reveal that the inclusion of the gender perspective in the research developed in this university is quite recent and, although it has been increasing consistently and slowly in the last years, it is still residual and far from the inclusion that is evidenced in other Portuguese public universities.

Although a more qualitative and in-depth analysis is needed to understand how gender is included in these publications, the analysis developed already reveals that if the UAVR intends to include in its research all the 17 Sustainable Development Goals, more efforts need to be made to integrate the gender perspective in the research developed.

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