European Commission

SHE FIGURES 2018

Research and Innovation

SHE FIGURES 2018

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Manuscript completed in February 2019.
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Luxembourg: Publications Office of the European Union, 2019

PDF ISBN 978-92-79-86715-6 doi: 10.2777/936 KI-04-18-555-EN-N

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EUROPEAN COMMISSION

SHE FIGURES 2018

Directorate-General for Research and Innovation
Horizon 2020 Science with and for Society

2019

Foreword

When the European Commission published its first She Figures report in 2003, women were significantly under-represented among PhD graduates, researchers and at the highest echelons of the academic career, and they were a minority on scientific boards.

The She Figures 2018 publication is a testimony to the progress achieved over the past years through a wide range of actions and policies. For example, Horizon 2020 supports research organisations who promote active change through gender equality plans. We have also reached our targets in the Horizon 2020 decision-making bodies: women now make up 55% of our advisory boards and 41% of our evaluation experts. It is my firm intention to continue these efforts in our next Framework Programme, Horizon Europe, to help accelerate the progress towards gender equality in research and innovation.

She Figures 2018 paints a picture of overall improvement in the EU, suggesting that efforts are starting to pay off. Today, women are actually a majority among PhD graduates. The proportion of women in the senior academic ranks has also been on the increase in Europe and the EU has established itself as world leader in integrating the gender dimension in research.

There is progress but it is slow. And we still have a long way to go to achieve full gender equality. For example, our data shows that women innovators are few and far in between. We cannot sit back and assume that having planted the seeds of gender equality, the positive trends will continue. As the past has shown us, gender inequality does not fix itself. What we need is a complete cultural change, which requires systematic and coordinated actions, education and strong political commitment by all actors involved. We have to keep an open mind and learn from other sectors that have gone before us. For instance, if voluntary targets do not deliver the results we need, it could be time to take a serious look at quotas for management positions in universities.

Gender equality is not only a matter of concern for women; it must matter to all of us. If we want to take scientific excellence to the next level; if we want to deliver science-based solutions to the many urgent and pressing global challenges, we need all talents in play. There is still a long and bumpy road ahead of us but every single step we take is worth it. We can shatter the glass ceiling, we can fix the system that keep women from developing their talents fully. I therefore invite you all to act as ambassadors of change to close the gender gap. Together, we will succeed.

Carlos Moedas
European Commissioner
for Research, Science and Innovation

Acknowledgements

Since its first edition in 2003, She Figures has benefitted from the knowledge and expertise of many individuals. She Figures 2018 is the outcome of a co-ordinated working effort of an even larger group of committed women and men. I would therefore like to thank the following actors for their valuable contributions to this publication:

- The Statistical Correspondents Group on Gender in Research and Innovation for providing the data and metadata for the Women in Science database, as well offering additional feedback on the other data sets and the scientific content of the publication;
- The members of the ERAC Standing Working Group on Gender in Research and Innovation for offering their feedback on policy and scientific aspects;
- Jolanta Reinegarde and Ligia Nobrega (EIGE), Fernando Galindo Rueda (OECD), Alessandro Bello, Ernesto Fernandez Polcuch (UNESCO) for providing scientific advice;
- Alexandra Alekseeva, Josephine Brinckmann, Ronald Delémont and Marco Scarno from Icon-Institut Public Sector GmbH; Jeroen Baas, Jörg Hellwig and Sarah Huggett from Elsevier; Hans Borchgrevink, Miriam Hufnagl, Elizabeth Pollitzer and Claartje Vinkenburg from Portia Ltd; and Maria Kabouridou, Despina Kapothanasi, Vaggelis Panoussis and Photis Stavropoulos from Quantos SA - Statistics and Information Systems for compiling and processing the data and writing and editing the publication;
- Stefania Panaitescu and Piotr Ronkowski from Eurostat for offering technical advice on data quality and methodological issues;
- The Communication unit of the Directorate-General for Research and Innovation of the European Commission (DG RTD) for graphical and dissemination guidance and support;
- The DG RTD Gender sector led by Mina Stareva, and in particular Roberta Pattono for her impetus and overall co-ordination of the project.

Jean-David MALO
Director Open Innovation and Open Science
DG Research and Innovation

Executive summary

Equality between women and men is a core value of the European Union, enshrined in the European Treaties. The EU, through a large body of legislation, actively promotes gender equality in areas such as equal pay, work-life balance, health and safety at work, social security, access to goods and services, and protection from human trafficking, gender-based violence and other forms of gender-based crime.

The EU is also equally committed to advancing gender equality in research and innovation. More specifically, gender equality and gender 'mainstreaming' (the integration of a gender perspective in the preparation and evaluation of policies) in academic research is one of the priorities for the European Research Area, and the promotion of both of these policies within research and innovation is among the aims of the EU's framework programmes. In Horizon 2020, gender equality is both a 'cross-cutting' issue and the topic of the dedicated Work Programme 'Science with and for Society', which funds specific initiatives in support of the EU's gender equality strategy.

The 'She Figures' publication provides a range of indicators on gender equality in research and innovation at pan-European level. It aims to give an overview of the gender equality situation, using a wide range of indicators to examine the impact and effectiveness of policies implemented in this area.

The EU is approaching gender balance among doctoral students (Chapter 2). Overall, in 2016, women made up 47.9 % of doctoral graduates at the EU level, while in two thirds of EU Member States the proportion of women among doctoral graduates ranged between 45 % and 55 %. While the overall number of both women and men doctoral graduates increased between 2007 and 2016, in most of the countries that She Figures covered, the number of women doctoral graduates increased at a faster rate than that for men. The proportion of women among doctoral graduates still varies among the different fields of education; in 2016, women doctoral graduates at EU level were over-represented in education (68 %), but under-represented in the field of information and communication technologies (21 %) and the fields of engineering and manufacturing and construction (29 %).

Tertiary educated women make up a majority of 'professionals and technicians' in the EU-28 (Chapter 3). More specifically, in 2017 at the EU level, women represented 53.1 % of the persons with tertiary education who were employed as professionals or technicians. In contrast, in science and engineering, women in the EU-28 were still a minority as they made up only 40.8 % of people employed as scientists or engineers. However, between 2013 and 2017, in both science and engineering and professional and technical occupations, the number of women grew on average by 2.9 % per year between 2013 and 2017. In total employment, women continue to hold lower shares than men, and even when they have tertiary education, women are more likely than men to be unemployed. In the EU-28 in 2017, the unemployment rate for women with tertiary education was 3.8 %, while for men the same rate was 2.9 %.

Gender imbalance amongst researchers still remains as in 2015 only one third of the EU's researchers were women (Chapter 4). However, during the 2008-2015 period, the number of women researchers in the EU-28 increased at higher rate on average than men (3.8 % for women and 3.4 % for men). Women researchers' presence in 2015 was strongest in the government sector (where 42.5 % of researchers are women) and in the higher education sector (42.1 %) resulting in a more gender-balanced population of researchers at the EU level. On the contrary, in the business enterprise sector, women are still severely under-represented as they only represent 20.2 % of the total number of researchers.

Differences between women and men can also be observed in their working conditions as researchers (Chapter 5). At the EU level, the proportion of women researchers working part-time was higher than that of men; 13 % of women researchers and 8 % of men researchers were working part-time in 2016. Furthermore, 8.1 % of women and 5.2 % of men researchers worked under contract arrangements considered as 'precarious employment'. In terms of equal payment, there is still a considerable gender pay gap in scientific R&D occupations. Across the EU-28, women in R&D earned on average 17 % less than their men colleagues in 2014, and the gender pay gap was found to widen with age. Moreover, the presence of women researchers seems to have an inverse relationship with the R&D expenditure per researcher; most of the countries that spent more per researcher had some of the lowest shares of women researchers.

As they moving up the academic ladder, women are less represented (Chapter 6). In the EU-28 in 2016, women represented 48 % of doctoral students and graduates, 46 % of grade C academic positions, 40 % of grade B and 24 % of grade A academic positions. The gap between women and men was wider in STEM (science, technology, engineering and mathematics); while women made up 37 % of doctoral students and 39 % of doctoral graduates, they held only 15 % of grade A academic positions. In the EU-28, the proportion of women among heads of institutions in the higher education sector increased from 20 % in 2014 to 22 % in 2017. Furthermore, in 2017, women made up 27 % of the members of boards of research organisations, while when focusing on board leaders alone, the

proportion of women decreased to 20 %.

In the EU-28, women were still under-represented in the writing of scientific papers (Chapter 7). Between 2013 and 2017, the ratio of women to men among authors of scientific publications in the EU was on average one to two. However, this ratio is slowly improving and it has been increasing by almost 4 % per year since 2008. The highest women to men ratio of authorship was observed in the fields of medical and agricultural sciences, where a little over eight women authors corresponded to 10 men authors. Moreover, women are still strongly under-represented among patent inventors; between 2013 and 2017 in the EU, the women to men ratio of patent inventors was on average just over one to three. A strong gender gap in the composition of the inventors' teams was also observed in the EU-28, where the most frequent composition of the teams was all men (47 %), followed by those with just one male inventor (33%). A final overall observation for EU countries was a slight gender gap in receiving research grants. The funding success rate was higher for men team leaders than women team leaders by 3.0 percentage points.

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Abbreviations

AS	Agricultural sciences
B.Sc.	Bachelor of Science
BES	Business enterprise sector
CAGR	Compound annual growth rate
DG	Directorate-General
DI	Dissimilarity Index
EFTA	European Free Trade Association
EIGE	European Institute for Gender Equality
EPO	European Patent Office
EPO PATSTAT	EPO Worldwide Patent Statistical Database
ERA	European Research Area
ET	Engineering and Technology
EU	European Union
EUROSTAT	Statistical Office of the European Union
FORD	Field of Research and Development
FTE	Full-time equivalent
FWCI	Field-Weighted Citation Impact
GCI	Glass Ceiling Index
GERD	Gross domestic expenditure on R&D
GOV	Government sector
GPG	Gender pay gap
H	Humanities and arts
HC	Headcount
HEA	Higher Education Authority
HEIs	Higher education institutions
HES	Higher education sector
HR	Human resources
HRST	Human resources in S&T
HRSTC	Human resources in S&T - Core
HRSTE	Human resources in S&T - Education
HRSTO	Human resources in S&T - Occupation
ICT	Information and Communication Technologies
ILO	International Labour Organization
IoT	Institutes of Technology
IPC	International Patent Classification (by WIPO)
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
KIA	Knowledge-intensive activities
KIABI	Knowledge-intensive activities – Business industries
LFS	Eurostat Labour Force Survey
M.Sc.	Master of Science
MORE	Mobility and Career Paths of Research in Europe
MoRRI	Monitoring the Evolution and Benefits of Responsible Research and Innovation
MS	Medical sciences
NACE Rev.2	Nomenclature statistique des activités économiques dans la Communauté européenne, Rev.2 (Statistical Classification of Economic Activities in the European Community, Rev.2)
NS	Natural sciences
OECD	Organisation for Economic Co-operation and Development
PhD	Doctor of Philosophy
PNP	Private non-profit
PPS	Purchasing power standards
PROs	Public Research Organisations
R&D	Research and Development
R&I	Research and innovation
RPOs	Research performing organisations
RRI	Responsible Research and Innovation
S&E	Scientists and engineers
S&T	Science and technology
SES	Structure of Earnings Survey
SGDRC	Sex and gender dimension in research content
SILK	Survey on Income and Living Conditions
SS	Social sciences
STEM	Science, technology, engineering and mathematics
UIS	UNESCO Institute of Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organisation
WiS	Women in Science

1 Introduction

Equality between women and men is a core value of the European Union, enshrined in the European Treaties. The EU, through a large body of legislation, actively promotes gender equality in areas such as equal pay, work-life balance, health and safety at work, social security, access to goods and services, and protection from human trafficking, gender-based violence and other forms of gender-based crime (European Parliament, 2018a). The European Commission's 'Strategic Engagement for Gender Equality 2016-2019' (European Commission, 2016a) is the current framework for the European Commission's work towards full gender equality. The strategy identifies five priority areas, which include the increasing economic independence and participation of women in the labour market, reducing gender pay, earnings and pension gaps and promoting gender equality in decision-making. Furthermore, the strategy emphasises the need to integrate a gender equality perspective into all EU policies, as well as into EU funding programmes.

In the area of research and innovation, the EU is equally committed to advancing gender equality. More specifically, gender equality and gender mainstreaming in research is one of the key priorities of the European Research Area (European Commission, 2012) and their promotion is a clear objective and a legal obligation under the EU framework programme for research and innovation Reg 1291/2013). In Horizon 2020, gender equality is a cross-cutting issue (European Commission, 2013a), as the programme aims to promote gender balance in research teams, panels and advisory groups and to integrate the gender dimension in research and innovation (R&I) content. In addition, the Horizon 2020 'Science with and for Society' work programme also funds specific initiatives in support of the gender equality policy.

Gender inequalities persist and a need to document them remains. The She Figures publication, released every three years since 2003, provides a range of indicators on gender equality in Research and Innovation (R&I) at the pan-European level. It aims to give an overview of the gender equality situation in research and innovation, using a wide range of indicators to examine the impact and effectiveness of the policies implemented in this area.

Much of the She Figures publication is dedicated to reporting back on well established statistical indicators. Most of these indicators present and explore the following themes: i) the presence of women in research across different sectors of the economy; ii) horizontal segregation by sex across different fields of research and development and research occupations; and iii) vertical segregation by sex in academia, i.e. the (under-)representation of women in the highest grades and research posts and as heads of academic institutions.

Each edition of She Figures also aims to provide better understanding of emerging issues by introducing additional indicators, which bring critical gender based issues to the forefront of the research and innovation debate. She Figures 2006 developed new indicators to give a more detailed picture of the labour force as a whole and the patterns of employment for women and men researchers across different sectors, such as the business enterprise sector. The 2009 edition introduced indicators on the gender pay gap and began to break down some of the data by age group (in addition to sex disaggregation). Amongst other things, the 2012 report added indicators on the mobility of researchers and the proportion of researchers with children. The 2015 report introduced indicators on part-time and precarious employment, on the adoption of gender equality plans by research organisations, on the intellectual output of women and men in the form of scientific publications and patent applications and on the integration of a sex and gender analysis into the content of published research.

This She Figures 2018 publication includes new indicators to further assess gender inequalities. Some of these indicators provide insights on the early segregation in the education pathways chosen by young women and young men and their subsequent progress to the top educational levels. Another new indicator measures the propensity of women and men to work alone, in same-sex teams or in mixed teams, as patent inventors. Finally, an indicator on the integration of a sex and gender dimension in published research has been further developed by expanding its scope to cover additional species as well as humans, and the definition of the sex and gender dimension has been revised.

History of the She Figures

Twenty years ago, in 1999, the Council of the EU recognised that women were under represented in the fields of scientific and technical research, describing this as a 'common concern' at both the national and the European level. At this time, there were virtually no pan European statistics on what happened to women after they left university, despite fears that after attaining their degrees, women frequently encountered obstacles in their careers which contributed to their under representation in scientific posts.

The EU therefore recognised that if governments were to develop effective policies in this area, harmonised sex disaggregated data on women in science and research was needed. Meeting in 1999, the Helsinki Group on Gender in Research and Innovation

appointed a sub group of Statistical Correspondents with responsibility for collecting national data and contributing to the creation of a source for European statistics on these topics.

The end result of this process was the She Figures, first released in 2003 and updated every three years since then. By presenting statistical indicators on a wide range of related gender issues, the report enables readers to develop a comprehensive understanding of the current state of play as regards gender equality in research and innovation.

In 2015, a She Figures Handbook was also produced for the first time. A new edition (European Commission, 2019) has been produced to accompany the She Figures 2018, which contains methodological information both on the collection of data and on the calculation of all the indicators used in the She Figures. The handbook serves a dual purpose. Firstly, it helps readers of She Figures to correctly interpret the results presented in the publication. Secondly, it provides guidelines and recommendations to assist the collection, processing and use of data on gender equality in research, innovation and science, with the potential to inform organisations at both the national and European level.

Data sources and coverage

Most of the data for the She Figures indicators originate from Eurostat (the Statistical Office of the EU), which provides sex disaggregated data on education, research and development, professional earnings and scientific employment. Data on education, research and the labour market for countries outside the EU, when not available in Eurostat, were compiled from web-sites including the International Labour Organization (ILO), the OECD and the UNESCO Institute of Statistics (UIS). The Statistical Correspondents enrich this picture, by collecting primary data (broken down by sex) on senior academic staff, the heads of universities, funding applicants and beneficiaries, as well as the membership of boards of national research organisations. The expansion of the She Figures since 2003 has resulted in the use of other sources, including the EC MORE Survey on the Mobility of Researchers, the FP7 Monitoring the Evolution and Benefits of Responsible Research and Innovation (MoRRI) project, the Worldwide Patent Statistical Database (PATSTAT) of the European Patent Office (EPO) and the Scopus™ abstract and citation database.

In this edition of the She Figures, data are presented at the individual country level as well as the broader EU level for the current 28 EU Member States and the associated countries. Data availability differs between the countries, with availability for EU Member States, EFTA (Iceland, Norway and Switzerland) and candidate countries (Montenegro, North Macedonia, Albania, Serbia and Turkey) usually being higher than for the rest of the countries examined (Armenia, Bosnia and Herzegovina, the Faroe Islands, Georgia, Israel, Moldova, Tunisia and Ukraine). All tables and figures in the publication contain footnotes which indicate the respective data that were not available.

Further information about data sources as well as the definitions of key terms used in She Figures 2018 are provided in Appendix 2.

Structure of the She Figures 2018

The structure of She Figures 2018 aims to follow the 'chronological journey' of researchers, from graduating in higher education programmes to acquiring decision-making roles while considering their working conditions and other aspects of their profession, and also highlighting the differences between women and men. More specifically,

- Chapter 2 deals with the tertiary education pathways that women and men choose, and it focuses more on doctoral education. It compares the numbers of women and men doctoral graduates, their choices for their field of education and the progress they have made in undertaking postgraduate education over the recent years.
- Chapter 3 investigates the participation of tertiary educated women in science and technology occupations and their differences from men within various sectors of the economy and economic activities.
- Chapter 4 discusses researchers' patterns of employment with regards to their sex across the sectors of the economy, fields of R&D and age groups.
- Chapter 5 examines the working conditions of women and men researchers, their mobility during their PhD studies and subsequent careers, the magnitude of the gender pay gap in scientific R&D, and the extent of adoption of gender equality plans by research performing organisations.
- Chapter 6 discusses the progression of women across the different grades of a typical academic career, and looks at women's presence among top-level positions (i.e. as heads of institutions or as members of the boards of research organisations).
- Chapter 7 compares the contribution of women and men in scientific publications and patent applications, and at the relative success of women and men researchers in obtaining research funding. The extent of integration of a sex or gender dimension in the research content of scientific publications is also examined.
- content of scientific publications is also examined.

2 The pool of graduate talent

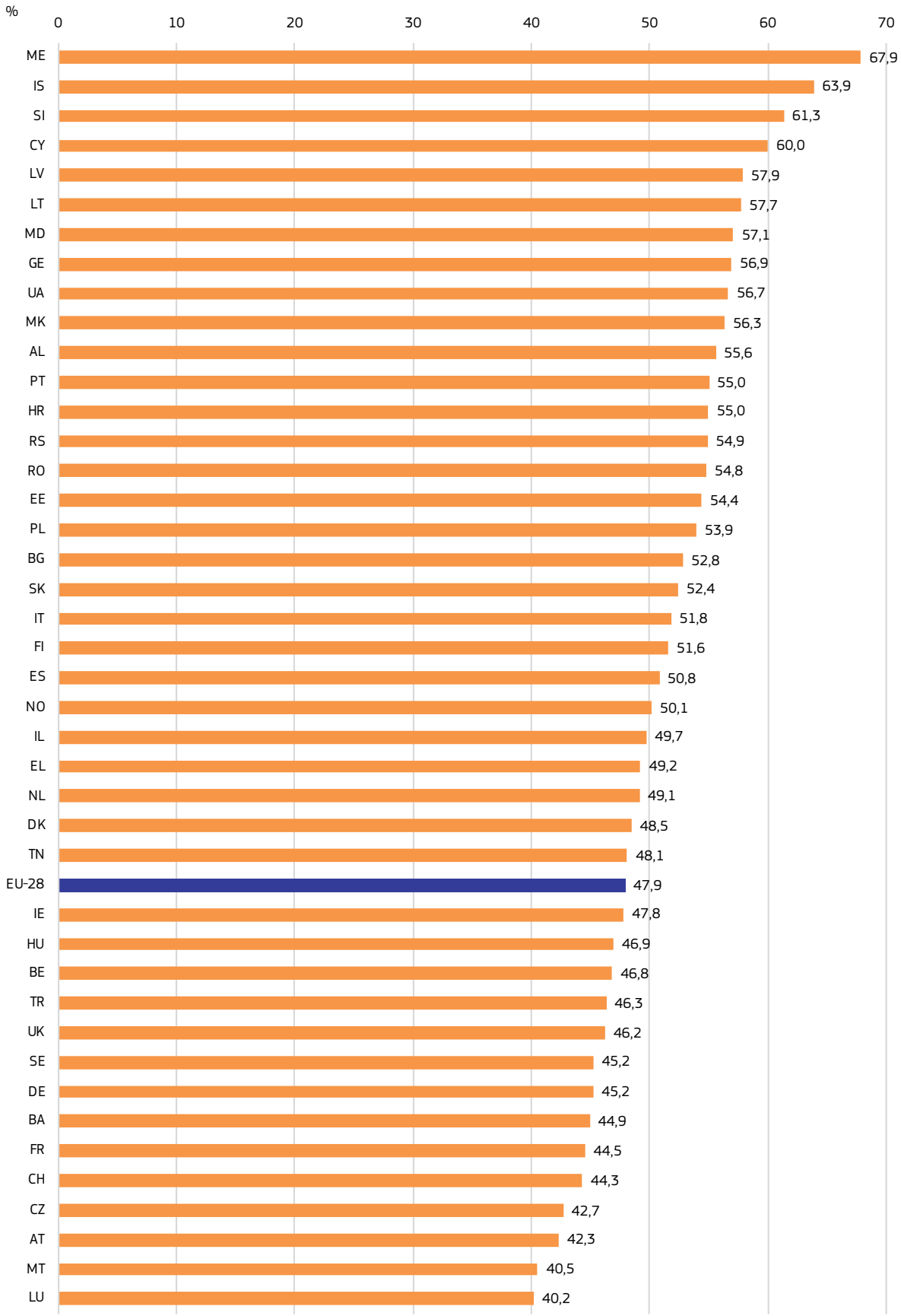
Main findings:

- In 2016, the proportion of women among doctoral graduates ranged between 40 % and 60 % in the great majority of countries examined.
- The presence of women among doctoral graduates increased between 2007 and 2016 both at the EU-28 level and at country level.
- Between 2007 and 2016, while the number of both female and male doctoral graduates increased at country-level and at the EU-28 level, the number of women doctoral graduates increased at a faster rate.
- Between 2007 and 2016, at the EU-28 level, the average annual growth rate of doctoral graduates was 2.3 % for women and 1.4 % for men.
- Women doctoral graduates are still over-represented in the fields of education (68 % of all graduates at the EU-28 level) and health and welfare (60 %). Their share among graduates in agriculture, forestry, fisheries and veterinary science is 59 %. They are, however, significantly under-represented in the fields of information and communication technologies (21 %), and engineering, manufacturing and construction (29 %).
- Both women and men show high preference for doctoral studies in the field of natural sciences and mathematics.
- Between 2013 and 2016, the proportion of women doctoral graduates grew in several narrow fields of Science, Technology, Engineering and Mathematics (STEM) in several countries. These fields were biological sciences, environmental science, and information and communication technologies (ICT).
- In most of the countries examined, the number of female graduates grew at a lower rate than men in various narrow fields within STEM.
- Women are more likely than men to graduate at bachelor level, but less likely than men to continue to doctoral level.
- If all fields of study are taken together, in half the countries considered the ratio of the number of women, who graduated at doctoral level to the number of women who started their studies at doctoral level, was higher than the corresponding ratio for men.

The importance of doctoral education lies in the fact that it is both part of the education of many future academic researchers, and it produces actual research results. Gender gaps in doctoral education do not arise simply from the differences between the numbers of male and female doctoral students and graduates, but also from the different choices of field of doctoral education for men and women. The need to address these different choices has been recognised by the European Commission (2015 and 2017). These different choices are highlighted in the recent review of the implementation of the Beijing Platform for Action in the EU Member States by the European Institute for Gender Equality (2018).

This Chapter (Chapter 2) deals with the women and men who graduate from doctoral education (doctoral graduates = ISCED 2011, level 8). It compares the numbers of women and men doctoral graduates, their choices of field of education and the progress in undertaking postgraduate education. It also compares the propensity of women and men to graduate from bachelor or equivalent level studies (ISCED level 6), to move from master or equivalent (ISCED level 7) to doctoral or equivalent level (ISCED level 8), and to graduate from doctoral level studies.

Figure 2.1 Proportion (%) of women among doctoral graduates, 2016



Notes: Exceptions to the reference year: IE, NL, IL: 2015; Data not available: FO; Definition differs: EU-28.
Other: The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02), UNESCO Institute for Statistics (Tertiary graduates by level of education).

Table 2.1 Proportion (%) of women among doctoral graduates, 2016

Country	2007	2016
EU-28	45,9	47,9
BE	39,1	46,8
BG	54,8	52,8
CZ	37,1	42,7
DK	40,8	48,5
DE	42,5	45,2
EE	51,6	54,4
IE	46,0	47,8
EL	39,9	49,2
ES	47,6	50,8
FR	41,8	44,5
HR	52,1	55,0
IT	52,2	51,8
CY	68.8 (11 /16)	60,0
LV	59,6	57,9
LT	59,9	57,7
LU	:	40,2
HU	42,1	46,9
MT	33.3 (3 /9)	40,5
NL	41,8	49,1
AT	42,4	42,3
PL	49,4	53,9
PT	61,2	55,0
RO	49,9	54,8
SI	45,8	61,3
SK	46,4	52,4
FI	51,6	51,6
SE	46,4	45,2
UK	44,1	46,2
IS	60.0 (6 /10)	63,9
NO	42,2	50,1
CH	37,6	44,3
ME	:	67,9
MK	52,4	56,3
AL	:	55,6
RS	:	54,9
TR	41,4	46,3
BA	33,1	44,9
AM	30,1	37,1
GE	26,6	56,9
IL	53,0	49,7
MD	50,0	57,1
TN	:	48,1
UA	:	56,7

Notes: Exceptions to the reference period: IE, NL, IL: 2007-2015; Data estimated for: EU-28 (2007); Definition differs for: PT (2007 data refer to master and doctoral graduates), EU-28. Other: The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates, with the exception of data for 2007, which refer to ISCED level 6 of the ISCED 1997 classification; ':' indicates that data are not available; For proportions based on fewer than 20 graduates, the numerator and denominator are displayed in brackets

Source: Eurostat – Education Statistics (online data codes: educ_grad5 and educ_uoe_grad02), UNESCO Institute for Statistics (Tertiary graduates by level of education).

At first glance, the existing pool of doctoral graduates is gender balanced in most countries, if no differentiation is made by field of study.

Figure 2.1 presents the proportion of women among doctoral or equivalent graduates in 2016. With a few exceptions, mainly for countries with a limited number of doctoral graduates, the proportion of women who graduated from top-level educational programmes ranged between 40 % and 60 %. This proportion exceeded 60 % in Montenegro (67.9 %), Iceland (63.9 %) and Slovenia (61.3 %), while it was below 40 % in Armenia (37.1 %).

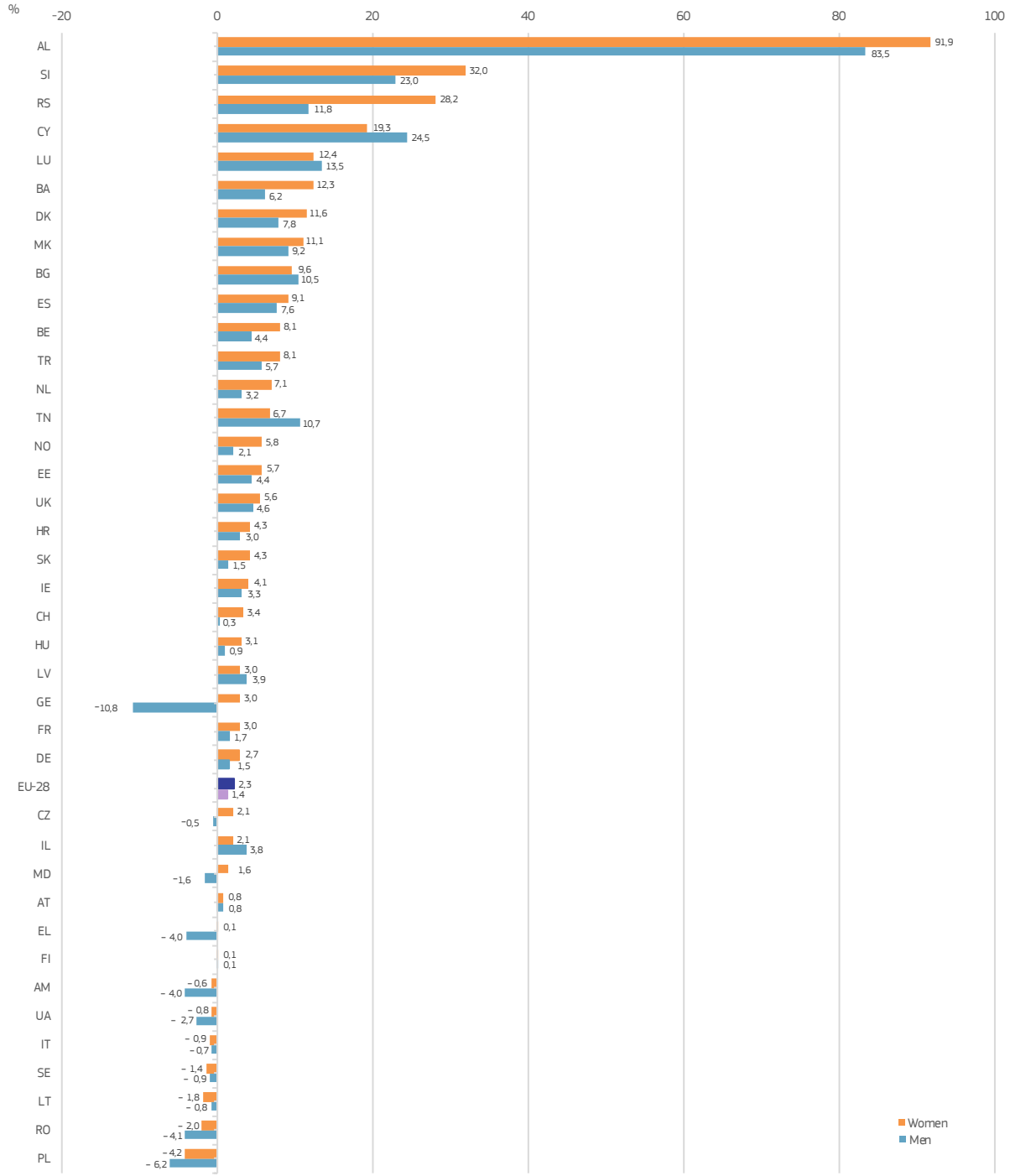
At the EU-28 level, women represented 47.9 % of doctoral graduates in 2016. At country level, the proportion of women among doctoral graduates ranged between 45 % and 55 % in two thirds of the EU Member States. Among the Member States, the proportion was the highest in Slovenia (61.3 %) and Cyprus (60 %), while it was the lowest in Luxembourg (40.2 %), Malta (40.5 %), Austria (42.3 %) and Czechia (42.7 %).

The proportion of women among doctoral graduates increased in the decade 2007-2016.

Table 2.1 shows the proportion of women among doctoral graduates in 2007 and 2016 when all the fields of education are taken together. At the EU-28 level, women's share among doctoral graduates increased by two percentage points between 2007

and 2016, almost reaching parity. The same trend can also be seen at country level. By 2016, the proportion of women among doctoral graduates was moving towards gender equality in all the countries where a clear unbalance had persisted in 2007. All the countries have now reached a proportion ranging from 40.5 % to 60 %. The single exception to this was Armenia since the proportion did not reach the threshold of 40 % in 2016, although it had increased by seven percentage points since 2007. The countries with a rather low share of women among doctoral graduates in 2007 which then moved towards parity in 2016 were Georgia (from 26.6 % to 56.9 %) and Bosnia and Herzegovina (from 33.1 % to 44.9 %). In contrast, women were over-represented among doctoral graduates in Cyprus in 2007 (68.8 %) but this decreased in 2016 (60.0 %).

Figure 2.2 Compound annual growth rate of doctoral graduates, by sex, 2007-2016



Notes: Exceptions to the reference period: IE, NL, IL: 2007–2015; AL, TN, UA: 2011–2016; RS: 2014–2016; Data not available: FO; Definition differs: EU-28; Excluded due to low number of observations in most years (<20): IS, MT; not computed due to lack of comparability with 2007: PT ; Excluded due to data being available for only one year: ME.
Other: The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates, with the exception of data for 2007 and 2011, which refer to ISCED level 6 of the ISCED 1997 classification.

Source: Eurostat – Education Statistics (online data codes: educ_grad5 and educ_uoe_grad02), UNESCO Institute for Statistics (Tertiary graduates by level of education) and OECD (Graduates by field).

Overall, the number of doctoral graduates grew between 2007 and 2016 in most countries and the growth in the number of women was faster than it was for men.

Figure 2.2 refers to the absolute numbers of doctoral graduates rather than to the shares of men and women among them. It presents the compound annual growth rate (CAGR), between 2007 and 2016, of the numbers of female and male doctoral graduates. This is an average annual rate of change in percentage terms. It should be noted that the text discusses the rates at full precision, even though they are presented with one decimal digit in the figure. The same applies to the whole chapter.
The figure shows that in most countries the number of female doctoral graduates grew at a faster average annual rate than that of male doctoral graduates during this time period. At the EU-28 level, the average growth was 2.3 % per year for women and 1.4 % per year for men.

Similarly, in 26 of the countries considered, the number of female doctoral graduates grew at a faster rate than the rate for male graduates, but in three countries it decreased at a slower pace. On the other side, among the seven countries, where the growth rate of male doctoral graduates was positive and surpassed that of female ones, the largest difference was observed in Serbia with 16.4 percentage points.

The highest annual growth rates can be seen in Albania for both women and men: the number of female doctoral graduates grew by 91.9 % per year on average while that of male ones by 83.5 % per year. The number of doctoral graduates declined for both sexes in seven countries, with Poland having the largest decrease rates (-4.2 % for women from 2997 ones to 2030, and -6.2 % for men from 3075 ones to 1734). The number of women doctoral graduates has increased, while it has decreased for men in four countries. These countries were Georgia, where the largest difference in annual growth rates in favour of women was observed, Moldova, Czechia and Greece. Attention must be paid to countries with low absolute numbers of graduates, where small changes in numbers can translate into large changes in percentage terms, for example Estonia, Ireland, Lithuania, Latvia, Slovenia, etc.

The proportion of women among doctoral graduates still varies in the different fields of education.

Table 2.2 presents the proportion of women among doctoral graduates in the different fields of education in 2016. At the EU-28 level, the proportion of women ranges between 40 % and 60 % in most of the fields resulting in balanced proportions of women and men graduates with few exceptions. More specifically, women are under-represented among doctoral graduates in the fields of information and communication technologies (ICT) and engineering, manufacturing and construction (21 % and 29 % respectively), while women are 68 % of doctoral graduates in education.

This same pattern is observed also at the national level. In most fields, gender equality has been reached in the majority of countries examined and no extreme values are observed even in the countries where the proportion of women is below the desired 40-60 % range. However, in education, the proportion of women among doctoral graduates ranged between 40 % and 60 % in only six countries: France (60 %), Spain (58 %), Hungary (55 %), Turkey (54 %), Croatia (52 %) and Luxembourg (40 %). In all of the remaining countries where gender distribution was unbalanced, the proportion of women among doctoral graduates was larger than 60 %.

On the other side of the coin, women are strongly under-represented in ICT and engineering, manufacturing and construction, since only four countries had a proportion above 40 % in ICT, and only two countries had a proportion above 40 % in engineering, manufacturing and construction. In ICT, the four countries with a balanced proportion of women among doctoral graduates were Bulgaria (56 %), Serbia (50 %), Turkey (44 %) and Romania (43 %). In the field of engineering, manufacturing and construction the corresponding proportion was 42 % in Poland and Serbia.

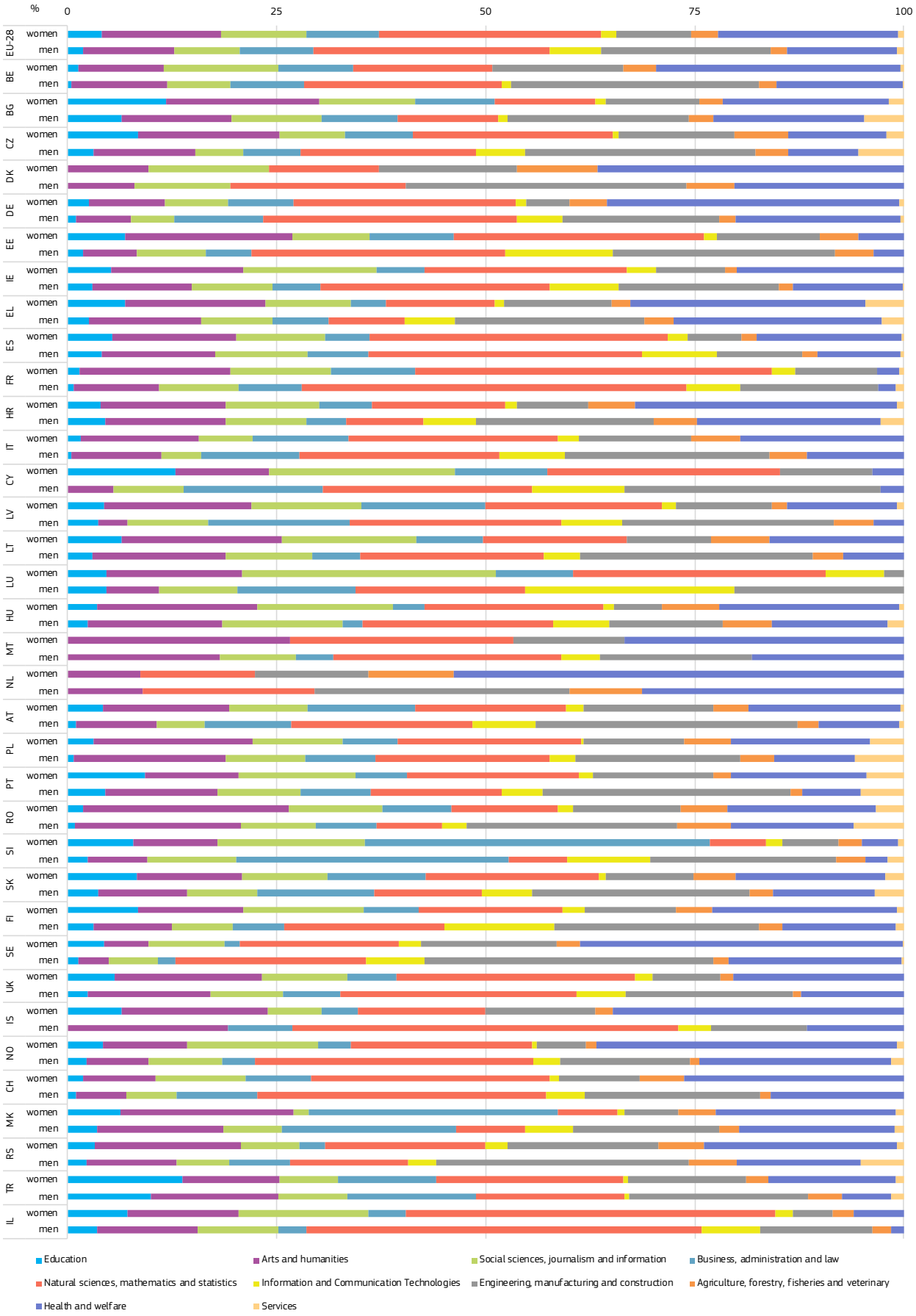
Table 2.2 Proportion (%) of women among doctoral graduates, by broad field of study, 2016

Country	Education	Arts and humanities	Social sciences, journalism and information	Business, administration and law	Natural sciences, mathematics and statistics	Information and Communication Technologies	Engineering, manufacturing and construction	Agriculture, forestry, fisheries and veterinary	Health and welfare	Services
EU-28	68	54	54	48	46	21	29	59	60	41
BE	68	44	61	47	38	0 (0/16)	32	62	63	83 (5/6)
BG	67	61	54	54	53	56 (10/18)	37	51	55	30
CZ	66	51	51	47	46	8	27	55	52	22
DK	-	53	54	-	37	-	32	61	63	-
DE	68	53	54	38	42	15	19	65	59	57
EE	82 (9/11)	79	57	68 (13/19)	54	13 (2/16)	36	55 (6/11)	64 (7/11)	-
IE	62	55	60	48	45	28	28	43	58	0 (0/1)
EL	72	55	54	37	58	14	36	37	52	63
ES	58	53	50	43	53	22	39	52	64	39
FR	60	59	50	52	43	27	32	-	51	30
HR	52	56	59	61	68	22	33	57	63	27 (3/11)
IT	81	58	60	51	53	25	37	59	64	-
CY	100 (7/7)	75 (6/8)	80 (12/15)	50 (6/12)	63	0 (0/4)	35 (6/17)	-	67 (2/3)	-
LV	63 (5/8)	87	65	55	53	25 (2/8)	38	33 (2/6)	83 (15/18)	100 (1/1)
LT	75 (12/16)	62	68	65	52	0 (0/6)	33	72 (13/18)	75	-
LU	40 (2/5)	64 (7/11)	68 (13/19)	31 (4/13)	50	16 (3/19)	7 (1/14)	-	-	-
HU	55	51	50	56	45	14	27	51	57	21 (3/14)
MT	-	50 (4/8)	0 (0/2)	0 (0/1)	40 (4/10)	0 (0/1)	33 (2/6)	-	56 (5/9)	-
NL	-	45	:	:	36	:	27	50	59	-
AT	76	53	54	47	38	17	26	54	58	36 (4/11)
PL	84	55	57	47	55	10	42	62	67	44
PT	71	51	63	48	62	28	37	64	74	51
RO	72	60	60	58	66	43	38	51	60	40
SI	84	69	72	67	60	24	32	56	72	37
SK	71	57	57	48	64	12	31	67	62	42
FI	74	59	68	53	49	18	32	63	63	47 (8/17)
SE	73	55	56	41	41	24	28	57	61	33 (3/9)
UK	67	51	51	43	46	24	26	57	59	-
IS	100 (3/3)	62 (8/13)	100 (3/3)	50 (2/4)	37 (7/19)	0 (0/1)	67 (6/9)	100 (1/1)	84 (16/19)	-
NO	64	58	64	49	40	15	27	56 (9/16)	61	38 (6/16)
CH	61	53	58	39	40	15	27	76	57	-
MK	70 (7/10)	64	25 (2/8)	65	53 (8/15)	17 (1/6)	32	71 (5/7)	60	50 (1/2)
RS	63	66	58	34	62	50	42	53	66	17
TR	54	40	42	40	52	44	36	36	69	34
IL	67	52	61	57	48	23	26	53	80	-

Notes: Exceptions to the reference year: NL: 2014; IE, IL: 2015; Data not available: AL, AM, BA, FO, GE, ME, MD, TN, UA; Definition differs: EU-28.
Other: ‚:' indicates that data are not available; '-' indicates that the number of graduates was zero; For proportions based on fewer than 20 graduates, the numerators and denominators are displayed in brackets; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02) and OECD (Graduates by field).

Figure 2.3 Distribution of doctoral graduates across broad fields of study, by sex, 2016



Notes: Exceptions to the reference year: NL: 2014; IE, IL: 2015; Data not available: AL, AM, BA, FO, GE, ME, MD, TN, UA; Definition differs: EU-28; Fields missing: NL: Social sciences, journalism and information; Business administration and law; Information and Communication Technologies.
Other: Distribution based on fewer than 20 graduates: MT (women); Graduates with unknown fields of study are not included in the data; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02) and OECD (Graduates by field).

At the EU level, both women and men doctoral graduates prefer natural sciences, mathematics and statistics to the other fields of education.

Figure 2.3 presents the distribution of female and male doctoral graduates across the broad fields of education in 2016. It shows how the population of female and male graduates is spread across the different fields.

At the EU-28 level, 26.6 % of the women and 28.3 % of the men that graduated at doctoral level studied in the field of natural sciences, mathematics and statistics. This field was the most popular broad field for both sexes. The second most popular field for women was health and welfare (21.5 % of female graduates) while for men it was engineering, manufacturing and construction (20.2 % of male graduates). For both sexes, services (i.e. personal, hygiene & occupational health, security and transport services) were the least popular field (0.6 % of female graduates and 0.8 % of men).

Data at national level reveal both similarities and differences between women and men. The two most popular fields for female graduates are natural sciences, mathematics and statistics, and health and welfare. In all the countries examined, apart from Slovenia, at least one of these two fields was among the two top choices for women. Natural sciences, mathematics and statistics was the most popular field among female doctoral graduates in 17 countries (CZ, EE, IE, ES, FR, IT, CY, LV, LU, HU, PL, PT, SK, UK, CH, TR, IL) and the second most popular one in another 10 countries (BE, DE, HR, LT, MT, AT, FI, SE, NO, RS). The field of health and welfare was the most popular field of study in 14 countries (BE, BG, DK, DE, EL, HR, HU, MT, AT, FI, SE, IS, NO, RS) and second most popular one in another 10 countries (IE, ES, IT, PT, RO, SK, UK, CH, MK, TR).

For men, the two most popular fields were engineering, manufacturing and construction, and natural sciences, mathematics and statistics. Neither of these fields were among the two top choices for male doctoral graduates in only one of the countries examined (MK). Engineering, manufacturing and construction was the most popular choice for male doctoral graduates in 16 countries (BE, BG, CZ, DK, IT, CY, LV, LT, AT, PT, RO, SK, FI, SE, RS, TR) and the second most popular one in another 13 countries (EE, IE, EL, FR, HR, LU, MT, NL, PL, SI, UK, CH, IL). Natural sciences, mathematics and statistics was the most popular for men in 13 countries (DE, EE, IE, ES, FR, HU, MT, PL, UK, IS, NO, CH, IL) and the second most popular in another 11 countries (BE, CZ, DK, IT, CY, LT, LU, AT, FI, SE, TR).

Very few people, either women or men, get postgraduate qualifications in the field of services. It was the field with the smallest number of graduates for both women and men in 23 countries (AT, CH, CY, DE, DK, EE, ES, FI, HR, HU, IE, IL, IS, IT, LT, LU, LV, MK, MT, NL, SE, SI, UK). It is worth noticing that although education is predominated by women (Table 2.2), it is not a very popular option for women to pursue doctoral study (Figure 2.3). In fact, in the majority of countries, women are more likely to attain their doctoral degree in engineering than in education.

Table 2.3 Proportion (%) of women among doctoral graduates, by narrow field of study in natural sciences, ICT and engineering, 2013 and 2016

Country	Natural sciences, mathematics and statistics (EF05)								Information and Communication Technologies (EF06)		Engineering, manufacturing and construction (EF07)					
	Biological and related sciences (EF051)		Environment (EF052)		Physical sciences (EF053)		Mathematics and statistics (EF054)		Information and Communication Technologies (EF061)		Engineering and engineering trades (EF071)		Manufacturing and processing (EF072)		Architecture and construction (EF073)	
	2013	2016	2013	2016	2013	2016	2013	2016	2013	2016	2013	2016	2013	2016	2013	2016
EU-28	:	:	:	:	38 (d)	:	34.7 (d)	:	21 (d)	:	25.8 (d)	:	35.4 (d)	:	39.5 (d)	:
BE	48,6	57,1	54,5	44.4 (4/9)	27,6	14,9	49,1	40,0	11,9	0 (0/16)	40,2	33,3	100 (1/1)	62.5 (5/8)	35.3 (6/17)	45,8
BG	75,0	66,2	-	-	54,8	47,3	52.6 (10/19)	35,0	44,0	55.6 (10/18)	29,1	33,1	48,4	42,3	37,5	37,5
CZ	57,7	60,4	66,7	42,3	40,6	36,6	29,7	34,0	9,9	10,3	22,6	24,1	35,4	51,5	29,0	31,0
DK	-	-	-	-	-	-	35,2	-	-	-	28,8	31,6	-	-	-	-
DE	58,0	60,1	-	-	30,5	31,4	26,6	24,8	13,7	13,8	16,9	17,9	32,3	34,7	34,1	28,1
EE	57,1	66,7	57.1 (4/7)	100 (1/1)	52,4	44,4	66.7 (2/3)	0 (0/2)	7.7 (1/13)	12.5 (2/16)	73.3 (11/15)	39,0	-	-	57.1 (4/7)	0 (0/4)
IE	70,3	54,9	60 (6/10)	57,7	43,5	37,2	20,7	25,0	13,2	27,9	20,3	21,5	66.7 (2/3)	47,8	20,0	45,2
EL	54,2	74,1	0 (0/1)	60 (6/10)	41,3	60,8	41,4	21,9	23,2	13,6	19,3	33,5	46.7 (7/15)	45,5	41,1	44,4
ES	47,4	60,1	-	-	63,1	50,7	32,3	38,9	25,3	-	32,5	-	46,9	-	31,6	39,3
FR	:	59,4	:	-	-	37,2	26,5	20,5	24,5	26,5	25,4	29,6	61,4	44,4	38,4	38,8
HR	:	56,3	:	66.7 (2/3)	71,9	73,0	50 (7/14)	83.3 (10/12)	16,7	21,7	30,8	20,0	80 (12/15)	61.1 (11/18)	56.3 (9/16)	50 (7/14)
IT	:	:	:	:	45,5	:	38,0	:	31,9	:	21,3	:	29,8	:	49,8	:
CY	100 (5/5)	75 (9/12)	0 (0/1)	50 (1/2)	50 (3/6)	44.4 (4/9)	0 (0/1)	100 (1/1)	0 (0/4)	0 (0/4)	44.4 (4/9)	21.4 (3/14)	-	-	50 (2/4)	100 (3/3)
LV	-	78.6 (11/14)	-	50 (2/4)	-	44,0	50 (1/2)	0 (0/2)	35.3 (6/17)	25 (2/8)	31,7	31,0	50 (3/6)	100 (3/3)	27.3 (3/11)	50 (1/2)
LT	64.7 (11/17)	46.7 (7/15)	50 (4/8)	62.5 (5/8)	56,0	50,0	57.1 (8/14)	55.6 (5/9)	7.7 (1/13)	0 (0/6)	28,2	35,6	-	-	63,9	25 (3/12)
LU	55.6 (5/9)	69.2 (9/13)	-	-	50 (1/2)	30 (3/10)	0 (0/1)	33.3 (1/3)	15.4 (2/13)	15.8 (3/19)	-	-	-	-	-	-
HU	48,8	49,2	51,7	52,6	35,2	39,3	40,0	47,8	7,7	13,6	22,4	20,0	50,0	40,9	0 (0/1)	29,6
MT	-	50 (1/2)	-	0 (0/1)	50 (1/2)	66.7 (2/3)	-	25 (1/4)	0 (0/1)	0 (0/1)	50 (1/2)	33.3 (1/3)	-	-	100 (1/1)	0 (0/1)
AT	58,6	59,4	-	36.4 (4/11)	30,5	28,1	25,9	26,7	18,0	20,0	24,7	25,3	21.4 (3/14)	35.3 (6/17)	38,4	35,6
PL	:	65,0	:	56,7	52.7 (d)	54,6	21,5	18,8	0 (0/10)	10,2	29.8 (d)	34,3	53.8 (d)	59,6	57,7	43,4
PT	64,6	67,2	75 (9/12)	58.8 (10/17)	55,8	55,7	44,6	65,2	26,7	27,8	38,5	37,0	48,7	56,5	39,3	31,3
RO	-	64,3	60,5	66.7 (10/15)	-	68,1	53,4	56,0	-	50,0	32,4	37,1	-	31,4	41,7	49,1
SI	60,2	67,7	76.9 (10/13)	62,2	48,6	61,5	46,9	62,5	22,7	23,9	16,5	23,0	80 (4/5)	0 (0/3)	48,6	41,9
SK	77,4	76,5	59,7	64,7	50,0	45,3	35,3	71,4	10,0	15,2	31,9	24,0	51,7	40,5	33,9	45,0
FI	61,9	63,8	50,0	72,4	33,3	34,7	16,7	37,5	21,9	17,9	30,9	31,1	57,1	22,7	48,0	44,4
SE	58,0	51,2	58,0	59,7	33,4	36,7	25,0	25,0	24,0	23,7	28,2	26,7	31,7	29,1	36,0	32,2
UK	:	59,9	:	-	38,4	35,5	29,5	26,5	24,5	23,5	22,6	21,7	27,7	30,7	39,8	35,2
IS	:	25 (2/8)	:	100 (2/2)	:	33.3 (3/9)	:	-	:	0 (0/1)	:	75 (3/4)	:	100 (1/1)	:	100 (1/1)
NO	55,9	56,4	-	100 (1/1)	33,3	23,8	37.5 (6/16)	21.1 (4/19)	25,6	15,4	20,0	23,2	-	-	40,0	48,0
CH	:	51,7	:	48,9	28,4	28,8	20,5	22,9	12,3	15,0	23,0	22,2	56,5	42,9	32,7	32,7
MK	100 (2/2)	50 (1/2)	-	0 (0/1)	50 (4/8)	66.7 (6/9)	66.7 (2/3)	33.3 (1/3)	33.3 (1/3)	16.7 (1/6)	32,0	28.6 (4/14)	100 (2/2)	60 (3/5)	33.3 (2/6)	0 (0/3)
RS	70.6 (12/17)	76,1	-	100 (3/3)	63,0	57,3	41,2	53,6	23.1 (3/13)	50,0	21,4	35,2	66.7 (8/12)	60,9	60,5	60,0
TR	59,5	58,0	58,1	40 (2/5)	45,8	48,9	49,7	47,0	40 (2/5)	44,1	27,6	27,7	61,5	53,4	44,8	50,5
IL	:	59,3	:	50,0	:	31,4	:	14,7	:	23,0	:	26,2	:	-	:	0.0 (0/2)

Notes: Exceptions to the reference period: IE: 2012-2015; IL: 2013–2015; EU-28, RS, PL, TR: 2014–2016; Data unavailable for: AL, AM, BA, FO, GE, ME, MD, NL, TN and UA.
Other: ‚:' indicates that data are not available; ‚-' indicates that the number of graduates was zero; ‚(d)' indicates that the definition differs; For proportions based on fewer than 20 graduates the numerators and denominators are displayed in brackets; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02) and OECD (Graduates by field).

Table 2.4 Compound annual growth rate (CAGR, %) and trend of doctoral graduates (number), by sex and narrow field of study in natural sciences, ICT and engineering, 2013-2016

	Natural sciences, mathematics and statistics (EF05)																Information and Communication Technologies (EF06)				Engineering, manufacturing and construction (EF07)											
	Biological and related sciences (EF051)				Environment (EF052)				Physical sciences (EF053)				Mathematics and statistics (EF054)				Information and Communication Technologies (EF061)				Engineering and engineering trades (EF071)				Manufacturing and processing (EF072)				Architecture and construction (EF073)			
	Women		Men		Women		Men		Women		Men		Women		Men		Women		Men		Women		Men		Women		Men		Women		Men	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
BE	-12,6		-22,0		-39,4		-30,7		-3,3		25,4		-33,3		-24,6		:		-35,3		5,2		16,0		71,0		-		22,4		5,7	
BG	6,1		22,4		:		:		2,4		13,3		-11,2		13,0		-3,1		-17,0		4,2		-2,1		-9,8		-2,1		10,1		10,1	
CZ	-5,1		-8,6		-15,1		18,6		-6,4		-0,9		13,3		6,0		-33,1		-34,1		3,6		0,6		0,0		-19,8		2,7		-0,4	
DK	:		:		:		:		:		:		7,0		4,7		:		:		8,2		3,6		:		:		:		:	
DE	-0,5		-3,4		:		:		2,5		1,0		-0,8		2,5		3,9		3,6		5,6		3,2		6,0		2,2		-2,9		6,6	
EE	3,2		-9,8		-37,0		-18,4		13,3		26,0		:		26,0		26,0		5,3		13,3		84,2		:		:		0,0		10,1	
IE	-13,6		7,9		35,7		40,1		-5,8		2,7		0,0		-7,8		33,9		-2,1		33,6		30,4		76,5		128,9		40,9		-5,3	
EL	15,4		-14,0		-		58,7		8,8		-16,4		-16,4		13,7		-25,8		-7,9		22,6		-4,4		28,9		31,0		16,1		10,9	
ES	9,2		-8,0		:		:		12,9		33,7		26,4		14,7		25,6		29,6		:		:		:		:		39,3		24,3	
FR	:		:		:		:		-		-		-2,3		9,2		-1,4		-4,8		19,1		11,1		-8,2		15,5		-2,0		-2,5	
HR	:		:		:		:		5,5		3,6		12,6		-34,1		7,7		-3,5		-27,9		-12,6		-2,9		32,6		-8,0		0,0	
IT	:		:		:		:		:		:		:		:		:		:		:		:		:		:		:		:	
LV	-		-		-		-		-		-		-100,0		26,0		-30,7		-18,3		-11,5		-10,6		0,0		0,0		-30,7		-50,0	
LT	-14,0		10,1		7,7		-9,1		2,3		10,9		-14,5		-12,6		:		-20,6		-12,6		-22,0		:		:		-49,3		-11,5	
HU	-7,2		-7,7		10,1		8,7		3,4		-2,4		-2,9		-12,6		14,5		-7,5		-9,8		-5,4		-13,7		-2,4		15,5		166,8	
AT	-8,2		-9,1		-		-		-8,6		-5,0		2,2		0,8		-37,0		-39,7		10,6		9,4		26,0		0,0		8,7		13,0	
PL	:		:		:		:		9,9		5,8		-27,2		-20,7		-		130,2		-0,8		-10,5		20,1		6,5		-12,4		16,8	
PT	-0,5		-4,2		3,6		32,6		-4,1		-4,0		-19,7		-39,4		7,7		5,7		-5,5		-3,5		11,0		0,0		-5,9		5,8	
RO	-		-		-57,1		-60,8		-		-		-56,0		-57,5		-		-		-32,2		-36,7		-		-		3,8		-6,1	
SI	-5,6		-15,4		72,1		117,8		-23,0		-35,3		38,7		12,2		65,1		61,4		28,2		11,8		11,8		44,2		45,2		58,7	
SK	11,9		13,9		-21,8		-27,1		-2,0		4,4		18,6		-28,6		20,5		2,7		-28,0		-17,8		-17,2		-3,7		-12,3		-24,9	
FI	11,4		8,3		3,4		-25,0		6,4		4,2		33,9		-7,2		-6,3		1,9		-1,8		-2,1		-25,3		23,6		10,1		15,4	
SE	-1,5		7,9		4,8		2,2		7,8		2,7		0,0		0,0		11,9		12,4		4,5		7,2		56,7		63,3		-8,9		-3,6	
UK	:		:		:		:		-1,5		2,7		-3,5		1,4		1,7		3,5		-6,9		-5,4		56,3		48,9		29,0		37,8	
NO	-12,6		-13,2		-		:		-12,0		2,9		-12,6		14,5		-26,3		-8,8		-1,3		-7,3		:		:		14,5		2,7	
CH	:		:		:		:		1,9		1,1		11,2		6,1		21,6		12,8		0,0		1,5		27,6		53,3		45,2		45,1	
RS	70,8		48,3		-		:		7,6		21,1		3,5		-19,4		130,9		26,5		51,2		7,0		32,3		50,0		8,3		9,5	
TR	22,5		26,3		-66,7		-52,0		23,3		16,0		16,0		22,5		173,9		151,7		26,6		26,2		5,2		24,2		20,4		7,4	

Notes: Exceptions to the reference period: IE: 2012-2015; RS, TR: 2014-2016; DK: 2013-2014 only for the field EF054; Data not available: EU-28 (2013, 2015, 2016), AL, AM, BA, FO, GE, IL (2013, 2014, 2016), ME, MD, NL, TN and UA; CY, LU, MT, IS and MK excluded due to low number of observations (fewer than 15 in every narrow field); Definition differs: FR: EF051, EF052 for 2013, 2014; PL: EF051, EF052, EF053, EF071, EF072 for 2014; UK: EF051, EF052 for 2014; Fields not applicable: CH: EF051, EF052, EF053, EF071, EF072 for 2014. Other: ‚:' indicates that not enough data are available to compute the CAGR; ‚-' indicates that the number of graduates at the start of the period was 0; Bars in the ‚Trend' column represent the actual numbers of graduates each year. This differs from the CAGR, which shows the average annual rate of change over the whole period; In the ‚Trends' column, the scale is not the same across countries; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02).

While women's share of doctoral graduates has increased in several narrow fields of STEM in several countries, they are still under-represented in most narrow fields of STEM.

Table 2.3 focuses on Science, Technology, Engineering and Mathematics (STEM), and more precisely on narrow fields within natural sciences, mathematics and statistics, information and communication technologies and engineering, and manufacturing and construction. It shows the proportion of women among doctoral graduates in these narrow fields for 2013 and 2016, in order to make an assess the progress in women's representation among graduates.

In the fields of biological and environment sciences (two narrow fields within the natural sciences, mathematics and statistics) women were either equal to or exceeded the number of men doctoral graduates in 2016 in 29 countries (BE, BG, CZ, DE, EE, IE, EL, ES, FR, HR, CY, LV, LU, MT, AT, PL, PT, RO, SI, SK, FI, SE, UK, NO, CH, MK, RS, TR, IL) and in 19 countries (EE, IE, EL, HR, CY, LV, LT, HU, PL, PT, RO, SI, SK, FI, SE, IS, NO, RS, IL) respectively. If one considers that in the 'parent' broad field they were the majority in 18 countries, this shows that variation at the broader level hides finer variations between narrow fields. In contrast, women were under-represented in the fields of physical sciences, mathematics and statistics, manufacturing and processing, engineering and engineering trades and ICT. More specifically, in the field of physical science, women numbered more than or equal to men among doctoral graduates in 11 countries (EL, ES, HR, LT, MT, PL, PT, RO, SI, MK, RS), in the field of manufacturing and processing in 10 countries (BE, CZ, HR, LV, PL, PT, IS, MK, RS, TR) and in the field of mathematics and statistics in seven countries (HR, CY, LT, RO, SI, SK, RS). The narrow fields, among those examined, with the smallest representation of women are engineering and engineering trades, where women were the majority in one country only (Iceland, three out of four graduates) and ICT, where they were the majority in Bulgaria.

Looking at the change in the proportion of women among doctoral graduates between 2013 and 2016, the picture is quite mixed in all the narrow fields that were looked at. For example, in the field of biological sciences, the proportion of women increased in 14 countries (BE, CZ, DE, EE, EL, ES, LU, HU, AT, PT, SI, FI, NO, RS) and decreased in eight (BG, IE, CY, SK, SE, CH, MK, TR). In the field of environment, it increased in nine countries (EE, EL, CY, LT, HU, RO, SK, FI, SE) and decreased in six (BE, CZ, IE, PT, SI, TR). In ICT, it increased in 17 countries (BG, CZ, DE, EE, IE, FR, HR, LU, HU, AT, PL, PT, SI, SK, CH, RS, TR) while it decreased in nine (BE, EL, LV, LT, FI, SE, UK, NO, MK). On the other hand, the situation for women deteriorated in manufacturing and processing, where the women's share of doctoral graduates decreased in 15 countries (BE, BG, IE, EL, FR, HR, HU, SI, SK, FI, SE, CH, MK, RS, TR) and increased in only seven (CZ, DE, LV, AT, PL, PT, UK).

The average annual growth rate of female doctoral graduates was smaller than that of men in all narrow fields of STEM, and also in most countries.

Table 2.4 presents the average annual rate of change between 2013 and 2016 in the numbers of women and men who graduated at doctoral level in each narrow field. Again, careful attention should be paid to countries with low absolute numbers of graduates, where small changes in numbers can translate into large changes in percentage terms.

In any of the fields, the number of female doctoral graduates grew at a higher rate than that of men in less than half of the countries where there are data available. In fact, the number of countries where the rate of change for women was positive and higher than that for men ranged from four countries (LT, HU, FI, SE) in environmental studies to 11 countries (BG, CZ, DK, DE, IE, EL, FR, AT, SI, RS, TR) in engineering and engineering trades. The highest growth rate in the number of female doctoral graduates (173.9 %) was observed in ICT in Turkey, while the lowest growth rate (-100 %) was in mathematics and statistics in Latvia.

The largest difference in average annual growth rates between female and male doctoral graduates (in favour of women) was in Serbia, in ICT (104.4 percentage points). The second largest was much lower (47.2 percentage points) in Slovakia in mathematics and statistics. The largest difference in favour of men (151.4 percentage points) occurred in Hungary in architecture and construction.

It must be noted that in many cases the numbers of both female and male doctoral graduates decreased. In such instances, the number of women decreased more slowly than it did for men.

Table 2.5 Ratio of bachelor graduates to bachelor entrants, by sex and broad field of study, 2016

Country	Total		Education		Arts and humanities		Social sciences, journalism and information		Business, administration and law		Natural sciences, mathematics and statistics		Information and Communication Technologies		Engineering, manufacturing and construction		Agriculture, forestry, fisheries and veterinary		Health and welfare		Services	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	0,80	0,62	0,96	0,58	0,65	0,63	0,72	0,52	0,69	0,60	0,67	0,49	0,27	0,41	0,74	0,65	0,66	0,67	0,80	0,63	0,65	0,47
BG	0,86	0,61	0,70	0,60	0,77	0,55	1,21	0,94	1,21	1,00	0,72	0,53	0,68	0,44	0,87	0,55	0,79	0,42	0,71	0,66	0,80	0,53
CZ	0,87	0,68	1,19	0,99	0,72	0,65	0,96	0,87	0,96	0,77	0,58	0,54	0,54	0,55	0,70	0,61	0,71	0,57	0,74	0,55	0,86	0,65
DK	0,88	0,82	1,17	0,91	0,92	0,87	1,06	1,00	0,79	0,79	0,79	0,81	0,70	0,75	0,67	0,77	0,97	0,91	0,97	0,98	0,78	0,71
DE	0,75	0,70	0,81	0,72	0,74	0,71	0,70	0,68	0,79	0,75	0,55	0,55	0,41	0,50	0,66	0,74	0,78	0,88	0,88	0,84	0,83	0,86
EE	0,84	0,59	1,01	0,71	0,81	0,62	1,04	0,78	0,92	0,65	0,67	0,64	0,48	0,50	0,58	0,51	0,53	0,58	0,90	0,82	0,74	0,63
IE	0,98	0,94	0,80	0,96	0,79	0,78	0,92	1,01	1,18	1,05	0,82	0,74	0,80	0,74	0,86	1,07	1,19	1,17	1,19	1,31	1,07	0,99
EL	0,85	0,67	0,92	0,97	0,87	0,70	0,89	0,75	0,93	0,77	0,62	0,64	0,83	0,51	0,64	0,60	0,44	0,39	1,13	0,86	0,92	0,91
ES	0,86	0,74	1,35	1,20	0,69	0,69	0,65	0,65	0,75	0,68	0,67	0,58	0,80	0,50	0,93	0,82	0,99	0,95	0,96	0,90	0,82	0,85
FR	0,64	0,54	1,03	1,53	0,47	0,40	0,60	0,57	0,77	0,68	0,42	0,27	1,10	0,58	0,72	0,70	1,77	1,90	0,93	3,88	0,66	0,41
HR	0,68	0,54	0,86	1,34	0,55	0,41	0,67	0,58	0,95	0,86	0,59	0,44	0,50	0,64	0,49	0,42	0,58	0,45	0,81	0,62	0,29	0,52
IT	0,93	0,76	0,95	0,68	0,75	0,69	0,90	0,80	0,90	0,79	0,55	0,54	0,51	0,44	0,79	0,65	0,60	0,54	1,20	1,01	1,32	1,21
CY	0,76	0,48	1,25	0,96	0,96	0,41	0,85	0,78	0,59	0,33	0,95	0,51	0,84	0,38	1,10	0,88	0,63	1.83 (11/6)	0,73	0,77	0,39	0,60
LV	0,63	0,38	0,62	0,50	0,63	0,48	0,76	0,48	0,66	0,40	0,53	0,33	0,39	0,27	0,48	0,35	0,58	0,58	0,66	0,33	0,63	0,38
LT	0,92	0,63	1,78	1,12	0,82	0,72	1,00	0,79	1,00	0,66	0,92	0,83	0,27	0,36	0,78	0,61	0,46	0,50	0,79	0,74	0,71	0,58
LU	0,69	0,66	0,77	0,82	0,56	0,51	0,91	0,73	0,88	1,01	0,33	0,53	0.75 (9/12)	0,42	0,58	0,33	-	-	0,00	0,04	-	-
HU	1,51	1,03	2,63	6,24	1,16	0,96	1,34	1,04	1,68	1,11	1,29	1,07	1,39	1,32	1,10	0,83	1,64	1,36	1,22	0,90	0,91	0,83
MT	0,82	0,63	3,38	2,33	0,63	0,55	0,83	0,81	0,66	0,65	0,80	0,53	0,71	0,66	0,67	0,55	0.38 (5/13)	0.4 (6/15)	0,77	0,51	1,40	0,68
NL	0,89	0,76	1,13	0,87	0,98	1,04	1,04	0,97	0,82	0,77	0,67	0,64	0,48	0,50	0,60	0,65	0,84	0,68	0,88	0,86	0,78	0,70
AT	0,67	0,58	0,75	0,51	0,55	0,46	0,85	0,85	0,71	0,63	0,40	0,42	0,41	0,52	0,59	0,58	0,78	0,65	0,77	0,60	1,06	0,96
PL	1,25	0,76	2,29	1,10	0,65	0,43	1,02	0,67	1,45	0,96	0,78	0,52	0,75	0,51	0,98	0,66	1,03	0,85	1,85	2,01	0,96	0,73
PT	0,94	0,86	0,92	0,50	0,70	0,63	0,87	0,79	0,69	0,62	0,82	0,69	0,55	0,48	1,65	1,02	1,02	0,70	1,15	1,33	0,73	0,63
RO	0,64	0,53	0,76	0,61	0,57	0,50	0,56	0,44	0,69	0,60	0,63	0,51	0,52	0,47	0,59	0,50	0,62	0,59	0,73	0,65	0,59	0,62
SI	1,00	0,87	0,94	0,46	0,72	0,74	0,87	0,57	1,30	1,08	0,69	0,51	0,56	0,56	0,80	1,02	0,69	0,72	1,07	0,86	1,68	1,34
SK	0,89	0,65	0,76	0,59	0,83	0,74	0,99	0,70	0,96	0,75	0,71	0,57	0,54	0,50	0,81	0,60	0,90	0,57	1,04	0,79	0,89	0,74
FI	1,06	0,84	1,27	0,96	1,17	1,13	1,32	1,32	1,01	0,74	0,66	0,69	0,91	0,75	1,12	0,85	1,29	1,23	1,04	0,85	0,96	0,82
SE	0,78	0,54	0,91	0,81	0,28	0,23	0,81	0,71	0,74	0,65	0,47	0,29	0,65	0,52	0,92	0,62	0,29	0,22	1,20	0,86	0,83	0,45
UK	0,78	0,74	0,86	0,78	0,79	0,81	0,74	0,76	0,79	0,74	0,70	0,71	0,63	0,56	0,72	0,71	0,85	1,01	0,89	0,98	-	-
IS	1,03	0,87	1,46	1,34	0,71	0,57	1,32	0,94	0,88	0,74	0,61	0,67	0,78	1,18	0,90	0,94	0,63	0,67	1,18	0,95	1,05	1,20
NO	0,72	0,57	1,17	1,31	0,34	0,39	0,43	0,43	0,59	0,48	0,41	0,28	0,44	0,56	0,93	0,83	0,34	0,77	1,11	1,00	0,46	0,36
CH	0,91	0,93	1,10	1,26	0,87	0,86	0,93	1,03	0,89	0,87	0,66	0,66	0,59	0,76	0,73	0,96	1,05	0,98	0,97	0,91	0,88	1,41
MK	0,52	0,39	1,12	0,44	0,62	0,50	0,58	0,55	0,61	0,41	0,81	0,57	0,37	0,27	0,47	0,42	0,35	0,48	0,26	0,16	0,45	0,39
TR	0,61	0,51	0,86	0,93	0,56	0,46	0,53	0,46	0,55	0,46	0,97	0,93	0,15	0,13	0,70	0,57	1,13	0,98	0,52	0,41	0,44	0,33
IL	0,83	0,82	0,84	0,67	0,65	0,66	0,84	0,85	1,06	1,26	0,50	0,39	0,51	0,60	0,87	0,93	0,78	0,96	0,89	0,93	:	:

Notes: Exceptions to the reference year: IE, IL: 2015; Data unavailable for: EU-28, AL, AM, BA, FO, GE, ME, MD, RS, TN and UA; Definition differs for: DE (ISCED level 6 graduates); Other: The indicator compares two different groups of people, i.e. the same reference year's entrants and graduates; „:" indicates that data are not available; „–" indicates that the denominator is zero; For ratios whose denominator is smaller than 20, the numerators and denominators are displayed in brackets. The ISCED 2011 classification is used.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02; educ_uoe_ent02); OECD (Graduates by field; New entrants by field).

Table 2.6 Ratio of doctoral entrants to master graduates, by sex and broad field of study, 2016

Country	Total		Education		Arts and humanities		Social sciences, journalism and information		Business, administration and law		Natural sciences, mathematics and statistics		Information and Communication Technologies		Engineering, manufacturing and construction		Agriculture, forestry, fisheries and veterinary		Health and welfare		Services	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	0,03	0,04	0,00	0,00	0,02	0,04	0,03	0,04	0,01	0,01	0,13	0,11	0,19	0,15	0,04	0,04	0,12	0,19	0,03	0,04	0,00	0,00
BG	0,06	0,11	0,06	0,30	0,20	0,36	0,10	0,15	0,01	0,03	0,18	0,44	0,08	0,09	0,13	0,11	0,05	0,14	0,13	0,18	0,03	0,07
CZ	0,09	0,18	0,04	0,09	0,21	0,33	0,06	0,10	0,04	0,09	0,45	0,65	0,12	0,13	0,15	0,20	0,17	0,23	0,12	0,24	0,09	0,14
DK	0,08	0,10	0,00	0,00	0,06	0,10	0,04	0,06	0,00	0,00	0,11	0,24	0,00	0,00	0,21	0,22	0,41	0,68	0,28	0,35	0,00	0,00
DE	0,17	0,23	0,07	0,17	0,11	0,16	0,17	0,21	0,08	0,15	0,38	0,47	0,33	0,17	0,17	0,18	0,42	0,24	0,30	0,48	0,38	0,20
EE	0,09	0,14	0,03	0,06	0,12	0,11	0,10	0,20	0,03	0,10	0,35	0,49	0,16	0,19	0,10	0,09	0,19	0,17	0,09	0,13	0,05	0,04
IE	0,11	0,13	0,04	0,06	0,12	0,19	0,20	0,26	0,03	0,02	0,48	0,51	0,08	0,06	0,21	0,23	0,96	1,25	0,12	0,27	0,00	0,00
EL	0,18	0,28	0,18	0,31	0,33	0,57	0,12	0,18	0,06	0,08	0,17	0,20	0,23	0,24	0,32	0,42	0,39	0,41	0,38	1,00	0,13	0,21
ES	0,16	0,21	0,05	0,06	0,46	0,60	0,24	0,44	0,07	0,11	0,61	0,67	0,26	0,25	0,13	0,17	0,20	0,33	0,14	0,19	0,05	0,07
FR	0,05	0,07	0,01	0,02	0,16	0,25	0,07	0,12	0,02	0,03	0,29	0,36	0,10	0,08	0,04	0,04	0,00	0,00	0,01	0,01	0,04	0,06
HR	0,19	0,24	0,07	0,12	0,26	0,43	0,23	0,43	0,03	0,06	0,78	1,21	0,08	0,02	0,19	0,23	0,17	0,25	0,46	0,71	0,16	0,11
IT	0,05	0,07	0,01	0,04	0,05	0,09	0,03	0,07	0,02	0,03	0,15	0,24	0,28	0,27	0,08	0,08	0,15	0,10	0,06	0,05	0,00	0,00
CY	0,06	0,10	0,03	0,07	0,13	0,26	0,13	0,12	0,03	0,05	0,25	0,57	0.31 (4/13)	0,13	0,07	0,17	0.00 (0/3)	0.00 (0/1)	0,12	0,14	0,02	0.00 (0/15)
LV	0,12	0,23	0,11	0,43	0,18	0,21	0,11	0,18	0,08	0,17	0,39	0,71	0,27	0,21	0,27	0,33	0,24	0,29	0,05	0,08	0,04	0,10
LT	0,06	0,11	0,06	0,08	0,12	0,22	0,06	0,10	0,02	0,04	0,33	0,46	0,12	0,12	0,10	0,13	0,11	0,12	0,04	0,08	0.00 (0/18)	0,00
LU	0,20	0,36	0,20	0.13 (2/15)	0.71 (10/14)	0.92 (12/13)	0,28	2.14 (15/7)	0,04	0,05	1.00 (17/17)	1,29	0.71 (5/7)	0,93	1.75 (7/4)	2.30 (23/10)	0.00 (0/2)	0.00 (0/2)	0.00 (0/12)	0.00 (0/4)	-	-
HU	0,09	0,13	0,03	0,03	0,21	0,26	0,11	0,26	0,03	0,04	0,46	0,63	0,11	0,14	0,04	0,05	0,14	0,15	0,12	0,17	0,18	0,23
NL	0,06	0,08	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
AT	0,13	0,17	0,04	0,03	0,24	0,31	0,09	0,15	0,09	0,09	0,23	0,38	0,25	0,13	0,21	0,19	0,24	0,36	0,16	0,22	0,06	0,06
PL	0,09	0,15	0,02	0,03	0,23	0,54	0,09	0,18	0,04	0,07	0,26	0,56	0,09	0,11	0,09	0,10	0,27	0,24	0,09	0,14	0,06	0,09
PT	0,16	0,24	0,15	0,29	0,38	0,60	0,19	0,53	0,08	0,19	0,28	0,51	0,46	0,77	0,13	0,11	0,10	0,15	0,10	0,13	0,33	0,26
RO	0,09	0,13	0,03	0,07	0,17	0,30	0,08	0,22	0,03	0,06	0,16	0,31	0,06	0,07	0,13	0,16	0,15	0,15	0,09	0,12	0,09	0,07
SI	0,04	0,07	0,01	0,02	0,04	0,07	0,01	0,04	0,03	0,03	0,14	0,34	0,02	0,11	0,07	0,06	0,30	0,25	0,02	0,05	0,04	0,03
SK	0,05	0,09	0,02	0,04	0,09	0,22	0,04	0,06	0,03	0,07	0,17	0,26	0,08	0,08	0,09	0,09	0,09	0,11	0,04	0,10	0,07	0,04
FI	0,08	0,10	0,06	0,06	0,08	0,16	0,10	0,15	0,04	0,04	0,12	0,18	0,11	0,08	0,10	0,08	0,08	0,13	0,10	0,26	0,05	0,05
SE	0,08	0,14	0,01	0,02	0,13	0,17	0,06	0,11	0,02	0,03	0,23	0,52	0,25	0,31	0,08	0,10	0,14	0,28	0,14	0,32	0,01	0,10
UK	0,12	0,19	0,04	0,05	0,20	0,34	0,10	0,16	0,03	0,05	0,42	0,66	0,22	0,24	0,19	0,23	0,23	0,26	0,18	0,32	-	-
IS	0,06	0,11	0,02	0,06	0,23	0,21	0,05	0,04	0,01	0,01	0,15	0,67	1.00 (1/1)	0.60 (3/5)	0,05	0,13	0.00 (0/1)	-	0,09	0,18	0.14 (1/7)	0.00 (0/3)
NO	0,12	0,16	0,05	0,04	0,16	0,17	0,09	0,08	0,02	0,02	0,45	0,64	0,12	0,05	0,11	0,18	0,04	0,13	0,22	0,46	0,02	0,02
CH	0,19	0,22	0,03	0,02	0,16	0,26	0,14	0,23	0,07	0,08	0,69	0,66	1,06	0,42	0,32	0,22	0,65	0,11	0,33	0,61	0,00	0,00
MK	0,15	0,22	0,13	0,41	0,42	0,43	1,07	1,96	0,04	0,09	0,40	0,48	0,27	0,26	0,06	0,09	0.50 (8/16)	0.61 (11/18)	0,16	0,22	0,26	0,20
TR	0,23	0,27	0,37	0,42	0,57	0,65	0,28	0,48	0,12	0,15	0,52	0,64	0,20	0,28	0,51	0,63	0,15	0,15	0,10	0,07	0,09	0,06
IL	0,09	0,13	0,03	0,04	0,05	0,23	0,20	0,13	0,03	0,01	0,12	0,70	0,03	0,26	1,44	0,23	0,04	0,17	1,05	0,06	0,00	0,00

Notes: Exceptions to the reference year: BE: 2013; IE, IL: 2015; Data unavailable for: EU-28, AL, AM, BA, FO, GE, ME, MD, RS, TN and UA; NL not available by field for ISCED level 8 entrants; MT excluded due to having only one entrant at ISCED level 8 in total, one man in ‚Arts and Humanities'.
Other: The indicator compares two different groups of people, i.e. the same reference year's entrants and graduates; ‚:' indicates that data are not available; For ratios whose denominator is smaller than 20, the numerators and denominators are displayed in brackets; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02; educ_uoe_ent02); OECD (Graduates by field; New entrants by field).

Table 2.7 Ratio of doctoral entrants to master graduates, by sex and narrow field of study in natural sciences, ICT and engineering, 2016

Country	Biological and related sciences (EF051)		Environment (EF052)		Physical sciences (EF053)		Mathematics and statistics (EF054)		Information and Communication Technologies (EF061)		Engineering and engineering trades (EF071)		Manufacturing and processing (EF072)		Architecture and construction (EF073)	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	:	:	:	:	0,16	0,11	0,12	0,12	0,19	0,15	0,09	0,06	0,00	0,00	0,02	0,01
BG	0,19	0,47	0,00	0,00	0,21	0,40	0.72 (13/18)	1.63 (26/16)	0,08	0,09	0,19	0,10	0,14	0,15	0,05	0,10
CZ	0,56	0,88	0,38	1,14	0,46	0,62	0,19	0,37	0,10	0,13	0,28	0,24	0,13	0,30	0,07	0,12
DK	0,00	0,00	0,00	0 (0/17)	0,00	0,00	0,00	0,00	0,00	0,00	0,48	0,43	0,00	0,00	0,00	0,00
DE	0,49	0,61	-	-	0,44	0,58	0,10	0,20	0,65	0,27	0,22	0,22	0,35	0,50	0,10	0,15
EE	0,48	0,71	0,12	0.24 (4/17)	0,51	0,43	0 (0/12)	0.63 (5/8)	0,16	0,19	0,17	0,10	0,00	0,00	0,06	0,08
IE	0,68	0,82	0,13	0,21	1,03	1,12	0,08	0,16	0,08	0,07	0,34	0,35	0,00	0,02	0,10	0,09
EL	0,40	0,65	0.3 (3/10)	0.42 (5/12)	0,28	0,39	0,08	0,21	0,17	0,21	0,35	0,40	0,29	0,29	0,31	0,47
ES	0,65	0,67	0,47	0,53	0,64	0,77	0,59	0,60	0,26	0,25	0,20	0,20	0,23	0,30	0,07	0,11
FR	0,30	0,35	0,00	0,00	0,44	0,54	0,17	0,23	0,10	0,09	0,08	0,06	0,08	0,06	0,02	0,03
HR	1,47	2,18	0,16	0.33 (3/9)	1,23	1,17	6,48	1,57	0,44	0,13	0,56	0,50	0,12	0,19	0,17	0,14
IT	:	:	:	:	0,11	0,11	0,07	0,19	0,72	0,69	0,17	0,10	-	332 (332/1)	0,04	0,03
CY	0,20	0.13 (1/8)	0.22 (4/18)	0.33 (3/9)	0.57 (4/7)	0.4 (2/5)	0.22 (2/9)	7 (7/1)	0.31 (4/13)	0,13	0,06	0,16	-	-	0,08	0,19
LV	0,38	1.27 (14/11)	0,27	0.63 (5/8)	0,45	0,55	0.44 (4/9)	1 (3/3)	0,27	0,21	0,26	0,31	0,26	0.5 (3/6)	0,29	0,37
LT	0,41	0,39	0,30	0.83 (5/6)	0,42	0,58	0,07	0,21	0,12	0,12	0,13	0,13	0,19	0,48	0,04	0,07
LU	1.71 (12/7)	1.43 (10/7)	-	-	3 (3/1)	1.18 (13/11)	0.22 (2/9)	1.33 (4/3)	0.71 (5/7)	0,93	0 (0/4)	0 (0/3)	-	0 (0/5)	-	0 (0/2)
HU	0,36	0,64	0,46	0,84	0,69	0,71	0,30	0,15	0,11	0,14	0,03	0,03	0,04	0,09	0,04	0,07
AT	0,21	0,36	0,04	0,06	0,40	0,44	0,39	0,59	0,15	0,05	0,51	0,29	0,14	0,12	0,13	0,15
PL	0,30	0,68	0,07	0,11	0,43	0,81	0,06	0,34	0,21	0,17	0,15	0,14	0,05	0,03	0,05	0,05
PT	0,24	0,44	0,31	0,57	0,33	0,45	0,38	0,91	0,46	0,77	0,14	0,10	0,21	0,37	0,10	0,13
RO	0,10	0,33	0,03	0,06	0,20	0,25	0,26	0,94	0,07	0,10	0,17	0,15	0,08	0,14	0,09	0,11
SI	0,13	0,37	0,00	0 (0/10)	0,04	0,06	0,11	0,19	0,02	0,11	0,15	0,06	0,00	0,00	0,05	0,03
SK	0,23	0,35	0,06	0,11	0,17	0,28	0,16	0,28	0,07	0,07	0,13	0,10	0,10	0,10	0,06	0,09
FI	0,10	0,25	0,13	0,14	0,18	0,23	0,03	0,08	0,11	0,08	0,11	0,09	0,10	0,12	0,07	0,04
SE	0,20	0,29	0,10	0,17	0,57	1,09	0,32	0,52	0,25	0,31	0,08	0,09	1,04	1,11	0,05	0,10
UK	0,37	0,50	-	-	0,67	0,94	0,28	0,50	0,22	0,24	0,39	0,34	0,26	0,30	0,10	0,10
IS	0.75 (3/4)	0.29 (2/7)	0,00	0.1 (1/10)	0.3 (3/10)	1.5 (15/10)	0 (0/2)	-	1 (1/1)	0.6 (3/5)	0 (0/9)	0,08	0.13 (1/8)	0 (0/3)	0.13 (1/8)	0.08 (1/12)
NO	0,10	0,20	0,00	0,07	0,24	0,27	0,07	0,09	0,13	0,05	0,12	0,23	0,00	0 (0/9)	0,12	0,12
CH	0,82	0,92	0,76	0,76	0,65	0,68	0,25	0,24	1,06	0,42	0,57	0,27	0,40	0,49	0,16	0,12
MK	0.44 (4/9)	2.5 (5/2)	0.5 (2/4)	1.5 (3/2)	0,38	0,25	0.33 (2/6)	0.4 (2/5)	0,27	0,26	0,02	0,05	0.67 (6/9)	0.42 (5/12)	0,03	0,08
TR	0,60	0,77	0,84	0,52	0,42	0,64	0,51	0,48	0,09	0,11	0,53	0,67	0,42	0,64	0,55	0,50
IL	0,58	0,90	0,47	0,56	1,17	0,76	0,09	0,29	0,27	0,26	1,37	0,23	0,00	0,00	0,00	0,28

Notes: Exceptions to the reference year: BE: 2013; IT: 2014; IE, FR, IL: 2015; Data not available: EU-28, AL, AM, BA, FO, GE, ME, MD, NL, RS, TN and UA; NL not available by field for ISCED level 8 entrants; MT excluded due to having no entrants at ISCED level 8 in the fields displayed.
Other: The indicator compares two different groups of people, i.e. the same reference year's entrants and graduates; ':' indicates that data are not available; „-" indicates that the denominator was zero; For ratios whose denominator is smaller than 20, the numerators and denominators are displayed in brackets; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02; educ_uoe_ent02); OECD (Graduates by field; New entrants by field).

Table 2.8 Ratio of doctoral graduates to doctoral entrants, by sex and broad field of study, 2016

Country	Total		Education		Arts and humanities		Social sciences, journalism and information		Business, administration and law		Natural sciences, mathematics and statistics		Information and Communication Technologies		Engineering, manufacturing and construction		Agriculture, forestry, fisheries and veterinary		Health and welfare		Services	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	1,97	2,08	-	-	1,75	2,33	1,60	1,31	2,61	2,63	1,72	2,70	0 (0/6)	0,33	3,66	2,95	0,88	0,53	2,07	1,86	-	-
BG	0,73	0,68	0,75	0,51	0,90	0,74	0,43	0,53	0,76	0,62	0,89	0,85	0,50	0,26	0,60	0,67	2 (22/11)	0,91	0,88	0,95	0.74 (14/19)	0,52
CZ	0,48	0,52	0,68	0,70	0,52	0,63	0,43	0,59	0,45	0,39	0,53	0,62	0,27	0,46	0,47	0,48	0,52	0,51	0,42	0,52	0,26	0,48
DK	0,90	0,96	-	-	0,73	0,80	1,26	1,33	-	-	1,07	1,05	-	-	0,89	0,96	1,10	1,12	0,79	0,80	-	-
DE	0,72	0,74	0,31	0,20	0,46	0,70	0,60	0,77	0,61	0,57	0,77	0,85	0,30	0,73	0,43	0,58	0,73	1,04	1,36	1,13	0,16	0,30
EE	0,67	0,62	1 (9/9)	1 (2/2)	0,90	0.64 (7/11)	0.63 (12/19)	0.64 (9/14)	0.76 (13/17)	0,26	0,72	0,69	0.22 (2/9)	0,54	0,73	0,78	0.55 (6/11)	1 (5/5)	0,33	0.44 (4/9)	0 (0/2)	0 (0/2)
IE	0,70	0,80	0,67	0,69	0,98	0,72	0,65	0,63	0,45	0,65	0,82	0,89	1,04	1,07	0,78	0,93	0,37	0,65	0,58	0,68	-	-
EL	0,63	0,59	0,53	0,57	0,67	0,69	0,68	0,61	0,27	0,46	0,73	0,44	0,17	0,57	0,62	0,61	0,38	0,78	0,76	0,60	1,50	0,90
ES	0,64	0,61	0,42	0,46	0,49	0,49	0,41	0,44	0,43	0,41	1,31	1,15	1,56	1,32	0,48	0,34	0,46	0,37	0,45	0,43	0,13	0,13
FR	0,73	0,75	0,52	0,52	0,61	0,58	0,71	0,79	0,61	0,53	0,86	0,81	0,77	0,78	0,78	0,88	-	-	0,55	0,59	0,58	0,82
HR	0,20	0,21	0,21	0,52	0,19	0,23	0,20	0,22	0,19	0,14	0,15	0,10	0.42 (5/12)	1.38 (18/13)	0,19	0,20	0,36	0,23	0,25	0,28	0,07	0,14
IT	1,12	1,07	3,85	1.8 (18/10)	1,11	1,22	0,93	0,71	1,16	1,21	1,26	1,06	3,43	2,16	0,93	0,87	1,09	1,31	1,06	1,18	-	-
CY	0,32	0,34	0,19	0 (0/9)	0,25	0.13 (2/15)	0,41	0.43 (3/7)	0,21	0,20	0.88 (15/17)	0.69 (9/13)	0 (0/4)	0.67 (4/6)	0.6 (6/10)	0.61 (11/18)	-	-	0.11 (2/19)	0.13 (1/8)	0 (0/1)	-
LV	0,34	0,27	0,20	0.3 (3/10)	0,43	0.2 (3/15)	0,41	0.44 (8/18)	0,24	0,21	0,48	0,48	0.14 (2/14)	0,27	0,28	0,21	0.14 (2/14)	0.57 (4/7)	0,56	0.23 (3/13)	0.2 (1/5)	0 (0/6)
LT	0,59	0,45	0.67 (12/18)	0.8 (4/5)	0,77	0,65	0,65	0,54	0,54	0,26	0,43	0,47	0 (0/3)	0.5 (6/12)	0,59	0,42	1 (13/13)	0.38 (5/13)	0,55	0,32	-	-
LU	0,65	0,55	0.29 (2/7)	1.5 (3/2)	0.7 (7/10)	0.33 (4/12)	1.18 (13/11)	0.4 (6/15)	0.44 (4/9)	0.82 (9/11)	0.76 (13/17)	0,48	0.6 (3/5)	0,59	0.14 (1/7)	0,57	-	-	-	-	-	-
HU	0,53	0,59	0,23	0,47	0,40	0,46	0,49	0,49	0,18	0,18	0,53	0,53	0.43 (6/14)	0,53	0,62	0,79	0,79	0,75	0,51	0,51	0,12	0,21
AT	0,52	0,63	0,48	0,52	0,49	0,55	0,38	0,50	0,33	0,38	0,78	0,82	0,48	0,79	0,64	0,76	0,78	0,76	0,60	0,49	0.44 (4/9)	0.78 (7/9)
PL	0,21	0,22	0,18	0,17	0,17	0,17	0,16	0,16	0,11	0,15	0,28	0,31	0,10	0,14	0,23	0,23	0,29	0,30	0,30	0,33	0,26	0,31
PT	0,58	0,45	0,43	0,29	0,45	0,41	0,52	0,32	0,45	0,27	0,92	0,52	0,67	0,47	0,63	0,71	0,73	0,63	0,66	0,48	0,49	0,42
RO	0,49	0,41	0,47	0.53 (9/17)	0,69	0,48	0,53	0,48	0,35	0,34	0,57	0,33	0,66	0,42	0,38	0,35	0,51	0,52	0,42	0,49	0,55	0,35
SI	8,27	5,05	10.8 (183/17	3.89 (35/9)	4,28	3,22	1.31 (407/13	6,74	26,44	19,79	3,47	1,76	45 (45/1)	5,11	4,37	4,76	1,16	1,65	6.13 (98/16)	3.45 (38/11)	3.4 (17/5)	7.25 (29/4)
SK	1,03	0,88	1,38	1,24	0,95	0,67	1,07	1,11	0,92	0,79	1,28	0,91	0.88 (7/8)	1,00	0,98	0,96	1,27	0,85	0,94	0,84	0,50	0,76
FI	1,24	1,28	1,09	1.76 (30/17)	0,86	0,77	0,99	0,86	1,00	1,09	2,14	2,02	0,82	1,62	1,60	1,35	2,19	1.8 (27/15)	1,38	1,13	0.8 (8/10)	0.82 (9/11)
SE	1,21	1,18	1,44	1.32 (25/19)	0,96	0,95	1,25	0,94	0,60	0,68	1,67	1,31	1,08	1,25	1,38	1,41	2,30	1,67	1,04	0,97	3 (3/1)	1.2 (6/5)
UK	0,75	0,80	0,60	0,66	0,75	0,83	0,76	0,81	0,61	0,69	0,76	0,79	0,61	0,77	0,76	0,81	0,86	0,94	0,82	0,87	-	-
IS	0,84	0,53	0.75 (3/4)	0 (0/2)	0.47 (8/17)	0.71 (5/7)	0.6 (3/5)	0 (0/2)	1 (2/2)	1 (2/2)	1.17 (7/6)	0.67 (12/18)	0 (0/1)	0.33 (1/3)	3 (6/2)	0.43 (3/7)	-	-	0.94 (16/17)	0.38 (3/8)	0 (0/1)	-
NO	0,72	0,72	0,55	1.14 (16/14)	0,64	0,60	0,77	0,64	0,72	0,84	0,70	0,70	0.44 (4/9)	1.47 (22/15)	0,67	0,63	1.8 (9/5)	0.7 (7/10)	0,75	0,79	2 (6/3)	1.67 (10/6)
CH	0,71	0,78	0,44	0,95	0,59	0,53	0,73	0,74	0,56	0,61	0,76	0,91	0,47	0,86	0,79	0,84	0,96	1,07	0,75	0,73	-	-
MK	0,51	0,41	1.4 (7/5)	0.25 (3/12)	0,61	0,65	0,05	0,13	1,32	0,55	0.5 (8/16)	0.44 (7/16)	0.08 (1/13)	0.33 (5/15)	0.7 (7/10)	1 (15/15)	0.63 (5/8)	0.18 (2/11)	0,53	0,70	0.08 (1/12)	0,05
TR	0,47	0,40	0,67	0,61	0,36	0,39	0,34	0,34	0,39	0,34	0,61	0,65	1.15 (15/13)	0,31	0,36	0,30	0,52	0,51	0,57	0,42	0,33	0,38
IL	0,71	0,75	0,65	1,38	0,73	0,58	0,56	0,51	0,61	0,77	0,84	0,92	0,77	0,97	0,46	0,59	1,75	1,46	0,57	0,36	0,00	0,00

Notes: Exceptions to the reference year: BE: 2013; IE, IL: 2015; Definition differs for: DE (ISCED level 8 entrants); Data not available EU-28, NL, AL, AM, BA, FO, GE, ME, MD, RS, TN and UA; NL: entrants not available before 2016, graduates not available for 2016; MT excluded due to having only one entrant at ISCED level 8 in total, one man in ‚Arts and Humanities'.
Other: The indicator compares two different groups of people, i.e. the same reference year's entrants and graduates; ':' indicates that data are not available; „-" indicates that the denominator was zero; For ratios whose denominator is smaller than 20, the numerators and denominators are displayed in brackets; The ISCED 2011 classification is used: ISCED 8 level for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02; educ_uoe_ent02); OECD (Graduates by field; New entrants by field).

Women are more likely than men to graduate from bachelor level studies but less likely than men to continue to doctoral level.

Table 2.5 presents, by sex, the ratio of the number of people who graduated from bachelor level studies to the number of people who started their bachelor level studies in 2016. This is not a graduation rate. Finding a graduation rate would require following a cohort of entrants for a reasonable number of years – which would probably need to differ between fields – and then estimating the proportion of the cohort that graduated after these years. The ratio shown here is proxy of a graduation rate, that works for the purpose of this research.

Taking everyone together, the proxy graduation rate was higher for women than men in all countries except Switzerland. Similar patterns can be seen in each broad field of study. The number of countries where the ratio of women was higher than men ranged from 19 in agriculture, forestry and veterinary science (BG, CZ, DK, IE, EL, ES, HR, IT, HU, NL, AT, PL, PT, RO, SK, FI, SE, CH, TR) to 32 in business, administration and law (BE, BG, CZ, DK, DE, EE, IE, EL, ES, FR, HR, IT, CY, LV, LT, HU, MT, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK, IS, NO, CH, MK, TR).

Table 2.6 shows the ratio of the number of people who started doctoral level studies to the number of people who graduated from master level studies in 2016. This is a practical proxy for a ratio that would be based on following a cohort of master level graduates and computing their proportion who proceed, within a reasonable number of years, to doctoral level studies.
As it can be seen, the pattern observed is the reverse of what was seen in Table 2.5; in all countries the ratio for women is smaller than that for men, when taking all fields of study together. The situation is the same in most broad fields of study, women had a higher ratio than men in only a few countries. The exceptions to this are the field of ICT, where the ratio for women is equal to or larger than that for men in 17 countries (BE, DE, IE, ES, FR, HR, IT, CY, LV, LT, AT, SK, FI, IS, NO, CH, MK), the field of engineering, manufacturing and construction (12 countries: BE, BG, EE, FR, IT, AT, PT, SI, SK, FI, CH, IL) and the field of services (10 countries: DE, EE, HR, AT, PT, RO, SI, SK, MK, TR).

Table 2.7 shows the same ratio for narrow fields of STEM. The ratio for women is higher than that for men in the field of engineering and engineering trades in 20 countries (BE, BG, CZ, DK, EE, ES, FR, HR, IT, HU, AT, PL, PT, RO, SI, SK, FI, UK, CH, IL), in ICT in 17 countries (BE, DE, IE, ES, FR, HR, IT, CY, LV, AT, PL, FI, IS, NO, CH, MK, IL) and in architecture and construction in 10 countries (BE, IE, HR, IT, SI, FI, IS, NO, CH, TR).

Finally, Table 2.8 presents, by sex, the ratio of the number of people who graduated from doctoral level studies to the number of people who started doctoral level studies in 2016. The situation seems more balanced at this level. When considering all graduates together, irrespective of their field of study, women have a higher ratio than men in half the countries examined. In individual fields, the number of countries with a higher ratio for women than men ranged from eight in ICT (BG, ES, IT, LU, PT, RO, SI, TR) to 21 in natural sciences, mathematics and statistics (BG, DK, EE, EL, ES, FR, HR, IT, CY, LV, LU, HU, PT, RO, SI, SK, FI, SE, IS, NO, MK).

Annex 2.1 Number of doctoral (ISCED level 8) graduates, by sex, 2012 - 2016

Country	2012		2013		2014		2015		2016	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	57 646	64 080	:	:	62 117	67 978	62 199	68 559	61 683	67 104
BE	1 036	1 332	1 054	1 410	1 137	1 444	1 214	1 586	1 353	1 537
BG	506	473	616	586	719	644	719	723	773	691
CZ	1 112	1 571	1 040	1 393	1 062	1 422	1 070	1 370	1 015	1 364
DK	703	849	852	1 036	1 002	1 124	1 054	1 122	1 065	1 133
DE	12 179	14 628	12 256	15 451	12 798	15 349	13 052	16 166	13 248	16 055
EE	96	94	139	94	113	100	107	101	130	109
IE	747	785	862	876	898	851	683	746	:	:
EL	761	973	691	836	784	817	849	945	986	1 017
ES	4 604	4 879	5 237	5 267	5 361	5 528	5 667	5 649	7 463	7 231
FR	5 761	7 517	6 088	7 802	6 003	7 362	6 054	7 720	5 797	7 219
HR	730	608	454	376	450	405	497	381	355	291
IT	6 099	5 359	5 557	5 130	5 588	5 090	5 409	5 076	5 077	4 726
CY	24	24	26	26	33	27	42	35	54	36
LV	160	107	181	134	159	105	141	114	114	83
LT	227	171	260	181	243	168	248	169	187	137
LU	29	28	25	39	31	51	48	59	43	64
HU	577	665	495	574	553	601	559	647	589	666
MT	6	7	12	12	6	16	16	14	15	22
NL	1 815	2 225	1 997	2 324	2 142	2 386	2 290	2 373	:	:
AT	1 009	1 403	974	1 254	924	1 283	954	1 236	947	1 292
PL	1 911	1 679	2 051	1 668	1 798	1 578	2 078	1 709	2 030	1 734
PT	1 637	1 272	1 355	1 108	1 347	1 156	1 259	1 092	1 289	1 055
RO	2 851	2 307	2 808	2 562	1 932	1 845	2 082	1 910	1 238	1 022
SI	287	282	626	540	562	441	568	432	2 308	1 455
SK	1 063	1 118	1 091	1 028	1 082	1 100	953	961	928	843
FI	944	890	961	938	1 061	952	1 052	948	1 036	973
SE	1 541	1 802	1 542	1 803	1 665	1 919	1 661	1 986	1 598	1 935
UK	9 415	11 023	12 033	13 863	11 757	13 263	12 507	14 129	12 647	14 719
IS	21	19	29	26	53	35	35	32	46	26
NO	677	731	741	808	712	730	731	676	686	682
CH	1 571	2 067	1 589	2 042	1 664	2 183	1 727	2 127	1 743	2 192
ME	:	:	:	:	:	:	:	:	19	9
MK	71	75	119	100	106	100	143	103	111	86
AL	69	48	114	95	27	30	314	206	364	291
RS	:	:	:	:	356	385	574	515	585	481
TR	2 096	2 410	:	:	2 155	2 361	2 394	2 798	2 803	3 249
BA	75	114	88	122	31	50	116	185	128	157
AM	116	264	106	271	74	173	116	210	125	212
GE	172	98	218	188	265	185	216	133	210	159
IL	823	763	804	737	769	777	804	813	:	:
MD	241	164	295	193	232	176	256	193	254	191
TN	:	:	337	284	468	357	824	501	700	755
UA	5 162	4 086	5 059	3 864	5 127	3 954	4 789	3 481	4 651	3 557

Notes: Data not available: F0; Definition differs: EU-28: 2015, 2016.
Other: The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates, with the exception of data for 2012, which refer to ISCED level 6 of the ISCED 1997 classification.

Source: Eurostat – Education Statistics (online data code: educ_grad5 and educ_uoe_grad02); UNESCO Institute for Statistics (Tertiary graduates by level of education).

Annex 2.2 Number of doctoral (ISCED level 8) graduates by sex and broad field of study, 2016

Country	Education		Arts and humanities		Social sciences, journalism and information		Business, administration and law		Natural sciences, mathematics and statistics		Information and Communication Technologies		Engineering, manufacturing and construction		Agriculture, forestry, fisheries and veterinary		Health and welfare		Services	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	2 498	1 202	8 658	7 298	6 232	5 216	5 262	5 798	16 196	18 763	1 113	4 127	5 489	13 390	1 971	1 367	13 115	8 680	393	557
BE	17	8	138	175	186	117	120	134	225	365	0	16	212	455	53	33	396	233	5	1
BG	91	45	142	91	88	74	74	63	93	83	10	8	86	149	22	21	153	124	14	33
CZ	85	43	172	166	80	78	82	94	243	286	7	79	140	376	65	54	120	113	21	75
DK	0	0	103	91	153	129	0	0	141	238	0	0	176	381	102	65	390	229	0	0
DE	339	162	1 201	1 049	1 012	848	1 037	1 698	3 519	4 863	150	871	695	3 015	587	311	4 628	3 176	79	59
EE	9	2	26	7	12	9	13	6	39	33	2	14	16	29	6	5	7	4	0	0
IE	36	22	108	89	108	72	40	43	165	204	24	62	56	142	10	13	136	98	0	1
EL	68	26	165	137	101	86	41	69	129	92	10	61	128	230	21	36	278	253	45	27
ES	378	278	1 025	916	748	755	365	493	2 481	2 225	170	605	447	694	130	118	1 209	678	16	25
FR	84	57	1 042	735	700	689	582	544	2 470	3 318	167	463	567	1 190	0	0	154	149	31	74
HR	14	13	53	42	40	28	22	14	57	27	5	18	30	62	20	15	111	64	3	8
IT	77	18	700	502	321	217	566	537	1 240	1 106	120	357	668	1 128	293	206	965	535	0	0
CY	7	0	6	2	12	3	6	6	15	9	0	4	6	11	0	0	2	1	0	0
LV	5	3	20	3	15	8	17	14	24	21	2	6	13	21	2	4	15	3	1	0
LT	12	4	36	22	30	14	15	8	32	30	0	6	19	38	13	5	30	10	0	0
LU	2	3	7	4	13	6	4	9	13	13	3	16	1	13	0	0	0	0	0	0
HU	17	14	94	90	80	81	18	14	105	128	6	38	28	76	34	33	105	78	3	11
MT	0	0	4	4	0	2	0	1	4	6	0	1	2	4	0	0	5	4	0	0
NL	0	0	145	177	:	:	:	:	225	401	:	:	224	600	171	169	889	614	0	0
AT	39	12	138	122	86	72	118	131	166	274	19	94	142	395	38	32	167	122	4	7
PL	63	12	387	317	219	163	132	147	447	361	6	53	243	342	114	69	338	168	81	102
PT	119	48	144	141	181	105	80	88	265	165	20	52	186	313	27	15	210	73	57	55
RO	23	9	305	203	138	91	103	74	156	81	23	30	160	257	68	66	221	150	41	61
SI	183	35	231	103	407	155	952	475	156	102	45	143	153	324	66	51	98	38	17	29
SK	77	31	117	89	94	71	109	118	193	109	7	50	97	220	47	23	166	103	21	29
FI	87	30	130	92	150	70	68	60	178	186	28	128	112	239	46	27	229	132	8	9
SE	69	25	86	70	145	113	29	42	305	440	42	135	258	669	46	35	615	400	3	6
UK	716	351	2 218	2 174	1 294	1 265	748	1 005	3 600	4 163	267	869	1 034	2 931	189	145	2 577	1 815	0	0
IS	3	0	8	5	3	0	2	2	7	12	0	1	6	3	1	0	16	3	0	0
NO	29	16	69	50	108	60	26	27	149	227	4	22	40	106	9	7	246	157	6	10
CH	33	21	151	132	186	133	137	211	497	756	18	102	169	458	93	29	457	348	0	0
MK	7	3	23	13	2	6	33	18	8	7	1	5	7	15	5	2	24	16	1	1
RS	19	11	102	52	41	30	18	35	112	68	16	16	105	145	32	28	135	71	5	25
TR	387	324	325	493	194	271	330	497	627	580	15	19	396	692	76	134	427	189	26	50
IL	58	29	107	97	124	79	36	27	355	384	17	57	38	109	21	19	48	12	0	0

Notes: Exceptions to the reference year: NL: 2014; EU-28, IE, IL: 2015; Data not available: AL, AM, BA, FO, GE, ME, MD, TN and UA; Definition differs: EU-28;
Other: ,:' indicates that data are not available; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02); OECD (Graduates by field).

Annex 2.3 Number of doctoral (ISCED level 8) graduates by sex and narrow field of study in natural science and engineering (fields EF4, EF5 and EF6), 2016

Country	Biological and related sciences (EF051)		Environment (EF052)		Physical sciences (EF053)		Mathematics and statistics (EF054)		Information and Communication Technologies (EF061)		Engineering and engineering trades (EF071)		Manufacturing and processing (EF072)		Architecture and construction (EF073)	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	36	27	4	5	38	217	8	12	0	16	121	242	5	3	11	13
BG	43	22	0	0	43	48	7	13	10	8	52	105	11	15	12	20
CZ	128	84	11	15	87	151	16	31	3	26	70	220	17	16	39	87
DK	0	0	0	0	0	0	0	0	0	0	176	381	0	0	0	0
DE	1 853	1 228	0	0	1 410	3 079	158	480	129	804	247	1 135	75	141	143	366
EE	22	11	1	0	16	20	0	2	2	14	16	25	0	0	0	4
IE	78	64	15	11	61	103	6	18	24	62	31	113	11	12	14	17
EL	40	14	6	4	76	49	7	25	9	57	70	139	15	18	36	45
ES	1 053	700	0	0	1 193	1 158	232	364	0	0	0	0	0	0	192	296
FR	1 119	764	0	0	1 228	2 077	123	477	167	463	397	946	75	94	95	150
HR	18	14	2	1	27	10	10	2	5	18	12	48	11	7	7	7
CY	9	3	1	1	4	5	1	0	0	4	3	11	0	0	3	0
LV	11	3	2	2	11	14	0	2	2	6	9	20	3	0	1	1
LT	7	8	5	3	15	15	5	4	0	6	16	29	0	0	3	9
LU	9	4	0	0	3	7	1	2	3	16	0	0	0	0	0	0
HU	32	33	20	18	42	65	11	12	6	38	11	44	9	13	8	19
MT	1	1	0	1	2	1	1	3	0	1	1	2	0	0	0	1
AT	79	54	4	7	61	156	16	44	5	20	100	295	6	11	36	65
PL	141	76	17	13	280	233	9	39	6	53	126	241	62	42	23	30
PT	135	66	10	7	97	77	15	8	20	52	118	201	26	20	35	77
RO	36	20	10	5	96	45	14	11	23	23	104	176	22	48	28	29
SI	42	20	51	31	16	10	40	24	45	143	40	134	0	3	52	72
SK	101	31	22	12	48	58	20	8	7	39	43	136	17	25	27	33
FI	83	47	21	8	59	111	12	20	28	128	91	202	5	17	16	20
SE	87	83	46	31	149	257	22	66	42	135	171	469	50	122	37	78
UK	2 220	1 485	0	0	1 193	2 165	186	515	267	869	567	2 040	126	284	303	557
IS	2	6	2	0	3	6	0	0	0	1	3	1	1	0	1	0
NO	22	17	1	0	15	48	4	15	4	22	26	86	0	0	12	13
CH	240	224	86	90	149	368	22	74	18	102	90	315	27	36	52	107
MK	1	1	0	1	6	3	1	2	1	5	4	10	3	2	0	3
RS	35	11	3	0	59	44	15	13	16	16	64	118	14	9	27	18
TR	267	193	2	3	234	245	117	132	15	19	186	486	62	54	100	98
IL	254	174	24	24	72	157	5	29	17	57	38	107	0	0	0	2

Notes: Exceptions to the reference year: IE, IL: 2015; Data not available: EU-28, IT, AL, AM, BA, FO, GE, ME, MD, NL, TN and UA.
Other: ‚:' indicates that data are not available; The ISCED 2011 classification is used: ISCED level 8 for doctoral graduates.

Source: Eurostat – Education Statistics (online data code: educ_uoe_grad02; educ_uoe_ent02); OECD (Graduates by field

3 Participation in science and technology (S&T) occupations

Main findings:

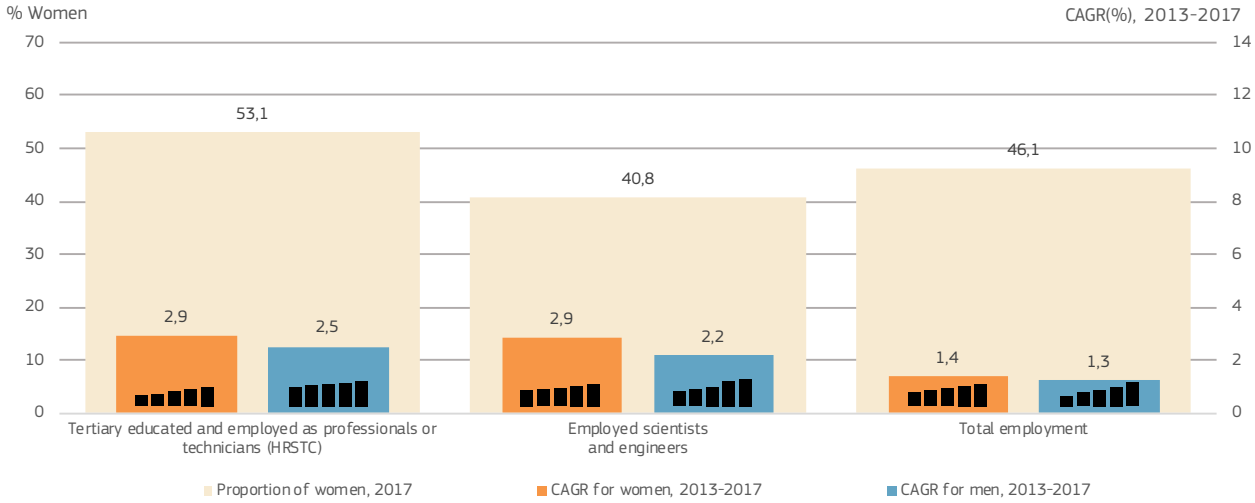
- The number of women employed as scientists and engineers grew on average by 2.9 % per year between 2013 and 2017. The number of tertiary educated women employed as professionals or technicians also grew over this period by 2.2 % per year on average. Both these rates are faster than the respective rates for men
- Furthermore, tertiary educated women are equally likely or more likely than men to be working as professionals or technicians in most countries. On the other hand, women are still a minority in science and engineering occupations in most countries.
- The proportion of employed women working in 'knowledge-intensive activities' (KIA) was higher than the corresponding proportion for men in all the countries examined. The difference between the two proportions at the EU-28 level was 15.5 percentage points. However, KIA include public sector jobs such as health care, education and social work, where women's presence is long established. When KIA is narrowed to 'business industries' (KIABI), the situation appears more balanced, with the proportion of employed women working in KIABI exceeding the respective proportion of men in half the countries examined.
- Women continue to have a lower share of total employment than men, and even when women have attained a tertiary level of education, in the majority of countries they are still more likely to be unemployed than men.
- The proportion of female R&D personnel working as researchers is lower than the corresponding proportion for men in most countries, in the higher education, government and business enterprise sectors. On the contrary, the proportion of female R&D personnel working as other supporting staff is higher than the corresponding proportion of men.
- The proportion of women researchers employed in manufacturing is smaller than the corresponding proportion for men in two thirds of the countries considered. Furthermore, in three major economic activity groups (manufacturing, services and 'other activities') a minority of the researchers are women. However, the opposite is true for 'pharmaceutical manufacturing'.

The demand for science, technology, engineering and mathematics (STEM) professionals is expected to grow by around 8 % between 2014 and 2025. This compares to an average of 3 % growth in demand for all occupations during the same period. Employment in STEM-related sectors is expected to rise by around 6.5 % (CEDEFOP, 2014). An insufficient supply of STEM skills and a low participation rate of women in STEM studies are perceived as barriers that impede job-rich recovery and growth in the EU (Reingarde, 2017). As a result, the European Parliament has called on Member States and the European Commission to take measures to enhance the attractiveness and perceived value of STEM subjects and to encourage young people, including women, to take up STEM studies (Eur. Parl., 2015). Although more women than men obtain undergraduate degrees in the EU-28, the proportion of women declines at postgraduate level in science and technology and even more so in knowledge-intensive occupations: women make up only 32.3 % of people employed in high-technology sectors ([1]). This under-utilisation of female talent is a missed opportunity for Europe's economy and for European society as a whole. All Member States now have laws that conform to EU gender equality directives. However, the low proportion of women in physical sciences - and in particular across STEM decision-making positions - calls for serious counteraction to create gender equality in science (Council of the European Union, 2015) and to stop the large-scale undervaluing of female knowledge and potential.

Chapter 3 investigates the progress that women have made in participation in science and technology occupations as well as their differences from men within various sectors of the economy and economic activities.

[1] Eurostat, 'Employment in Technology and Knowledge-Intensive Sectors at the National Level, by Sex (from 2008 Onwards, NACE Rev. 2)', (online code: htec_emp_nat2), data extracted on 30/4/2018

Figure 3.1 Proportion of women in the EU-28 among total employment, the population of tertiary educated professionals and technicians (HRSTC) and the population of scientists and engineers (S&E), 2017 and compound annual growth rate (CAGR) and trends in the numbers of women and men in the EU-28 in the same populations, 2013-2017.



Notes: Proportions show percentages, whereas compound annual growth rate (CAGR) shows average percentage growth per year; The 'trends' represent the actual changes in the number of women and men each year (headcount in thousands). This differs from CAGR, which shows the average yearly change over the whole period; Break in time series for HRSTC and S&E: 2014; Others: Age 25-64.

Source: Eurostat – Human resources in science and technology (online data code: hrst_st_ncat) and Eurostat – Labour Force Survey – Employment by sex, age and nationality (online data code: lfsa_egan).

Women are under-represented, in comparison to men, in the population of scientists and engineers although they are over-represented among the tertiary educated employed as professionals or technicians.

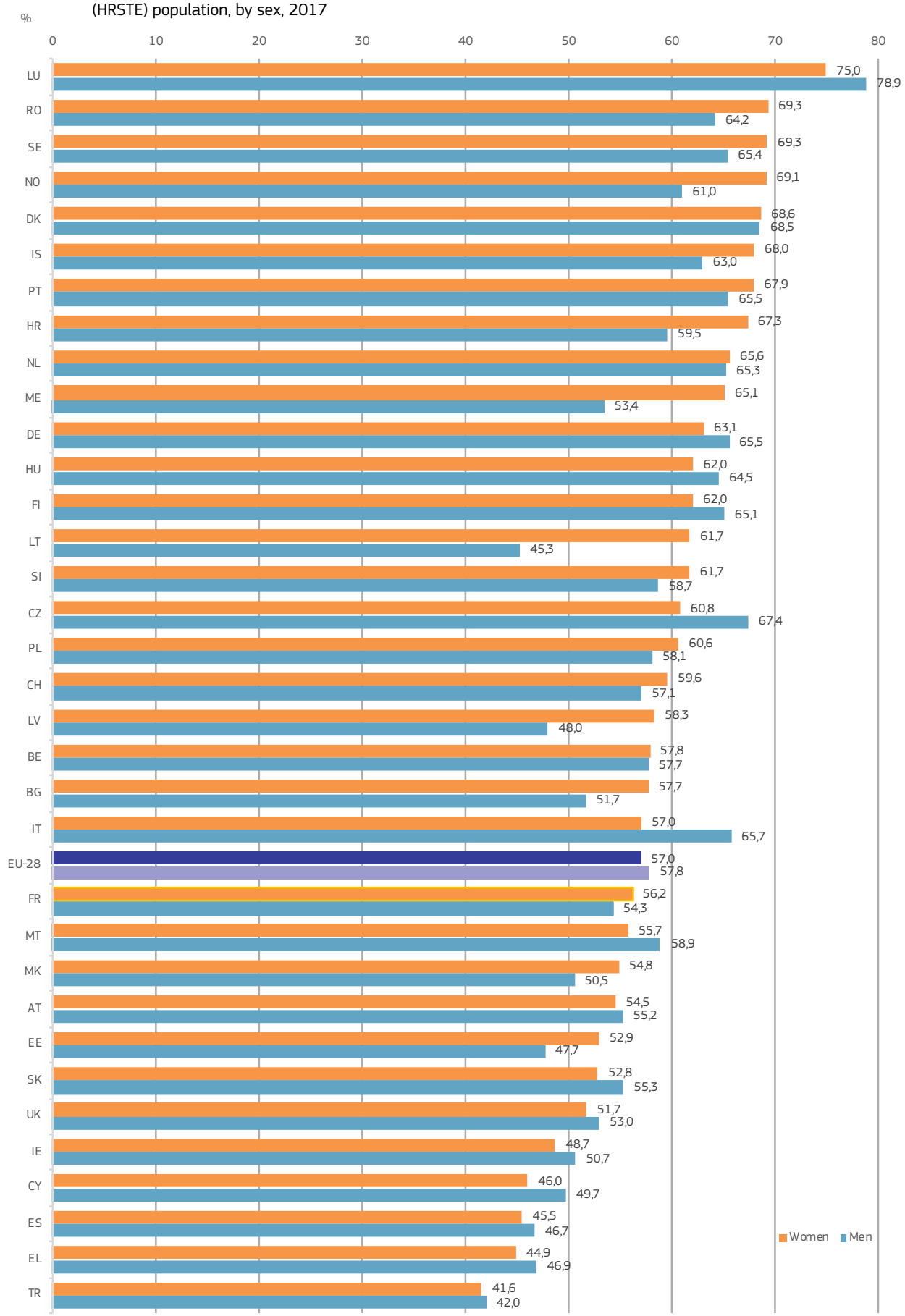
Although significant steps have been made towards gender equality in employment, women continue to hold a lower share (46.1 %) of total employment than men (Figure 3.1). Women form the majority of the tertiary educated population employed as professionals and technicians (53.1 %), but only 40.8 % of people are employed in science and engineering occupations.

The number of women grew slightly faster than men between 2013 and 2017 in all employment categories shown in Figure 3.1. Most progress occurred in scientists and engineers, where the number of women and men increased on average by 2.9 % and 2.2 % per year, respectively. However, the respective growth rates for women and men working as scientists and engineers during the period 2008 – 2013 were 11 % and 3.8 % (European Commission, 2016). The smallest difference in rates was observed in total employment where the rate for women was 1.4 % while that for men was 1.3 %. For the tertiary educated employed as professionals and technicians, average annual growth stood at 2.9 % for women and 2.5 % for men.

Limitations of headcount employment

When reading She Figures, it is important to bear in mind that some data presented in this publication are measured in headcount and therefore fail to take into account part time employment among researchers. Headcount data mask variation in working hours, both within the population of female researchers, and also when comparing men and women in research. It is therefore essential to temper the positive image of women's progression in employment in science and technology by keeping in mind their greater likelihood of holding part time jobs.

Figure 3.2 Tertiary educated and employed as professionals or technicians (HRSTC), as a percentage of tertiary educated (HRSTE) population, by sex, 2017



Notes: Data unavailable for: AL, AM, BA, FO, GE, IL, MD, RS, TN, UA; Break in time series for: BE, DK, IE, MT;
Others: Age 25-64; HRSTE represents all tertiary educated persons in each country while HRSTC is a subset of HRSTE representing those who are working as professionals and technicians; Data in headcount (HC).

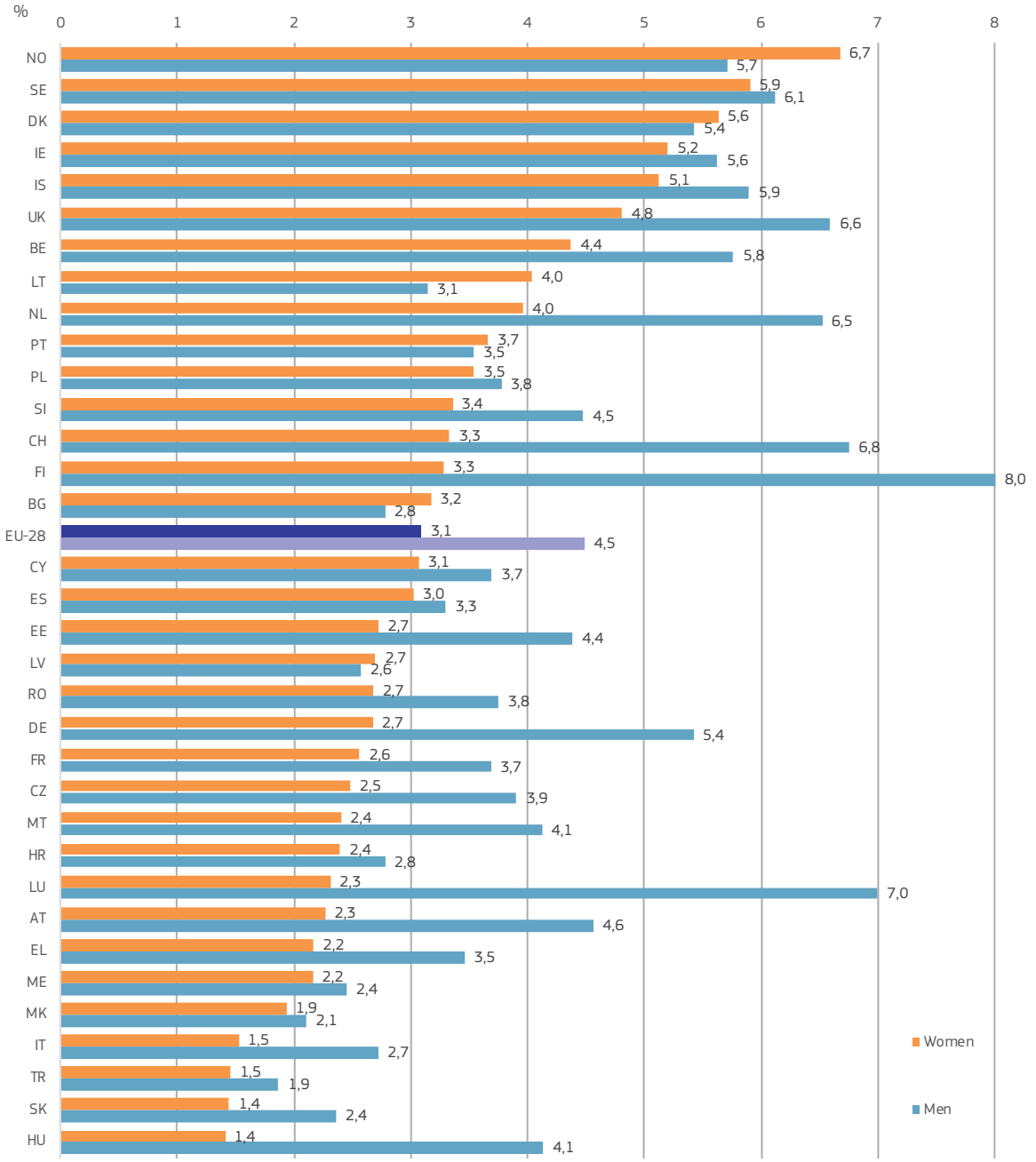
Source: Eurostat – Human resources in science and technology (online data code: hrst_st_ncat)

The proportions of tertiary educated women and men working as professionals or technicians are almost equal at the EU-28 level, but there is a considerable gender gap in some countries.

The proportions of tertiary educated women and men that worked as professionals or technicians in 2017 are given in Figure 3.2. At the EU-28 level there was gender balance, as 57 % of highly educated women and 57.8 % of highly educated men worked as professionals or technicians. Both the proportions and the difference between them increased slightly since 2013 when they were 56.5 % for women and 56.6 % for men.

In most counties the respective proportion of women exceeded that of men. The largest differences occurred in Lithuania (61.7 % of women, 45.3 % of men), Montenegro (65.1 % of women, 53.4 % of men) and Latvia (58.3 % of women, 48 % of men). The largest differences in the opposite direction occurred in Italy (65.7 % of men, 57 % of women) and Czechia (67.4 % of men, 60.8 % of women). The smallest differences were in Denmark and Belgium (0.1 percentage point in both countries).

Figure 3.3 Proportions (%) of male and female scientists and engineers among the total labour force, by sex, 2017



Notes: Data unavailable for: AL, AM, BA, FO, GE, IL, MD, RS, TN, UA; Break in time series for: BE, DK, IE, MT.
Others: Age 25-64.

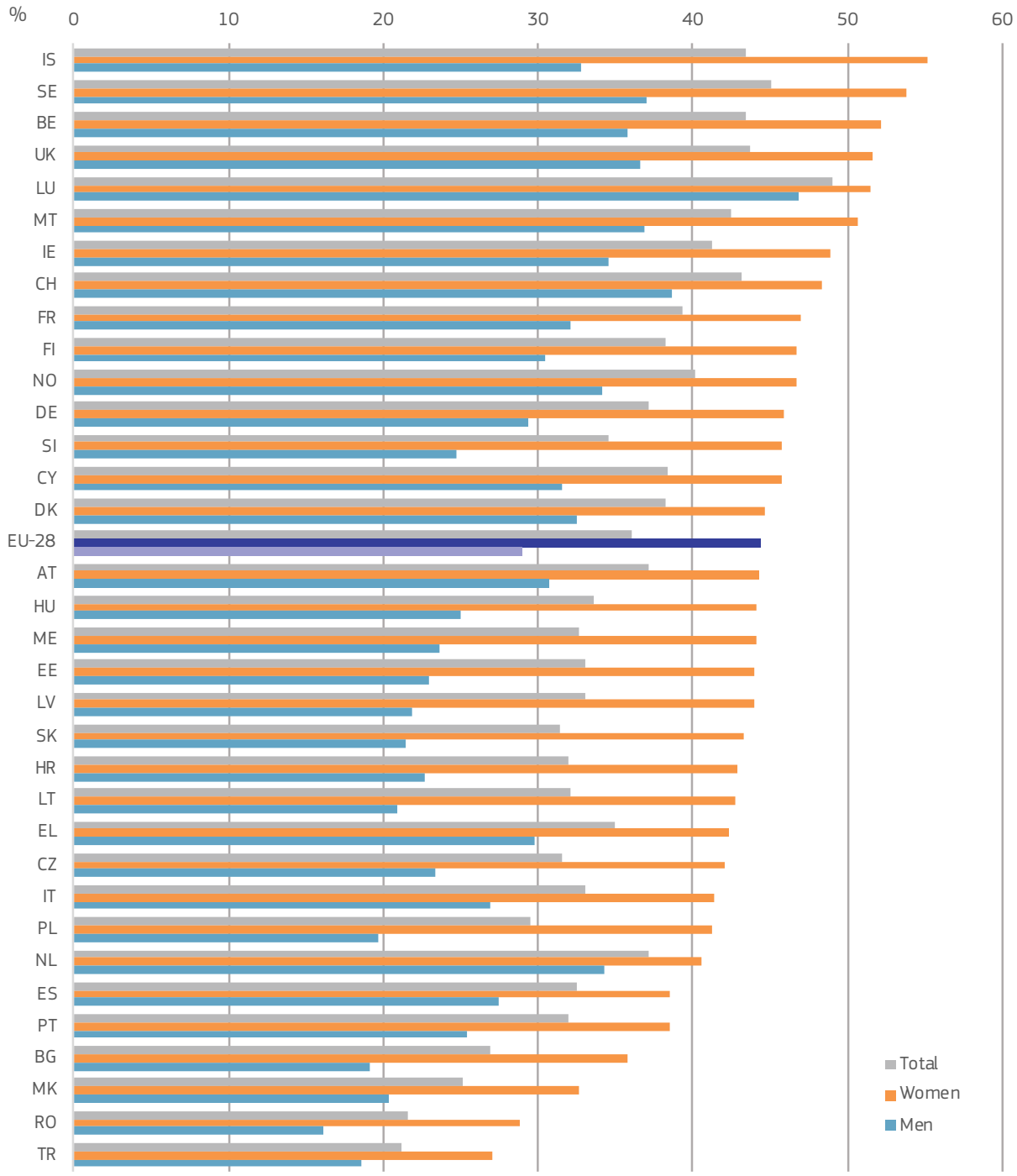
Source: Eurostat – Human resources in science and technology (online data code: hrst_st_ncat) and Eurostat – Labour Force Survey – Active population by sex, age and citizenship (online data code: lfsa_agan).

In the majority of countries, fewer women than men are employed as scientists or engineers.

Inequalities between genders stand out more in science and engineering occupations at both the EU-28 level and country level (Figure 3.3). In the EU-28, the difference between the proportions was 1.4 percentage points (4.5 % were male S&E and 3.1 % were female S&E). The gender gap has widened slightly since 2013, when the proportions were 4.1 % for men and 2.8 % for women.

In 2017, six countries had a higher proportion of female S&E than males among the total labour force. The difference was the highest in Norway (6.7 % female S&E, 5.7 % male S&E) and Lithuania (4.0 % female S&E, 3.1 % male S&E). The highest difference in favour of men was in Finland (8 % male S&E, 3.3 % female S&E), Luxemburg (7 % male S&E, 2.3 % female S&E) and Switzerland (6.8 % male S&E, 3.3 % female S&E). Differences of less than 0.5 percentage points can be seen in Bulgaria, Croatia, Denmark, Ireland, Latvia, Poland, Portugal, Spain, Sweden, North Macedonia, Montenegro and Turkey.

Figure 3.4 Employment in knowledge intensive activities (KIA), as a percentage of total employment, 2017



Notes: Data unavailable for: AL, AM, BA, FO, GE, IL, MD, RS, TN, UA; Break in time series for: BE, DK, IE, MT.

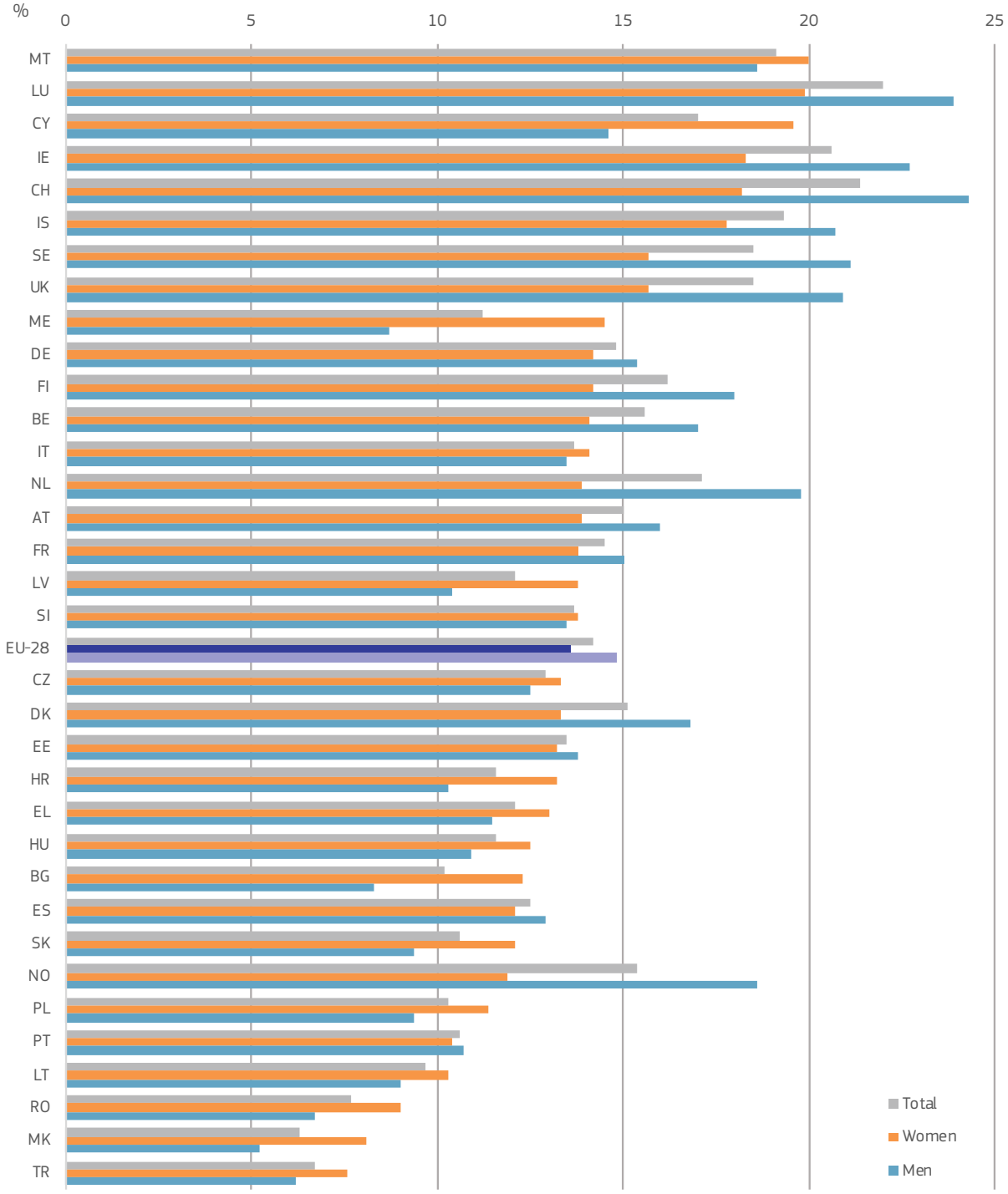
Source: Eurostat – Human resources in science and technology (online data code: htec_kia_emp2).

Across all countries, women are more likely than men to work in knowledge-intensive activities.

An alternative view on women in S&T occupations is provided in Figure 3.4. It shows the proportions of women and men employed in knowledge-intensive activities (KIA) out of the total number of women and men, respectively, employed in all sectors of economy. At both the EU-28 level and country level, the proportion of women in KIA is higher than that of men. The difference at the EU-28 level is 15.5 percentage points while at country-level it varies from 4.7 percentage points in Luxemburg to 22.4 percentage points in Iceland. Other countries with large differences were Latvia, Lithuania, Slovakia and Poland.

The relative over-representation of women in KIA can be partly explained by the fact that public sector jobs are included, such as in healthcare, education and social work where women have traditionally had greater shares than men.

Figure 3.5 Employment in knowledge-intensive activities – business industries (KIABI), 2017



Notes: Data unavailable for: AL, AM, BA, FO, GE, IL, MD, RS, TN, UA; Break in time series for: BE, DK, IE, MT.

Source: Eurostat – Human resources in science and technology (online data code: htec_kia_emp2)

Knowledge-intensive activities (KIA) and knowledge-intensive activities – business industries (KIABI)

An activity, according to NACE Rev. 2 (2-digit level), is classified as 'knowledge-intensive' if tertiary educated employees (ISCED 2011 levels 5 to 8) represent more than 33 % of the total employment in it. The definition is based on the average number of employed persons aged 25–64 at the aggregated EU-27 level in 2008 and 2009 using EU Labour Force Survey data. There are two aggregates in use based on this classification: total knowledge intensive activities (KIA) and knowledge intensive activities – business industries (KIABI).

A smaller proportion of women than men are employed in KIA – business industries across the EU-28 though the picture is mixed at national level.

As business industries are usually in the front line of innovation and development, it is worthwhile examining the employment of women and men in the sub-set of knowledge-intensive activities in business industries (KIABI). Figure 3.5 presents the proportions of women and men who are employed in KIABI out of the total number of women and men employed in all sectors of the economy.

At the EU-28 level, the proportion of men in KIABI exceeds women by 1.2 percentage points as 14.8 % of employed men and 13.6 % of employed women are working in such activities. Women are more likely than men to be working in KIABI in half the 34 countries examined, with Montenegro, Cyprus and Bulgaria having the largest differences between the proportions of men and women employed in KIABI (5.8, 5.0 and 4.0 percentage points respectively). The opposite can also be observed, most notably in Norway, Switzerland and the Netherlands, (with 6.7, 6.1 and 5.9 percentage points difference respectively).

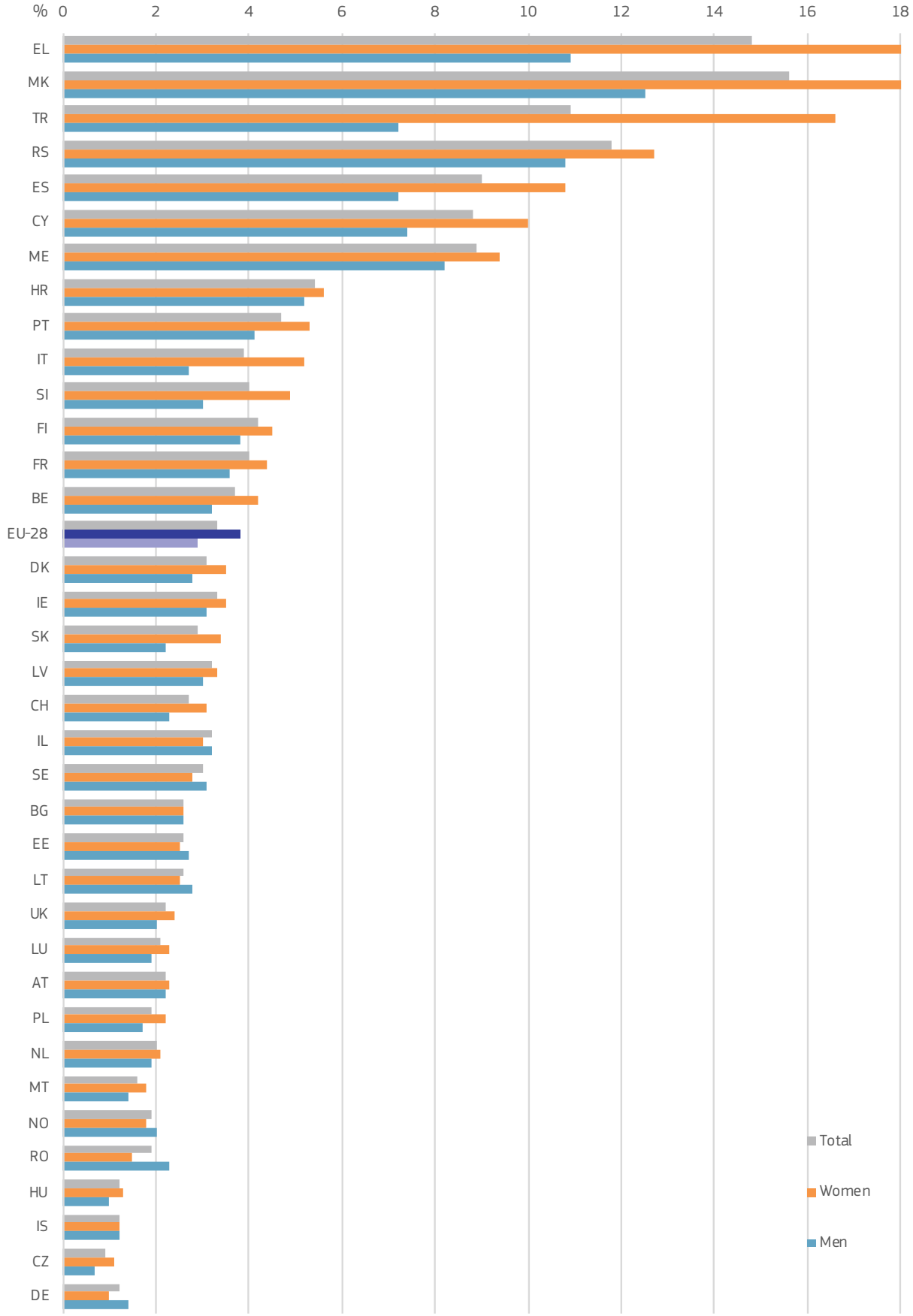
In the EU, tertiary educated women are more likely to be unemployed than tertiary educated men.

Figure 3.6 presents the proportions of unemployed women and men out of the tertiary educated labour force, for 2017. At the EU-28 level, a small gender imbalance can be seen, as the unemployment rate for women was found to be 3.8 % while the respective rate for men was 2.9 %.

The unemployment rate for tertiary educated women exceeded that of tertiary educated men in 27 of the 36 countries, with differences ranging from 0.1 percentage points in Austria to 9.4 percentage points in Turkey. The larger difference between unemployment rates, where the unemployment rate of men exceeded that of women, was observed in Romania with a difference of 0.8 percentage points. Negligible difference (zero to one decimal point accuracy) between unemployment rates was found in Bulgaria and Iceland.

The highest unemployment rates for tertiary educated women were observed in Greece (18.6 %), North Macedonia (18.5 %) and Turkey (16.6 %) while the lowest ones were found in Germany (1 %), Czechia (1.1 %) and Iceland (1.2 %).

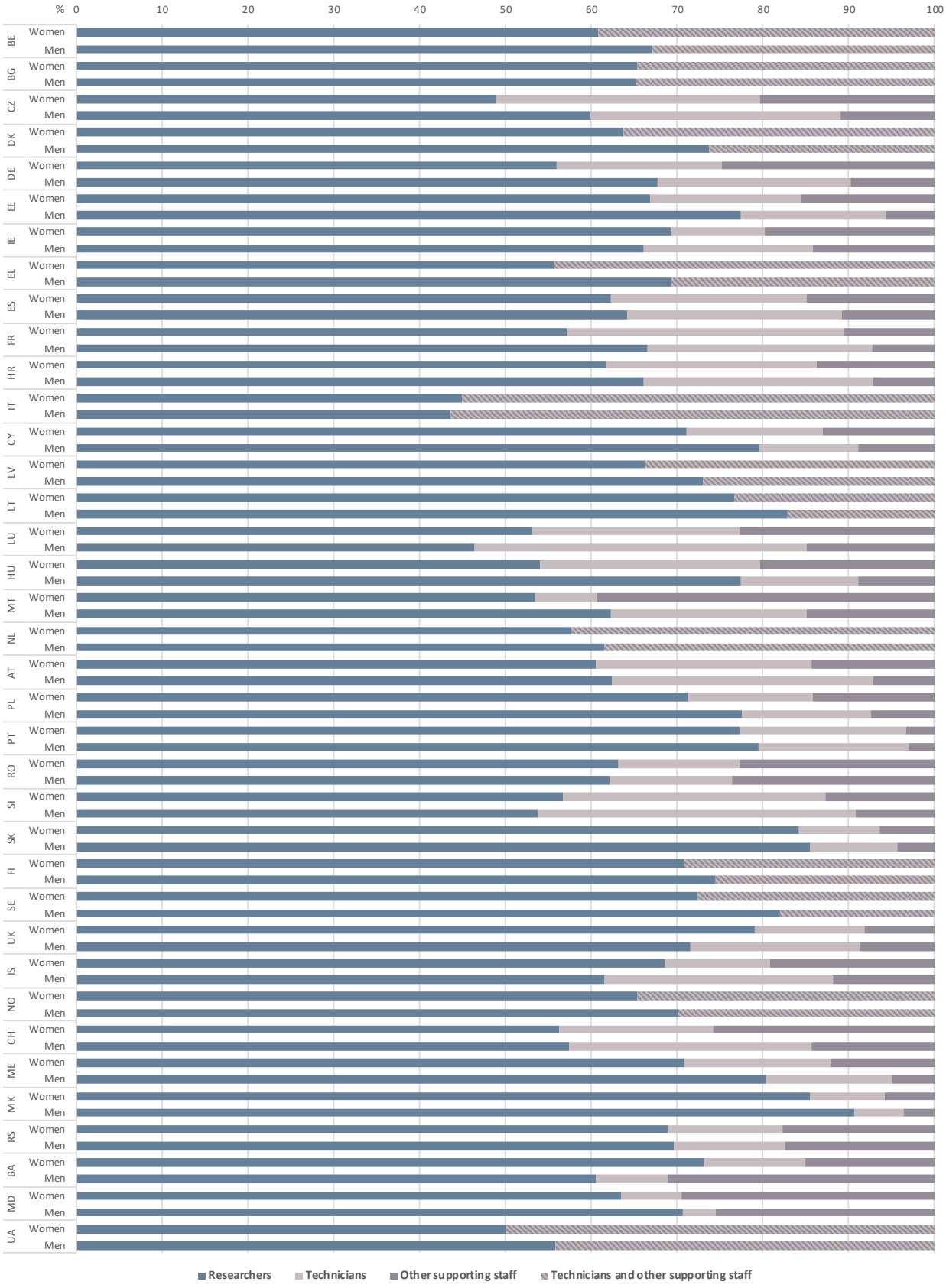
Figure 3.6 Unemployment rate of tertiary educated people, 2017



Notes: Exception to the reference year for: IL: 2016; Data unavailable for: AL, BA, AM, FO, GE, MD, TN, UA; Data with low reliability: LT (men); MT (men, women), RS; Break in time series for: BE, DK, IE, MT.

Source: Eurostat – Human resources in science and technology (online data code: hrst_st_nunesex - custom extraction) and International Labour Organisation - Database of labour statistics (online data: Unemployment by sex, age and education, Labour force by sex, age and education).

Figure 3.7 Distribution of R&D personnel across occupations in all sectors (higher education, government, business enterprise), 2015



Notes: Exceptions to the reference year: FR: 2013; Data unavailable for: EU-28, AL, AM, FO, GE, IL, TN, TR; Data estimated for: FR, UK; Definition differs for: CH, DE, HR, ME.
Others: Distribution computed from headcount (HC) data. Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The distribution computed for each country refers to the most 'detailed' occupations for which data were provided. Proportions are shown rounded to the nearest integer but the text discusses them at the precision of one decimal digit.

Sources: Eurostat - Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute of Statistics – Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

The proportion of researchers among male R&D personnel in all sectors of the economy combined is higher than the corresponding proportion of women in most countries.

The distribution of R&D personnel across occupations within all sectors (the higher education, government and business enterprise sectors) combined for 2015, is presented in Figure 3.7. The largest proportions of women researchers were observed in North Macedonia (85.4 %) and Slovakia (84.1 %), while the lowest proportions were in Italy (45 %) and Czechia (48.9 %). The proportion of women researchers among female R&D personnel falls behind the corresponding proportion of men for the majority of countries considered. The most striking differences in favour of men were found in Hungary, Greece and Denmark where the proportion of men working as researchers exceeded that of women by 23.4, 13.7 and 10.1 percentage points respectively. Among the nine countries where the proportion of women researchers surpassed that of men researchers, Bosnia and Herzegovina, the United Kingdom and Iceland had the largest differences at 12.7, 7.5 and 7.1 percentage points respectively.

The reverse pattern can be observed in other supporting staff. The proportion of other supporting staff among women R&D personnel, with all sectors combined, exceeded the relative proportion of men in all but three countries (Bosnia and Herzegovina, Romania and the United Kingdom) where the proportion of women trailed that of men by 16.0, 0.9 and 0.7 percentage points respectively. The highest and lowest proportions were found in Malta (39.3 %) and Portugal (3.3 %).

As regards technicians, their proportion among female R&D personnel is larger than that among male R&D personnel in 11 of the 25 countries that provided data for this occupation. France had the largest proportion of women technicians (32.3 %) while Moldova had the lowest (7.0 %).

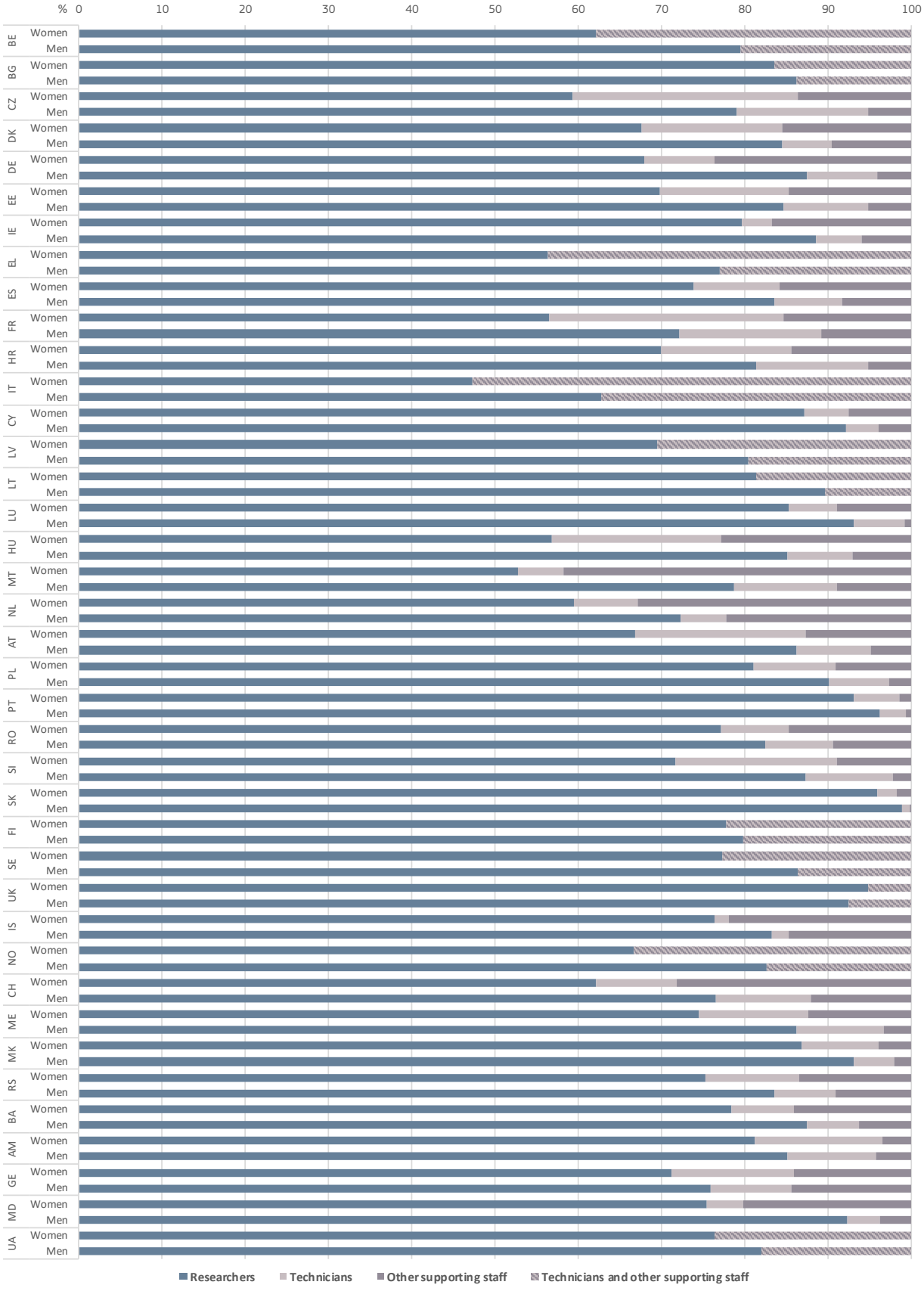
In the majority of countries, the proportion of researchers among male R&D personnel in the higher education sector is larger than the respective proportion for women, while in the case of other supporting staff, the situation is reversed.

Figure 3.8 focuses on the distribution of R&D personnel across occupations in the higher education sector. The proportion of women working as researchers was particularly high in Slovakia (95.8 %), the United Kingdom (94.7 %) and Portugal (93.1 %), while it was the lowest in Italy (47.2 %) and Malta (52.7 %). It can be seen that in all countries, except the United Kingdom, the proportion of men researchers exceeded that of women researchers, with the difference between the proportions rising above 25 percentage points in Hungary and Malta (28.2 and 25.9 percentage points respectively).

At the opposite end of the spectrum, the proportion of women working as other supporting staff was smaller than that of men only in Armenia and Georgia. In these countries, the proportion for men exceeded that for women by 0.8 and 0.3 percentage points respectively. The largest proportions of women working as other supporting staff were in Malta (41.8 %), the Netherlands (32.9 %) and Switzerland (28.3 %).

The proportion of technicians among female R&D personnel in the higher education sector was larger than the respective proportion for men in most of the countries examined. The difference between the proportions in those countries ranged from 0.2 percentage points (Romania) to 12.4 percentage points (Hungary). For the countries where the proportion of technicians among female R&D personnel was lower than the respective proportion for men ranged from 0.0 percentage points (Germany) to 6.9 percentage points (Malta). The highest proportions of women working as technicians were observed in France (28.2 %), Czechia (27.0 %) and Austria (20.5 %).

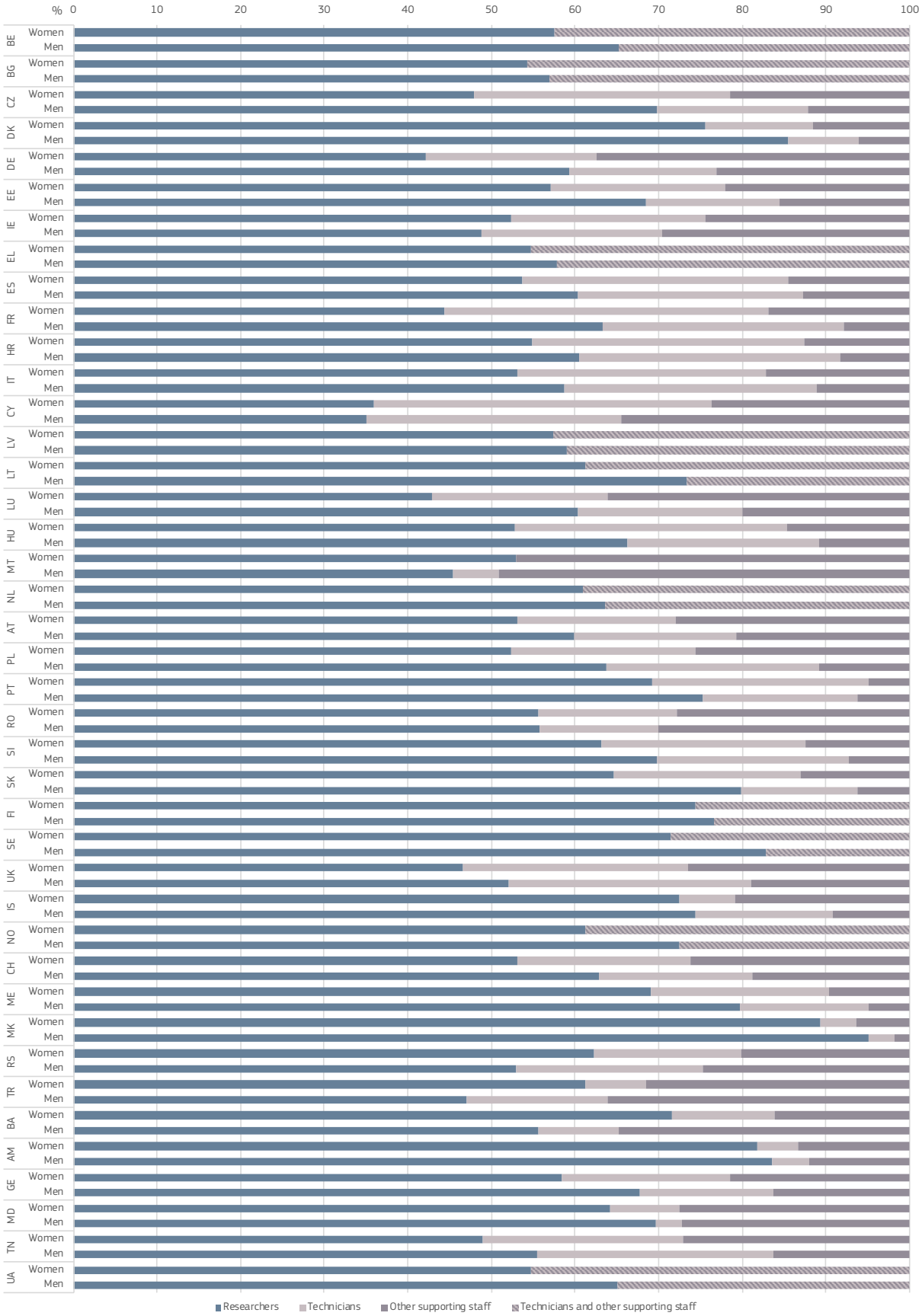
Figure 3.8 Distribution of R&D personnel in the higher education sector across occupations, by sex, 2015



Notes: Exceptions to the reference year: FR: 2014; Data unavailable for: EU-28, AL, FO, IL, TN, TR; Break in time series for: FR; Data estimated for: FR (researchers), UK; Definition differs for: ME. Others: Distribution computed from headcount (HC) data. Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The distribution computed for each country refers to the most 'detailed' occupations for which data were provided. Proportions are shown rounded to the nearest integer but the text discusses them at the precision of one decimal digit.

Sources: Eurostat - Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment)

Figure 3.9 Distribution of R&D personnel in the government sector across occupations, by sex, 2015



Notes: Exceptions to the reference year: FR: 2014; Data unavailable for: EU-28, AL, FO, IL; Data estimated for: FR, SE (researchers); Definition differs for: CH, DE, HR, ME.
Others: Distribution computed from headcount (HC) data. Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The distribution computed for each country refers to the most 'detailed' occupations for which data were provided. Proportions are shown rounded to the nearest integer but the text discusses them at the precision of one decimal digit.

Sources: Eurostat - Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

In the government sector, men are more likely than women to be employed as researchers, while women are more likely to be employed as technicians or other supporting staff.

Figure 3.9 shows the distribution of female and male R&D personnel across occupations in the government sector. Similar to the previous figure, the proportion of researchers among the men R&D personnel exceeded the corresponding proportion for women in most countries, however, the proportion of researchers among women is larger in a bigger group of countries, namely Cyprus, Ireland, Malta, Serbia, Turkey and Bosnia Herzegovina. The largest differences in favour of men were found in Chechia, France, Luxembourg and Germany, where they reached 21.9, 19.0, 17.5 and 17.0 percentage points, respectively, while the largest differences in favour of women were found in Serbia, Turkey and Bosnia and Herzegovina where they reached 9.4, 14.2 and 16.1 percentage points, respectively.

The highest proportion of women working as researchers in the government sector was in North Macedonia (89.3 %) while the lowest was in Cyprus (36 %).

The opposite pattern can be seen in other supporting staff, where the proportion of female R&D personnel exceeds that among male R&D personnel in most countries. The largest differences were observed in Luxembourg, Poland and Germany (16.2, 14.9 and 14.4 percentage points respectively). The highest proportions of women working as other supporting staff were observed in Malta (47.1 %), Germany (37.5 %) and Luxembourg (36.2 %).

In most countries, the proportion of technicians among female R&D personnel in the government sector is higher than the respective proportion for men, with differences ranging from 0.3 percentage points in Armenia to 12.5 percentage points in Czechia. The highest proportions of women technicians were observed in Cyprus (40.4 %) and France (38.8 %).

In the business enterprise sector, the proportion of researchers among female R&D personnel is smaller than that of men in the majority of countries.

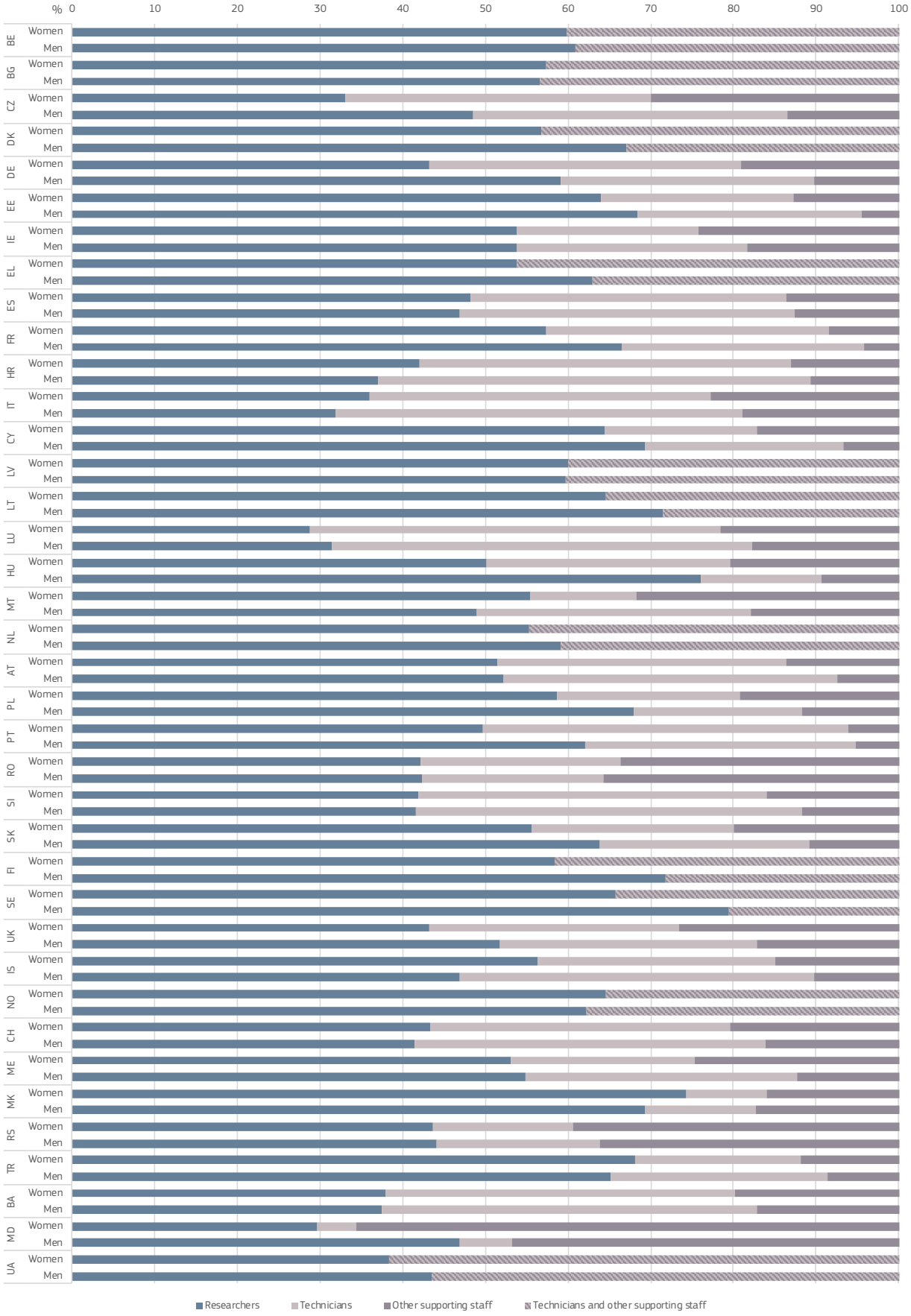
The distribution of R&D personnel in the business enterprise sector across occupations is presented in Figure 3.10. As was the case in the higher education and government sectors, women are less likely than men in most countries to be researchers. The largest differences between the proportions of researchers in favour of men were found in Hungary, Moldova and Germany (26.1, 17.2 and 16.0 percentage points, respectively). Unlike the other sectors, in business enterprise in nine countries (namely: Belgium, Austria, Serbia, Romania, Ireland, Slovenia, Latvia, Bulgaria and Bosnia and Herzegovina) the gap in absolute terms is very small (below 1.2 percentage points).

In almost half the countries, the proportion of women researchers is less than 55 %, with of its lowest values observed in Luxembourg (28.7 %) and Moldova (29.6 %). The largest proportions of women researchers were observed in North Macedonia (74.3 %) and Turkey (68 %).

As in the other sectors, the proportion of other supporting staff among female R&D personnel exceeded the respective proportion for men in all but two countries, with the largest differences in favour of women being observed in Moldova, Czechia and Malta (18.7, 16.5 and 13.9 percentage points respectively). The highest proportion of women in the 'other supporting staff' category was observed in Moldova (65.6 %), Serbia (39.5 %) and Romania (33.7 %).

The proportion of women technicians in the business sector was lower than that of men in most countries, with the largest difference in favour of men in Malta (20.3 percentage points) and the largest difference in favour of women been observed in Hungary (15.0 percentage points). The largest proportions of women technicians were in Luxembourg (49.6 %), Croatia (45.0 %) and Portugal (44.1 %).

Figure 3.10 Distribution of R&D personnel in the business enterprise sector across occupations, by sex, 2015



Notes: Exceptions to the reference year: FR: 2013; Data unavailable for: EU-28, AL, AM, FO, GE, IL, TN; Definition differs for: ME.
Others: Distribution computed from headcount (HC) data. Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The distribution computed for each country refers to the most 'detailed' occupations for which data were provided. Proportions are shown rounded to the nearest integer but the text discusses them at the precision of one decimal digit.

Sources: Eurostat - Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

Figure 3.11 Distribution of researchers in the business enterprise sector across economic activities (NACE Rev. 2), by sex, 2015

Notes: Exceptions to the reference year: IS: 2016; TR: 2014; FR: 2013; CH: 2012; Data unavailable for: EU-28, LU, SE, AL, AM, BA, FO, GE, IL, MD, ME, MK, TN, UA; Data confidential for: LU (C: Manufacturing); SE (G-N: Services of business economy).
Others: Distribution computed from headcount (HC) data. Proportions are shown rounded to the nearest integer but the text discusses them at the precision of one decimal digit.

Source: Eurostat – Research and development statistics (online data code: rd_p_bempoccr2).

Within the business enterprise sector, the proportion of women working as researchers in manufacturing activities is lower than the corresponding proportion of men in a most countries.

Research positions in the business sector are mainly found in manufacturing and services (more than 80 % of all research positions in the vast majority of countries considered). Figure 3.11 shows the distribution of researchers across economic activities by sex.

The largest proportions of women researchers in manufacturing out of all women researchers in BES were observed in Germany (69.9 %), Croatia (65.5 %) and Denmark (55 %). Croatia had also the largest gender gap in favour of women (22.1 percentage points). The proportion of women researchers in manufacturing is lower than the corresponding proportion of men in 21 out of the 31 countries considered, with the largest difference in favour of men observed in Austria and Italy (16.5 percentage points in both cases).

The situation is more balanced in services, with half the countries having a higher proportion of women than men working as researchers. The largest gender gap in favour of women was observed in Austria with a difference of 16.3 percentage points, while in Croatia there was a difference of 21 percentage points in favour of men. The share of 'other activities' among women researchers was larger than that for men researchers in 23 of the 31 countries for which data were available.

In most countries, the pharmaceutical manufacturing industry is the only sector with more women researchers than men researchers.

Table 3.1 illustrates the proportion of women among researchers in the three main activity groups (Manufacturing, Services of the business economy and all 'other activities') as well as in two manufacturing 'sub-activities'.

In manufacturing as a whole, the only country where women make up the majority of researchers is Croatia. However, in the pharmaceutical manufacturing industry women form the majority of researchers in 21 of the 31 countries where data were available. Within pharmaceuticals, the largest proportion of women researchers were in Romania (83.4 %) and Croatia (79.1 %) while the lowest were in Iceland (33.3 %), Malta (35.7 %) and Switzerland (36.9 %); attention must be paid to the small numbers of researchers in these last three countries.

In the chemical manufacturing industry, 12 of the 31 countries with available data had more women than men in research positions with Romania (69.9 %), Luxembourg (75 %) and Croatia (80.8 %) again having the largest proportions of women.
In services, women researchers were fewer than men in all countries. The highest proportions of women among researchers in this activity were observed in Latvia (38.2 %) and Iceland (37.9 %), while the lowest were in Finland (16.8 %), Czechia (14.1 %) and Luxembourg (9.11 %).

In the rest of the economy, Romania was the only country where women made up a larger proportion of researchers (51.5 %) than men.

Table 3.1 Proportion (%) of women among researchers in the business enterprise sector, by selected economic activities (NACE Rev. 2), 2015

Country	C -Manufacturing	C20 - Manufacture of chemicals and chemical products	C21 - Manufacture of basis pharmaceutical products and pharmaceutical preparations	G-N - Services of the business economy	Other activities
BE	29,28	39,40	59,38	25,74	23,85
BG	37,38	63,57	74,02	37,72	36,60
CZ	11,09	34,54	43,36	14,05	15,95
DK	28,64	22,70	56,32	20,78	20,23
DE	12,99	26,72	45,26	21,11	25,50
EE	19,44	62,50	45.00 (9/20)	31,10	25,89
IE	23,85	45,90	40,87	23,88	32,99
EL	29,50	30,67	63,96	26,24	34,35
ES	29,34	44,91	62,82	30,06	38,36
FR	17,81	41,61	58,50	21,15	26,26
HR	52,35	80,77	79,13	29,80	37,84
IT	18,08	31,65	53,84	28,48	40,26
CY	37,35	33.33 (1/3)	48,08	30,23	31,43
LV	45,00	59,52	66,67	38,18	40,67
LT	26,46	65,99	58,62	30,25	39,17
LU	: c	75.00 (21/28)	:	9,11	:
HU	19,01	31,06	52,53	17,22	25,39
MT	20,20	50.00 (2/4)	35.71 (5/14)	21,01	50.00 (1/2)
NL	15,65	27,36	47,35	17,33	20,54
AT	12,35	28,99	51,04	21,80	18,01
PL	20,42	61,90	70,22	19,71	29,74
PT	28,49	46,27	58,93	31,83	38,43
RO	37,28	69,86	83,41	32,39	51,52
SI	27,86	49,08	60,90	23,84	31,25
SK	16,94	50,46	72,00	18,47	21,88
FI	17,18	48,18	68,93	16,83	23,63
SE	24,44	: c	56,12	25,54	49,86
UK	16,26	37,46	49,56	24,85	17,66
IS	27,27	62,86	33.33 (2/6)	37,87	45,08
NO	22,54	38,56	52,06	22,49	26,21
CH	21,99	26,65	36,93	:	:
RS	26,51	66.67 (2/3)	-	33,04	44,00
TR	23,21	50,30	62,59	24,01	26,88

Notes: Exceptions to the reference year: FR: 2013; IS: 2016; SE: 2011; TR: 2014; Data unavailable for: AL, MA, BA, FO, GE, IL, MD, ME, MK, TN, UA; Definition differs for: CH, TR (C20); RS reported zero total researchers on C21.
Others: Distribution computed from headcount (HC) data; For proportions based on small numbers, numerators and denominators are displayed in the table; ':' denotes unavailable data; '-' denotes zero researchers in this activity; ': c' denotes data not published for confidentiality reasons.

Source: Eurostat – Statistics on research and development (online data code: rd_p_bempoccr2).

Annex 3.1 Distribution of researchers in the business enterprise sector across economic activities (NACE Rev. 2), by sex, 2015

Country	Researchers		Technicians		Other supporting staff		Technicians and other supporting staff	
	Women	Men	Women	Men	Women	Men	Women	Men
BE	13270	18639	:	:	:	:	8110	4839
BG	4086	3816	:	:	:	:	808	615
CZ	8427	15536	3839	3101	1951	1037	:	:
DK	11769	16231	2942	1162	2700	1841	:	:
DE	104622	165721	12939	15993	36480	7905	:	:
EE	2183	2427	486	293	461	151	:	:
IE	8251	10093	364	614	1749	686	:	:
EL	14135	23328	:	:	:	:	10983	7021
ES	50782	70379	7050	6859	10925	7019	:	:
FR	40120	73097	20038	17320	10956	10991	:	:
HR	3582	3737	803	620	741	238	:	:
IT	31198	45205	:	:	:	:	34863	26886
CY	571	949	34	40	50	41		
LV	2953	2719	:	:	:	:	1298	662
LT	6991	5609	:	:	:	:	1612	648
LU	492	798	33	53	52	7	:	:
HU	6170	9473	2190	871	2494	800	:	:
MT	286	577	30	91	227	66	:	:
NL	10900	14910	1409	1141	6026	4602	:	:
AT	14655	22044	4507	2308	2800	1248	:	:
PL	30792	39866	3735	3230	3483	1176	:	:
PT	25428	26897	1465	879	417	212	:	:
RO	7308	7749	779	757	1401	889	:	:
SI	1810	2376	487	287	228	61	:	:
SK	7632	8933	185	81	148	26	:	:
FI	10583	11590	:	:	:	:	3036	2953
SE	19696	24215	:	:	:	:	5787	3836
UK	157301	189737	:	:	:	:	8739	15468
IS	1078	980	24	24	310	175	:	:
NO	11709	12895	:	:	:	:	5853	2709
CH	17814	28118	2749	4201	8109	4465	:	:
ME	446	555	79	67	74	22	:	:
MK	1419	1546	150	81	65	35	:	:
RS	5694	5936	855	522	1026	647	:	:
TR	56503	76013	:	:	:	:	:	:
BA	646	836	61	61	117	60	:	:
AM	511	321	96	40	22	16	:	:
GE	4279	4275	883	551	848	813	:	:
MD	464	498	27	21	125	21	:	:
TN	17656	13621	:	:	:	:	:	:
UA	2570	2702	:	:	:	:	800	594

Notes: Exceptions to the reference year: FR: 2014; Data unavailable for: EU-28, AL, IL, FO; Data estimated for: UK, IT, FR (‚Researchers'); Definition differs for: ME; Break in time series for: FR. Others: Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The numbers reported for each country refer to the most 'detailed' occupations for which data were provided. ':' denotes that data were not provided or that data for more ‚detailed' occupations are available. For BA and AM, occupation categories do not add up to total R&D personnel, possibly due to some R&D personnel not being classified by occupation. For UA, the number of ‚Technicians and other supporting staff' was calculated as the difference between ‚Researchers' and total R&D personnel, therefore it may include R&D personnel that have not been classified by occupation.

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

Annex 3.2 R&D personnel in the government sector, by sex and occupation, 2015 (headcount)

Country	Researchers		Technicians		Other supporting staff		Technicians and other supporting staff	
	Women	Men	Women	Men	Women	Men	Women	Men
BE	1675	2826	:	:	:	:	1237	1510
BG	2689	2141	:	:	:	:	2263	1620
CZ	3847	6058	2453	1569	1726	1052	:	:
DK	1284	1301	219	129	198	92	:	:
DE	22247	40543	10690	12088	19768	15821	:	:
EE	409	259	150	60	158	59	:	:
IE	235	338	104	150	110	205	:	:
EL	6772	8986	:	:	:	:	5614	6564
ES	16257	16114	9603	7163	4406	3420	:	:
FR	9928	18475	8689	8385	3781	2306	:	:
HR	1297	1180	767	611	299	162	:	:
IT	13838	15220	7721	7819	4475	2879	:	:
CY	99	78	111	68	65	77	:	:
LV	549	398	:	:	:	:	407	276
LT	963	923	:	:	:	:	610	335
LU	270	408	132	133	228	135	:	:
HU	2698	3592	1656	1244	753	588	:	:
MT	9	25	0	3	8	27	:	:
NL	4984	6988	:	:	:	:	3200	3991
AT	1742	2005	622	648	919	696	:	:
PL	6469	8999	2708	3588	3174	1521	:	:
PT	2723	1897	1016	466	195	157	:	:
RO	3472	3560	1032	899	1738	1920	:	:
SI	964	963	374	315	190	101	:	:
SK	1958	1999	673	347	396	156	:	:
FI	2160	2728	:	:	:	:	746	834
SE	5574	6657	:	:	:	:	2231	1385
UK	3172	5219	1829	2908	1805	1894	:	:
IS	97	145	9	32	28	18	:	:
NO	2960	3411	:	:	:	:	1875	1299
CH	394	701	153	204	195	210	:	:
ME	315	258	97	50	44	16	:	:
MK	208	210	10	7	15	4	:	:
RS	1851	1385	521	587	600	647	:	:
TR	2188	5011	256	1783	1128	3851	:	:
BA	106	115	18	20	24	36	:	:
AM	1512	1512	90	82	248	217	:	:
GE	312	203	107	48	115	49	:	:
MD	1116	1012	144	44	478	397	:	:
TN	709	925	346	471	393	271	:	:
UA	15288	15399	:	:	:	:	12648	8287

Notes: Exceptions to the reference year: FR: 2014; Data unavailable for: EU-28, AL, IL, FO; Data estimated for: FR; Definition differs for: CH, DE, HR, ME;
Others: Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The numbers reported for each country refer to the most 'detailed' occupations for which data were provided. ':' denotes that data were not provided or that data for more ‚detailed' occupations are available. For BA and AM, occupation categories do not add up to total R&D personnel, possibly due to some R&D personnel not being classified by occupation. For UA, the number of ‚Technicians and other supporting staff' was calculated as the difference between ‚Researchers' and 'total R&D personnel', therefore it may include R&D personnel that have not been classified by occupation.

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

Annex 3.3 R&D personnel in the business enterprise sector, by sex and occupation, 2015 (headcount)

Country	Researchers		Technicians		Other supporting staff		Technicians and other	
	Women	Men	Women	Men	Women	Men	Women	Men
BE	10030	26917	:	:	:	:	6748	17328
BG	2425	4034	:	:	:	:	1805	3092
CZ	2887	19651	3229	15361	2628	5496	:	:
DK	7254	22394	:	:	:	:	5519	10974
DE	37226	215671	32613	111670	16519	37341	:	:
EE	498	1284	181	508	100	86	:	:
IE	3410	10765	1388	5554	1538	3682	:	:
EL	1962	5145	:	:	:	:	1691	3035
ES	18469	41741	14636	36063	5267	11221	:	:
FR	43762	176559	26102	77998	6473	11197	:	:
HR	545	748	585	1057	170	216	:	:
IT	14337	47833	16496	73726	9099	28429	:	:
CY	94	196	27	68	25	19	:	:
LV	491	717	:	:	:	:	327	486
LT	821	1986	:	:	:	:	450	791
LU	143	1023	247	1663	108	580	:	:
HU	2980	13505	1762	2580	1215	1664	:	:
MT	108	407	25	275	62	149	:	:
NL	12788	62376	:	:	:	:	10382	43065
AT	6320	30664	4288	23710	1677	4349	:	:
PL	6530	25674	2457	7716	2147	4439	:	:
PT	7319	16179	6499	8501	904	1386	:	:
RO	1702	3221	973	1668	1360	2722	:	:
SI	1350	3834	1362	4324	515	1081	:	:
SK	671	3130	296	1247	241	534	:	:
FI	4849	23128	:	:	:	:	3469	9116
SE	11287	41081	:	:	:	:	5905	10638
UK	28806	107591	20112	64663	17764	35644	:	:
IS	524	898	267	820	139	198	:	:
NO	4838	16368	:	:	:	:	2653	9987
CH	5554	18253	4643	18746	2612	7124	:	:
ME	43	75	18	45	20	17	:	:
MK	214	160	28	31	46	40	:	:
RS	495	970	191	432	448	798	:	:
TR	12445	38624	3671	15543	2174	5094	:	:
BA	44	48	49	58	23	22	:	:
MD	75	203	12	27	166	203	:	:
TN	504	1174	:	:	:	:	:	:
UA	7072	10804	:	:	:	:	11404	14030

Notes: Exceptions to the reference year: FR: 2013, Data unavailable for: EU-28, AL, AM, FO, GE, IL; Definition differs for: ME.
Others: Starting with reference year 2012, it is not compulsory for countries to report data on technicians separately from other supporting staff. The numbers reported for each country refer to the most 'detailed' occupations for which data were provided. ':' denotes that data were not provided or that data for more ,detailed' occupations are available. For BA, occupation categories do not add up to total R&D personnel, possibly due to some R&D personnel not being classified by occupation. For UA, the number of 'Technicians and other supporting staff' was calculated as the difference between 'Researchers' and 'total R&D personnel', therefore it may include R&D personnel that have not been classified by occupation.

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc) and UNESCO Institute for Statistics - Human resources in research and development (online data code: Total R&D personnel by function and sector of employment).

Annex 3.4 Researchers in the business enterprise sector, by sex and selected economic activities (NACE Rev. 2), 2015 (headcount)

	C -Manufacturing		C20 - Manufacture of chemicals and chemical products		C21 - Manufacture of basis pharmaceutical products and pharmaceutical preparations		G - N - Services of the business economy		Other activities	
Country	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	4509	10890	658	1012	2128	1456	5210	15034	311	993
BG	869	1456	164	94	151	53	1444	2384	112	194
CZ	1116	8949	162	307	98	128	1618	9896	153	806
DK	3991	9942	267	909	2318	1798	3175	12105	88	347
DE	26033	174345	2717	7453	4075	4928	10567	39497	626	1829
EE	84	348	30	18	9	11	385	853	29	83
IE	919	2935	235	277	141	204	2394	7633	97	197
EL	493	1178	69	156	197	111	1288	3621	181	346
ES	6281	15129	966	1185	1669	988	9755	22702	2433	3910
FR	16677	76958	1907	2676	1645	1167	25579	95371	1506	4230
HR	357	325	42	10	182	48	160	377	28	46
IT	6588	29860	756	1633	1213	1040	6300	15823	1449	2150
CY	31	52	1	2	25	27	52	120	11	24
LV	162	198	25	17	64	32	244	395	85	124
LT	271	753	97	50	17	12	503	1160	47	73
LU	: c	: c	21	7	:	:	55	549	:	:
HU	1110	4729	41	91	613	554	1757	8444	113	332
MT	20	79	2	2	5	9	87	327	1	1
NL	4046	21799	767	2036	491	546	7506	35796	1236	4781
AT	2245	15938	218	534	392	376	3961	14207	114	519
PL	2750	10717	541	333	573	243	3521	14345	259	612
PT	2315	5810	211	245	353	246	4358	9334	646	1035
RO	579	974	51	22	191	38	1038	2167	85	80
SI	726	1880	107	111	299	192	584	1866	40	88
SK	367	1800	55	54	36	14	290	1280	14	50
FI	2615	12608	383	412	284	128	1931	9541	303	979
SE	4986	15415	: c	: c	1390	1087	2847	8301	539	542
UK	8702	44831	1043	1741	681	693	18903	57159	1201	5601
IS	60	160	22	13	2	4	409	671	55	67
NO	1384	4756	209	333	101	93	2988	10300	466	1312
CH	3361	11922	391	1076	2000	3416	:	:	:	:
RS	22	61	2	1	0	0	407	825	66	84
TR	4745	15703	758	749	584	349	6457	20438	243	661

Notes: Exceptions to the reference year: FR: 2013; SE: 2011; IS: 2016; TR: 2014; Data unavailable for: EU-28, AL, AM, BA, FO, GE, IL, MD, ME, MK, TN, UA; ':' denotes unavailable data; ': c' denotes data not published for confidentiality reasons.

Source: Eurostat – Research and development statistics (online data code: rd_p_bempoccr2).

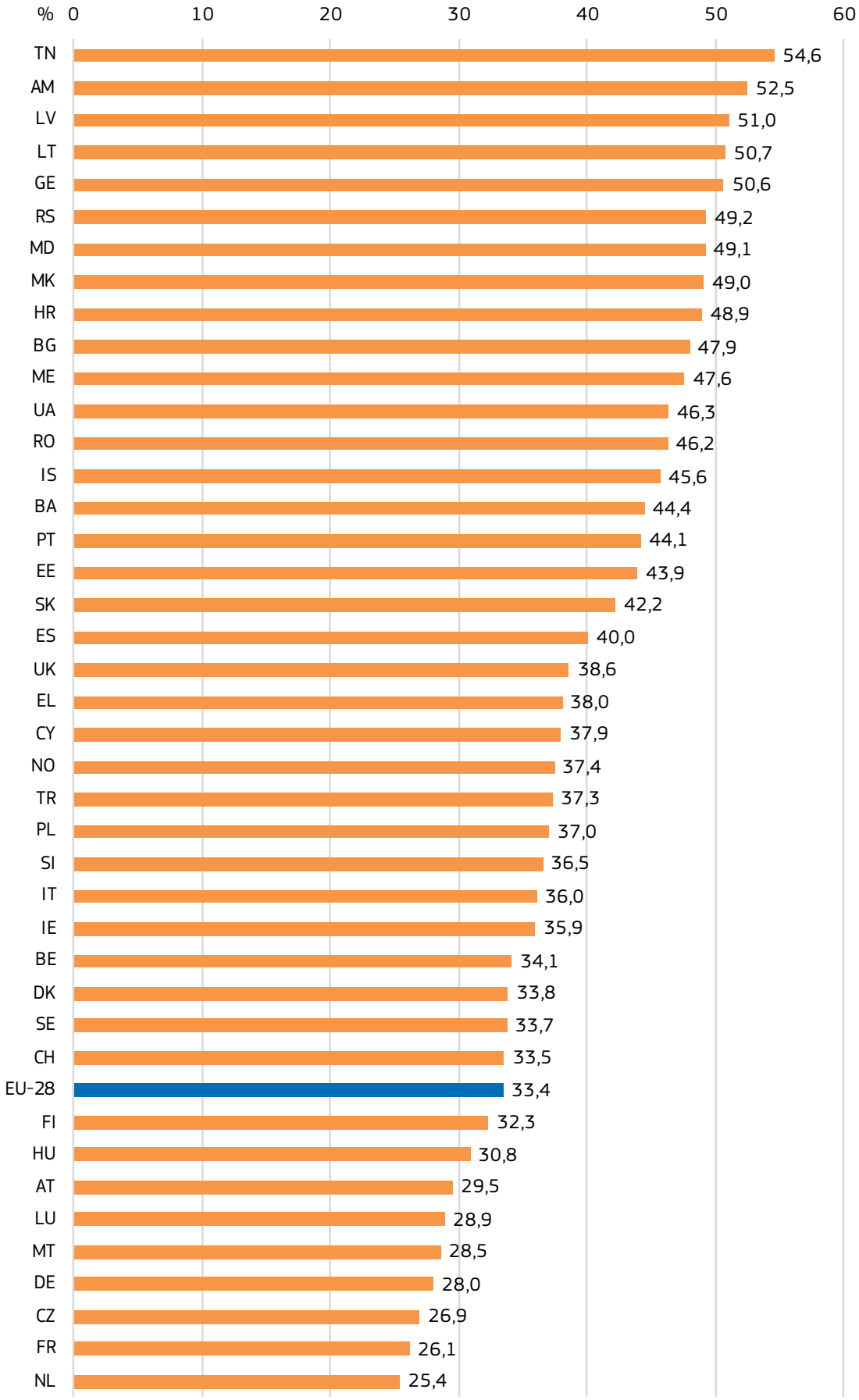
4 Labour market participation as researchers

Main findings:

- In 2015, the proportion of the total number of researchers who were women remained at low levels (33.4 %). There had been a slight decrease since 2009 when women accounted for 33.6 % of researchers in the EU-27. However, when it came to the 2008-2015 period, the number of women researchers in the EU 28 increased at a higher rate on average than men (3.8 % as against 3.4 %).
- In the majority of countries, women researchers are concentrated in the higher education sector (HES), while the business enterprise sector (BES) still has a disproportionately high share of men researchers. Across the EU, 62.5 % of women researchers are employed in the HES, while 47.9 % of men researchers work in the BES.
- In the EU-28, gender balance in the population of researchers is currently almost at parity in the government sector (GOV) and in the higher education sector, as women account for 42.5 % and 42.1 % of researchers respectively in those sectors.
- In the business enterprise sector, women are still severely under-represented as they make up only 20.2 % of all researchers. However, between 2008 and 2015 in the business enterprise sector, the annual growth rate of women researchers was higher than that of men (6.5 % for women and 5.6 % for men in the EU-28). There was also an average annual growth in the number of women researchers in the HES (3.1 %) and in the GOV (3.4 %) during this period.
- In the higher education and the government sectors, the majority of women researchers were in the under 35 and the 35-44 age group, while the majority of men researchers were in the 45-54 and the over 55 age group.
- In the majority of the countries considered in the report, there were higher proportions of women researchers in the HES working in medical sciences and in social science. In contrast, in the GOV sector, women researchers were more likely to work in natural sciences or medical sciences.
- Overall, the growth rate of women researchers in the HES and GOV sectors was positive in most fields of Research and Development (R&D) and in most countries.
- In the BES, women working as researchers are better represented in the field of medical science as in most countries the proportion is over 40 %. However, women researchers are still under-represented in the field of engineering and technology, though their proportion among researchers has increased in these sectors since 2007.

As seen earlier in Chapter 2, the distribution of doctoral graduates in the EU in all fields of study is gender-balanced. However, there are signs that women are still under-represented in the population of researchers. This Chapter presents a detailed description of women's presence as researchers, and the patterns of employment with regards to researchers' sex, across the main sectors of economy, their fields of Research and Development, and their age group.

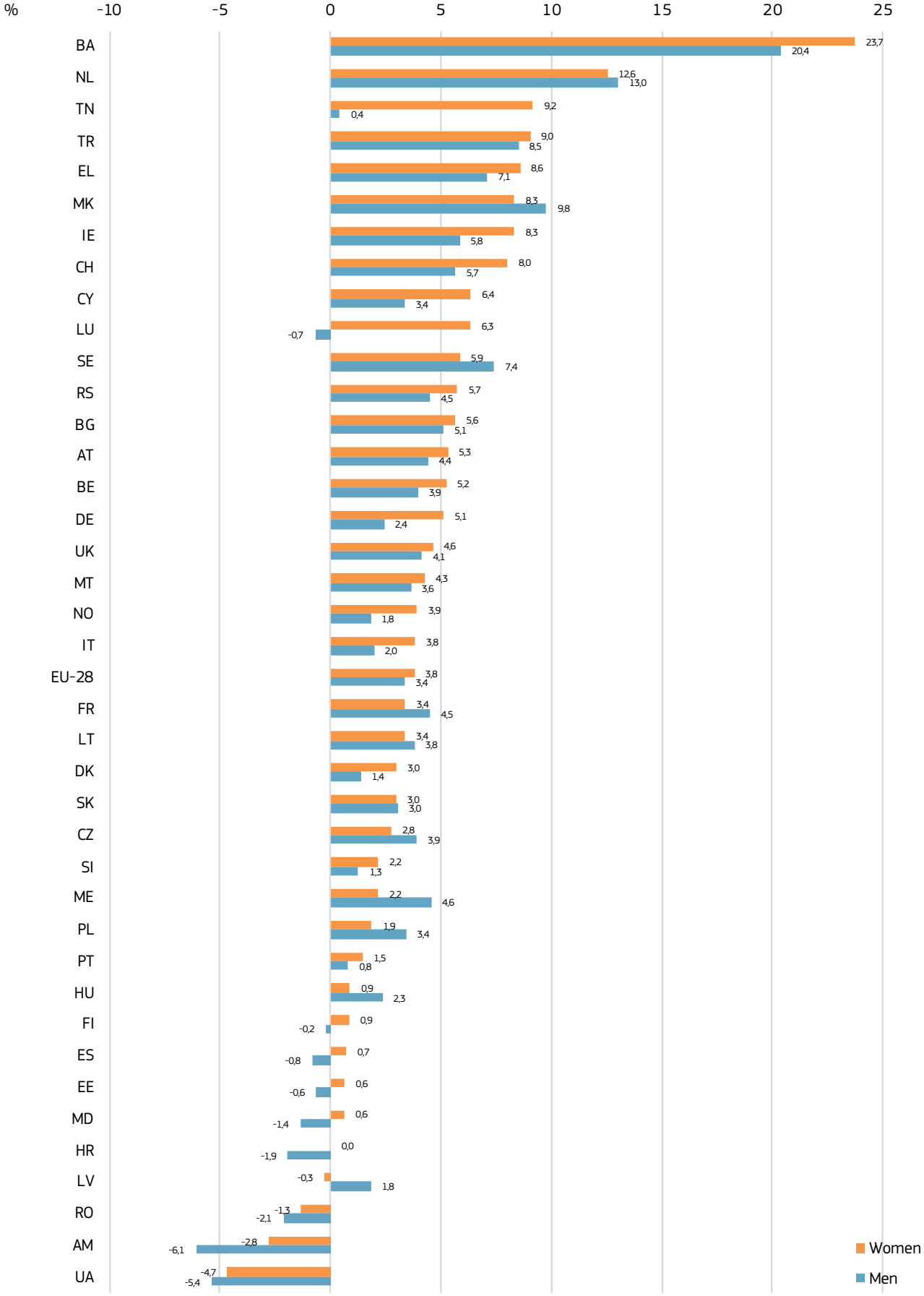
Figure 4.1 Proportion of women among researchers, 2015



Notes: Exceptions to the reference year: FR: 2014; Data unavailable for: AL, IL, FO; Break in time-series for: FR; Definition differs for: ME; Data estimated for: EU-28, FR, SE, UK.
Other: Proportions computed from data in head count (HC); Total number (HC) of researchers in AM and GE include only the sectors of higher education and government.

Sources: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

Figure 4.2 Compound annual growth rate for researchers, by sex, 2008–2015



Notes: Exceptions to the reference period: EU-28, DK, DE, LU, NL, AT, SE, UK, TN: 2009-2015; EL, ME: 2011-2015; BA: 2012-2015; FR: 2008-2014, Data unavailable for: AL, GE, IL, FO; Break in time series for: FR(2014), EL(2011), SE(2009), PT, SI (2008); Definition differs for: ME(2015), FR(2008); Data estimated for: EU-28, SE(2009, 2015), FR(2014), UK(2009); Not computed due to lack of comparability of data with 2008: IS. Other: Compound annual growth rates computed from data in head count (HC).

Sources: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

The proportion of women researchers in the EU remains low.

Figure 4.1 shows the proportion of women researchers in 2015. As can be seen, in the EU-28, women represent very slightly over one third (33.4 %) of the total population of researchers. This proportion has seen a minor increase since 2012, when women represented 33.0 % of researchers.

In about half the countries examined (46%), the proportion of women researchers was within the range of 40 % and 60 %, which is within the range generally considered as 'gender-balanced'. Inside the EU, Latvia and Lithuania are the countries with the highest proportions of women researchers (51.0 % and 50.7 % respectively). Likewise, outside the EU, the highest proportion of women researchers is observed in Tunisia (54.6 %) and Armenia (52.5 %). The Netherlands had the lowest proportion of women researchers (25.4 %) followed by France (26.1 %) and Czechia (26.9 %).

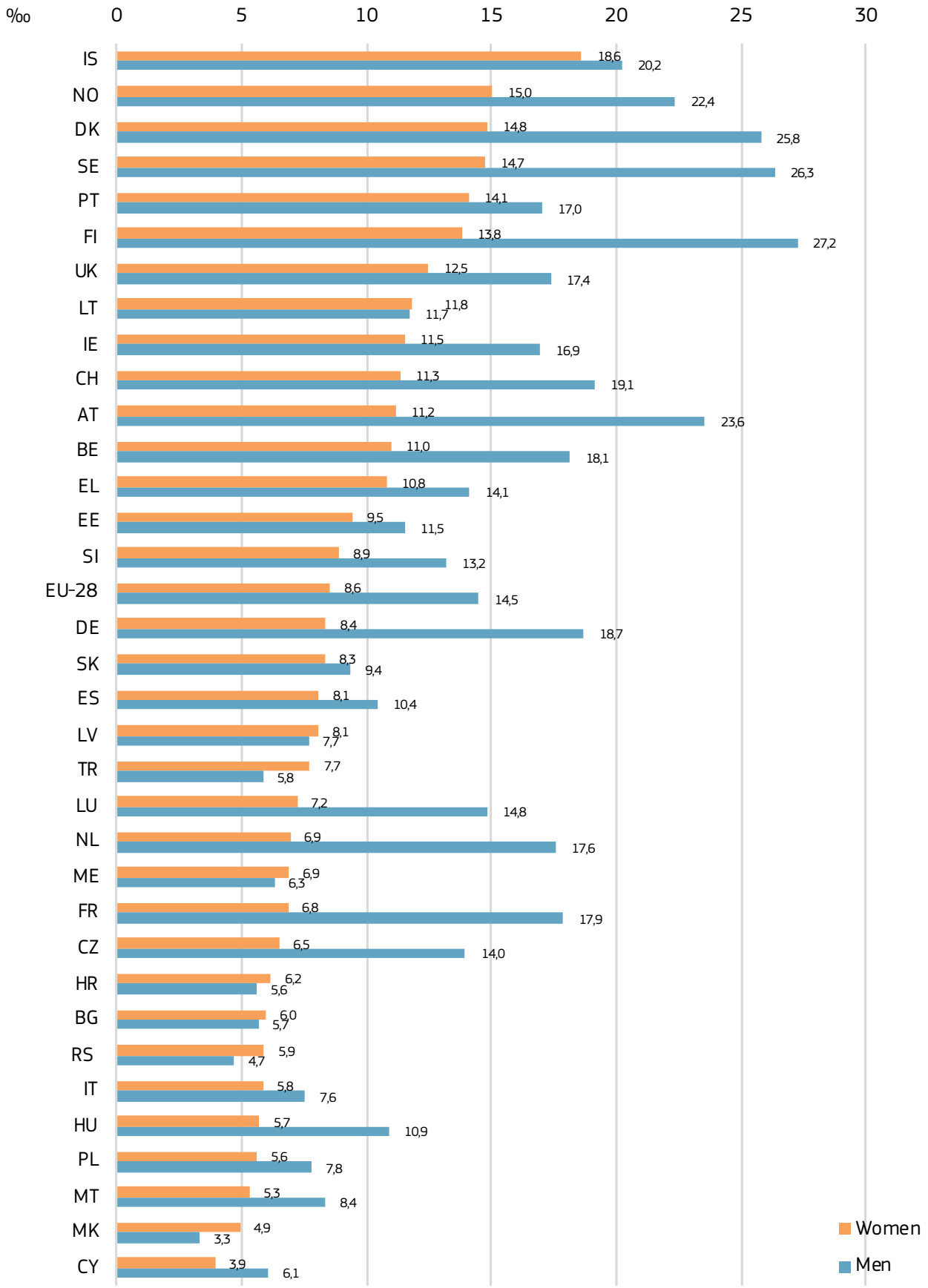
At the EU level, the number of women researchers grew faster than the number of men researchers between 2008 and 2015.

Figure 4.2 shows the average annual rates at which the numbers of women and men researchers changed during the 2008-2015 period. At the EU level, the average growth rate of women researchers was higher than that of men researchers; the number of women researchers increased on average by 3.8 % each year, while the number of men researchers increased by 3.4 %.

Overall, the pattern was similar in most of the countries considered. Between 2008 and 2015, the number of women researchers increased at a higher rate than the number of their male colleagues in most of the countries considered. The highest growth rates for both sexes were observed in Bosnia and Herzegovina (23.7 % for women and 20.4 % for men) and the Netherlands (12.6 % for women and 13.0 % for men). The number of both women and men researchers decreased on average in three countries; Romania (by 1.3 % for women and -2.1 % for men), Armenia (by -2.8 % for women and -6.1 % for men) and the Ukraine (by -4.7 % for women and -5.4 % for men).

In Latvia, the average annual rate declined for women researchers (-0.3 %) while it increased for men researchers (1.8 %). In contrast, the average annual rate declined for men researchers while it increased for women researchers in five countries (MD, ES, LU, EE, FI). In Croatia, there was no change on the number of women researchers, while the number of men researchers decreased on average by 1.9 % per year.

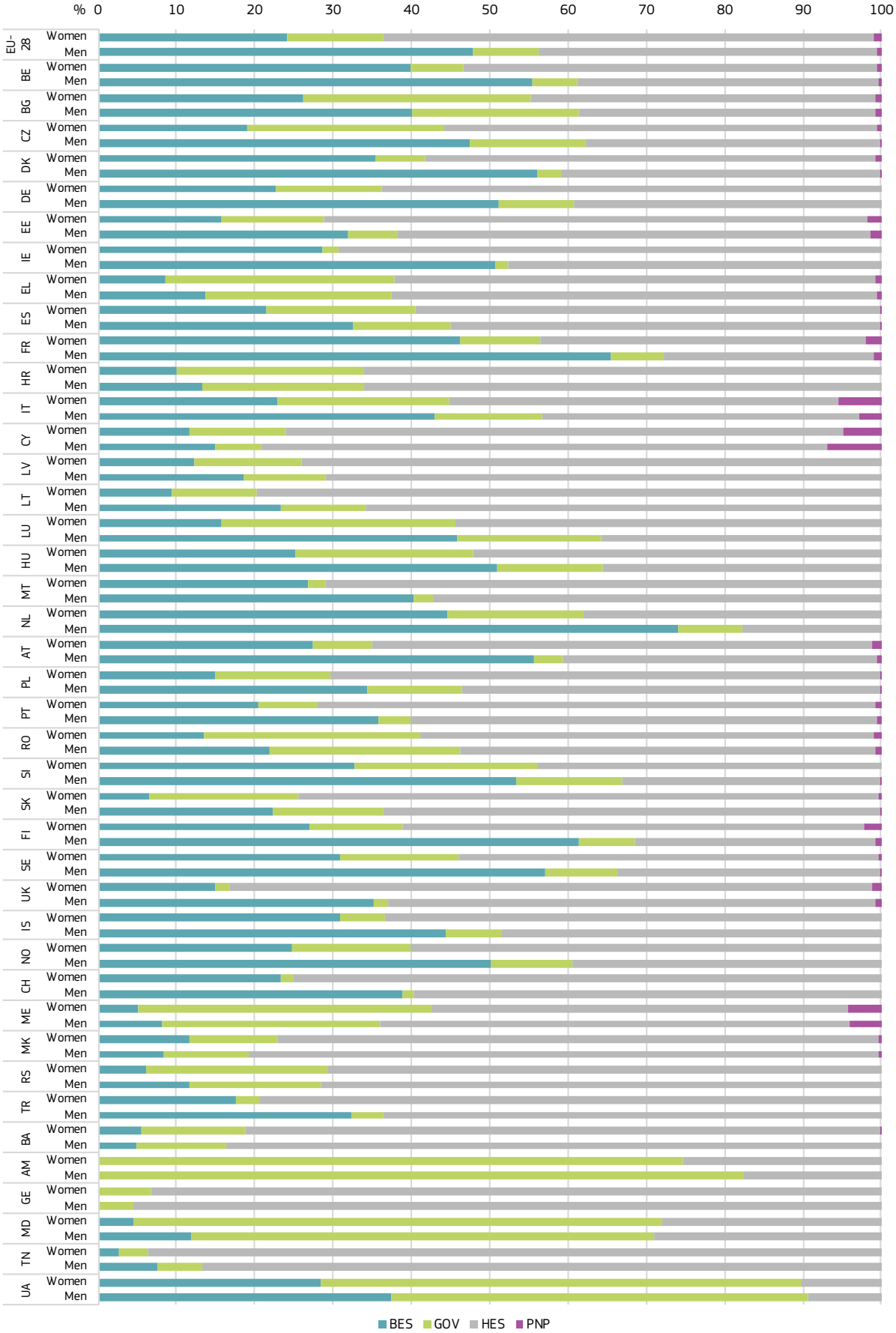
Figure 4.3 Proportion of researchers per thousand labour force, by sex, 2015



Notes: Exception to reference period: FR: 2014; Data unavailable for: AL, RS, BA, IL, GE, FO, MD, AM, TN, UA; Break in time-series for: FR; Definition differs for: ME; Data estimated for: EU-28, FR, SE, UK.
Others: The numerator (researchers) is in headcount (HC) while the denominator (labour force age 15+) is per 1 000 active population.

Sources: Eurostat – Statistics on research and development (online data code: rd_p_persocc) and Labour Force Survey (online data code: lfsa_agan).

Figure 4.4 Distribution of researchers across sectors, by sex, 2015



Notes: Exceptions to reference year: FR: 2014; Data unavailable for: AL, IL, FO; Data unavailable for PNP sector: IE, DE, HR, LV, LT, LU, HU, MT, IS, NO, CH, TR; Break in time series for: FR (HES); Definition differs for: DE, HR, NL, CH: GOV; ME: ALL; Data estimated for: EU-28, FR (GOV, HES), SE (GOV), IT, UK (HES).
Other: Percentages computed from data in head count (HC).

Sources: Eurostat – Research and development statistics (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment)

In the majority of countries, women researchers make up a lower share of the 'economically active' population than men.

The proportion of researchers among economically active women and men in 2015 is presented in Figure 4.3. At the EU level, the proportion of women and men researchers was 8.6 out of every thousand active women and 14.5 out of every thousand active men respectively, resulting in a difference of 5.9 points per thousand.

The picture is no different at country level as more than three quarters of the countries examined had a higher proportion of male researchers in their labour force than females. The largest differences were seen in Finland (13.4 points per thousand), Austria (12.4 points per thousand) and Sweden (11.6 points per thousand). On the female side, the proportion of researchers among active women was higher than the corresponding proportion among active men in nine countries, with the most important differences being seen in Turkey (1.9 points per thousand), North Macedonia (1.6 points per thousand) and Serbia (1.2 points per thousand). The highest proportions of women researchers in the total active female population was found in Iceland (18.6 points per thousand) and Norway (15.0 points per thousand). However, the corresponding proportions of men researchers in those countries were 20.2 points per thousand (Iceland) and 22.4 points per thousand (Norway).

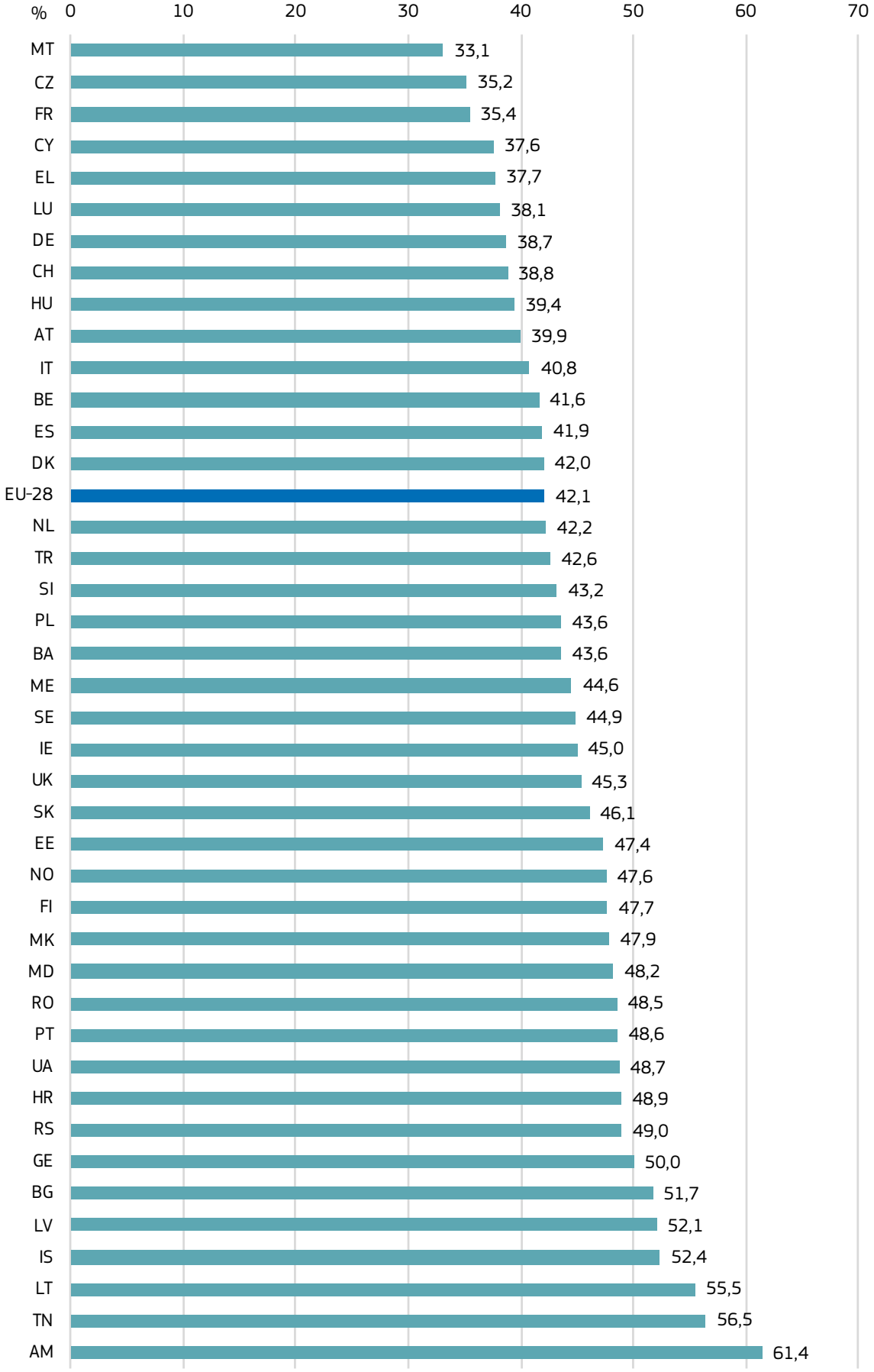
In the majority of countries, women researchers are more likely to work in the higher education sector than in other sectors.

The distribution of women and men researchers across the four main sectors of the economy in 2015 is presented in Figure 4.4. The four sectors are: the business enterprise sector (BES), government (GOV), higher education (HES) and private non-profit (PNP).

Women researchers in the EU are more likely to work in the HES in comparison to the other main sectors of the economy. The HES employed 62.5 % of women researchers in 2015, followed by the BES with 24.1 %. In contrast, men researchers are more equally distributed between the BES (47.9 %) and the HES (43.1 %). The GOV employed 12.3 % of women researchers and 8.4 % of men researchers in the EU, while in the PNP sector the corresponding proportions were 1.1 % and 0.6 % respectively.

The pattern is similar in most of the countries where data were available. Women researchers are more likely to work in the HES in all but five of the countries considered. More specifically in France and the Netherlands, women researchers have a higher concentration in the BES, while in Armenia, Moldova and the Ukraine both women and men researchers have higher shares in the GOV. On the other hand, men researchers have a higher concentration in the BES in 17 countries and in the HES in 22 countries. No country had a particular high concentration of researchers in the PNP sector; the largest shares were found in Cyprus and Italy where 7.0 % of men researchers and 5.5 % of women researchers work in the PNP.

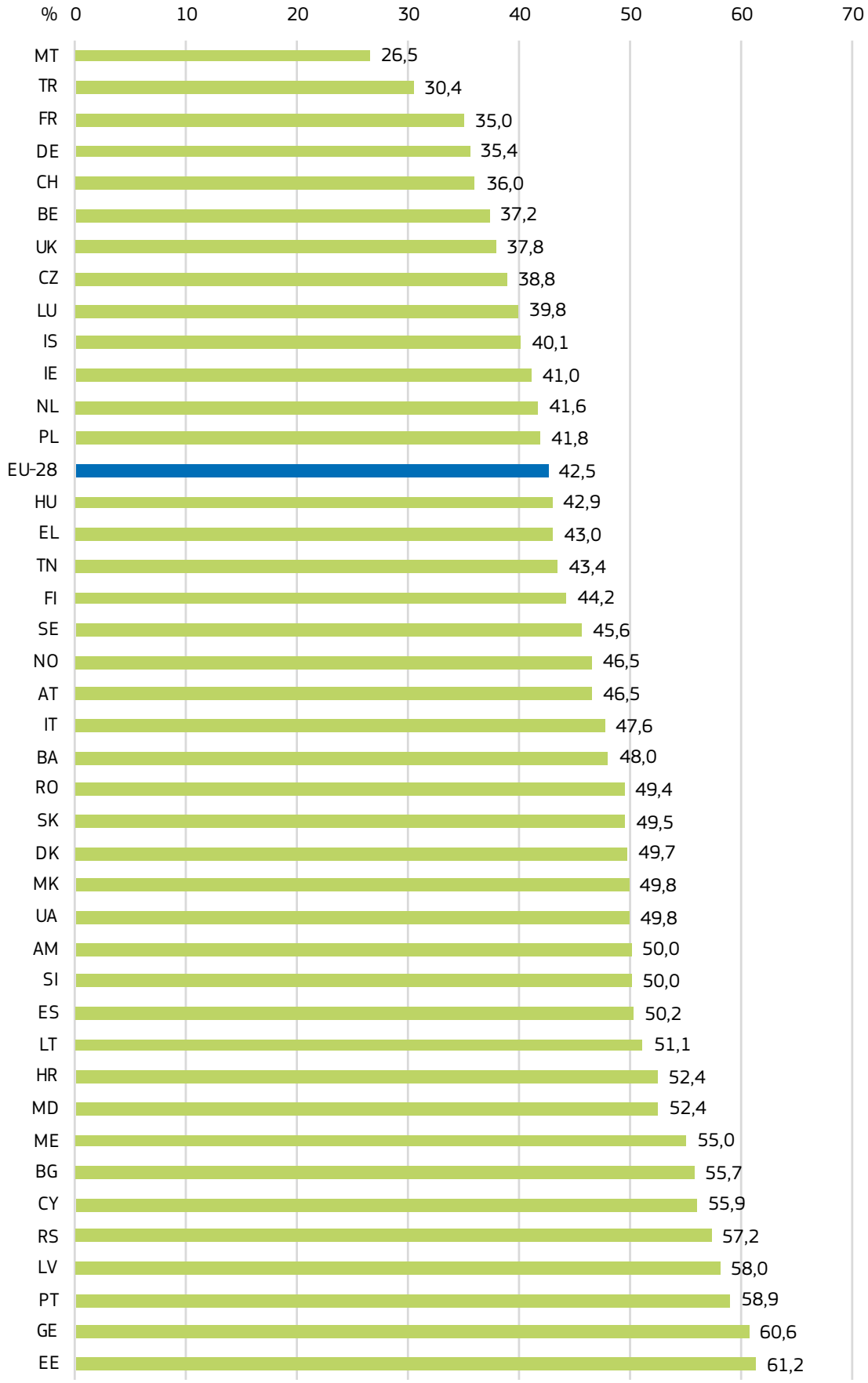
Figure 4.5 Proportion of women among researchers in the higher education sector, 2015



Notes: Exceptions to reference year: FR: 2014; Data unavailable for: AL, IL, FO; Break in time series: FR; Definition differs for: ME; Data estimated for: EU-28, FR, IT, UK.
Other: Proportions computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

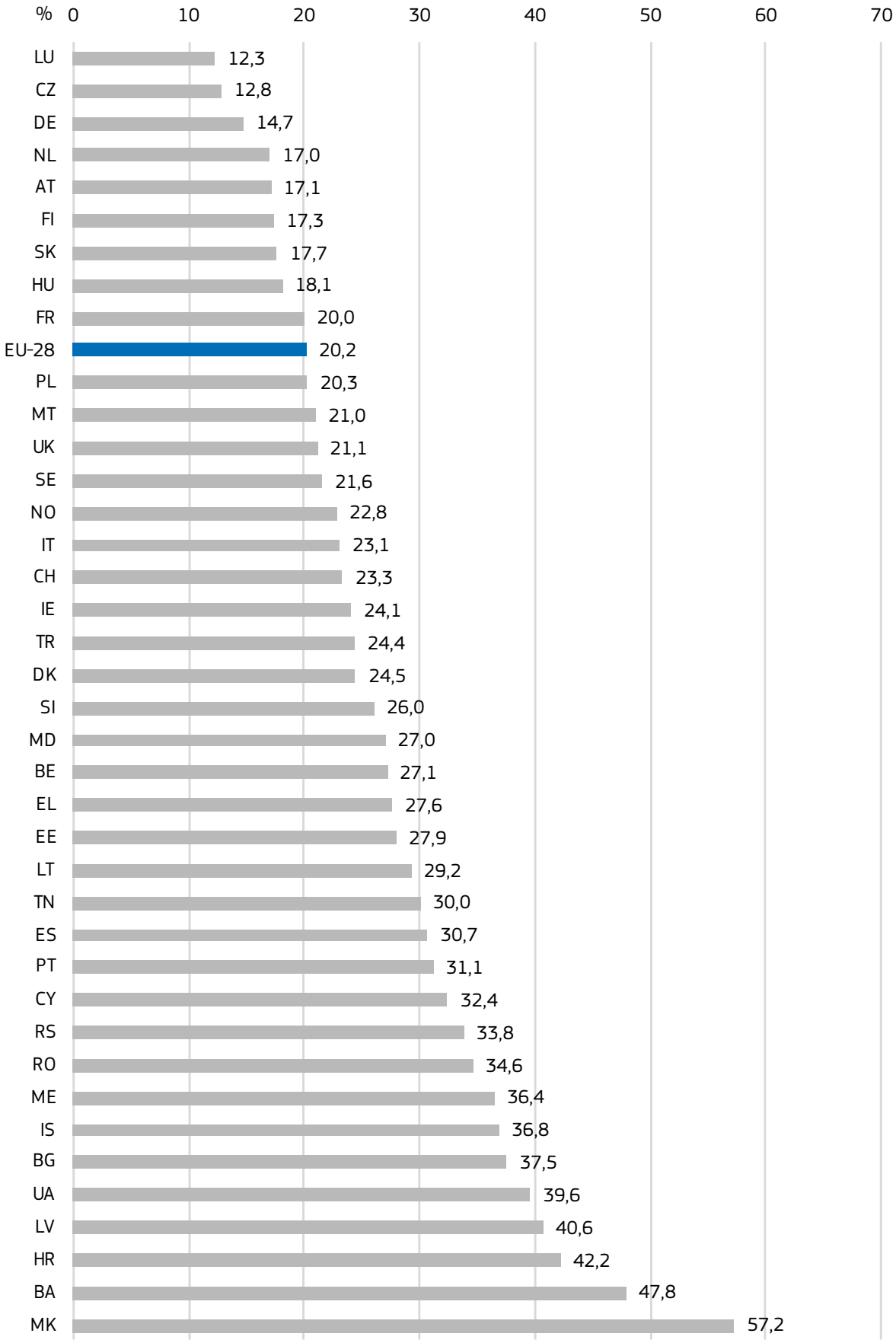
Figure 4.6 Proportion of women among researchers in the government sector, 2015



Notes: Exceptions to reference year: FR: 2014; Data unavailable for: AL, IL, FO; Definition differs for: CH, DE, HR, ME, NL; Data estimated for: EU-28, SE.
Other: Proportions computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

Figure 4.7 Proportion of women among researchers in the business enterprise sector, 2015



Notes: Exceptions to reference year: FR: 2014; Data unavailable for: AL, AM, FO, GE, IL; Definition differs for: ME; Data estimated for: EU-28.
Other: Proportions computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

In the higher education and the government sectors, gender balance was reached in the majority of countries. However, in the business enterprise sector, women researchers are still under-represented.

The proportion of women researchers in each of the three main sectors (HES, GOV and BES) of the economy in 2015 can be seen in Figures 4.5, 4.6 and 4.7. These three main sectors together employed more than 99% of all researchers in the EU.

Women represent 42.1 % of the researchers' population working in the HES in the EU (Figure 4.5), and the corresponding proportion in the GOV sector is similar where women make up 42.5 % of researchers (Figure 4.6). The picture is different in the BES where women researchers are under-represented, making up a proportion of only 20.2 % (Figure 4.7).

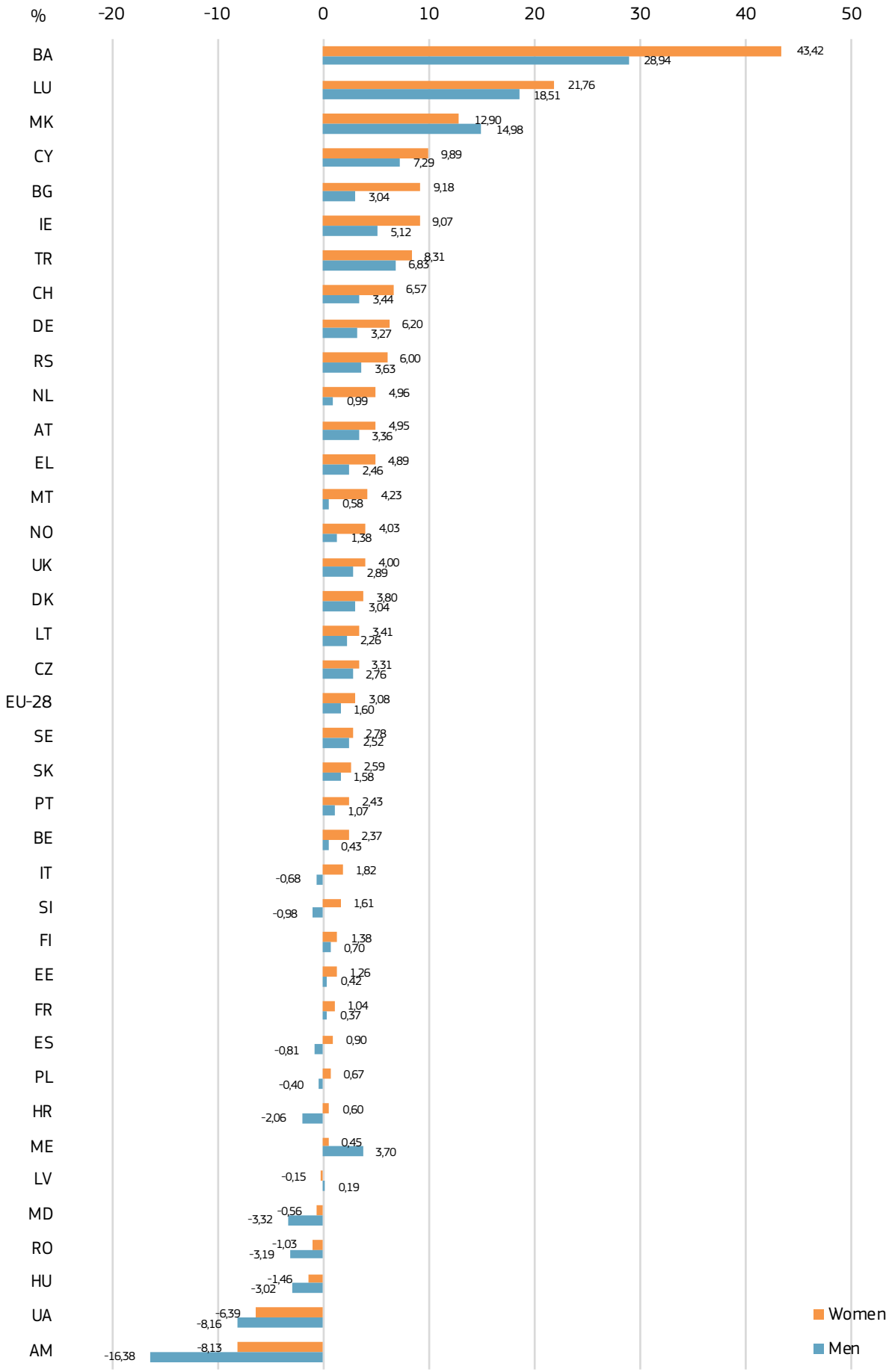
In the higher education and government sectors, the current population of researchers is gender-balanced in the majority of countries. The proportion of women researchers ranged between 40 % and 60 % in 31 out of 41 countries examined in the HES, and 32 out of 41 countries in the GOV sector (Figures 4.5 and 4.6). In the HES only one country (Armenia) surpassed the 60 % threshold, while this was true for two countries (Georgia and Estonia) in the GOV sector. In contrast, 10 countries (MT, CZ, FR, CY, EL, LU, DE, CH, HU, AT) had proportions of less than 40 % in the HES and nine countries (MT, TR, FR, DE, CH, BE, UK, CZ, LU) had proportions of less than 40 % in the GOV sector.

As the higher education sector is the main source of employment for women researchers, it is not surprising that even in those countries where women researchers are under-represented in this sector, the proportion of women researchers is not particularly low there. In Malta, women hold the lowest share of higher education researchers (33.1 %), followed by Czechia (35.2 %). In contrast, the highest proportion of women researchers can be found in Armenia (61.4 %), resulting in a difference between Armenia and Malta of 28.3 percentage points.

The variation in the proportion of women researchers is slightly larger in the government sector, with 34.8 percentage points between the lowest share and the highest share for women researchers. The lowest shares can be found in Malta (26.5 %) and Turkey (30.4 %), while the highest shares can be found in Estonia (61.2 %) and Georgia (60.6 %).

In the business enterprise sector, women researchers were under-represented in 35 of the 39 countries examined. More specifically, the proportion of women researchers was within the 40-60 % range in only four countries (MK, BA, HR, LV), while all the other countries failed to reach the 40 % threshold (Figure 4.7). The disparities among countries were also notable in this sector. As can be seen in Figure 4.7, the proportion of women in research populations was low in Luxembourg (12.3 %) and Czechia (12.8 %), while it reached up to 47.8 % in Bosnia and Herzegovina, and 57.2 % in North Macedonia.

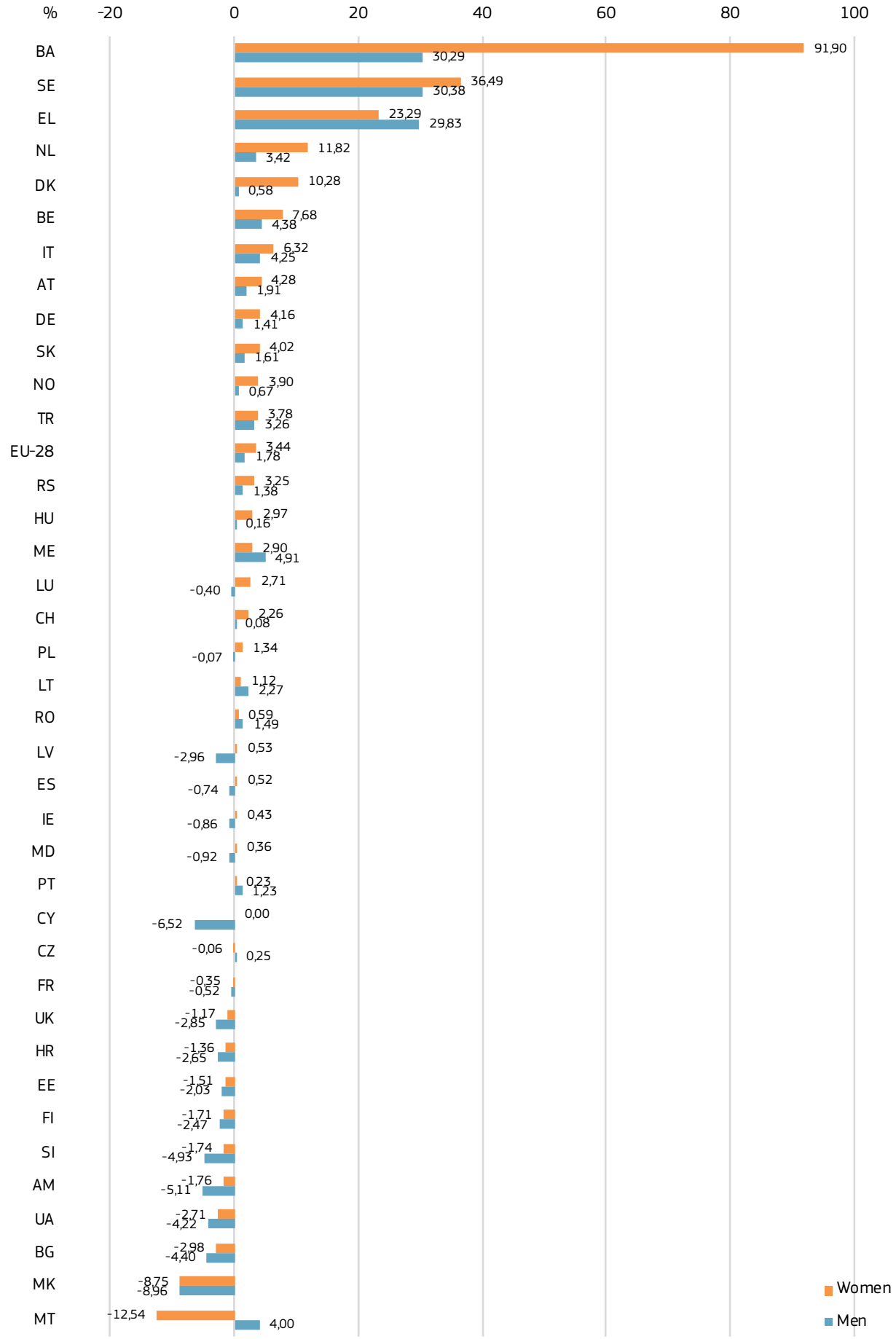
Figure 4.8 Compound annual growth rate for researchers in the higher education sector, by sex, 2008–2015



Notes: Exceptions to reference period: EU-28, AT, DK, SE, UK, MD, UA, TN: 2009-2015; EL, ME: 2011-2015; BA: 2012-2015; FR: 2008-2014; Data unavailable for: AL, GE, TN, IL, FO; Data estimated for: EU-28, UK (2009, 2015); FR(2014); IT(2015); Break in time series for: EL(2011); FR(2014); PT(2008); Definition differs for: ME (2015); Not computed due to lack of comparability with 2008: IS. Other: Compound annual growth rate computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

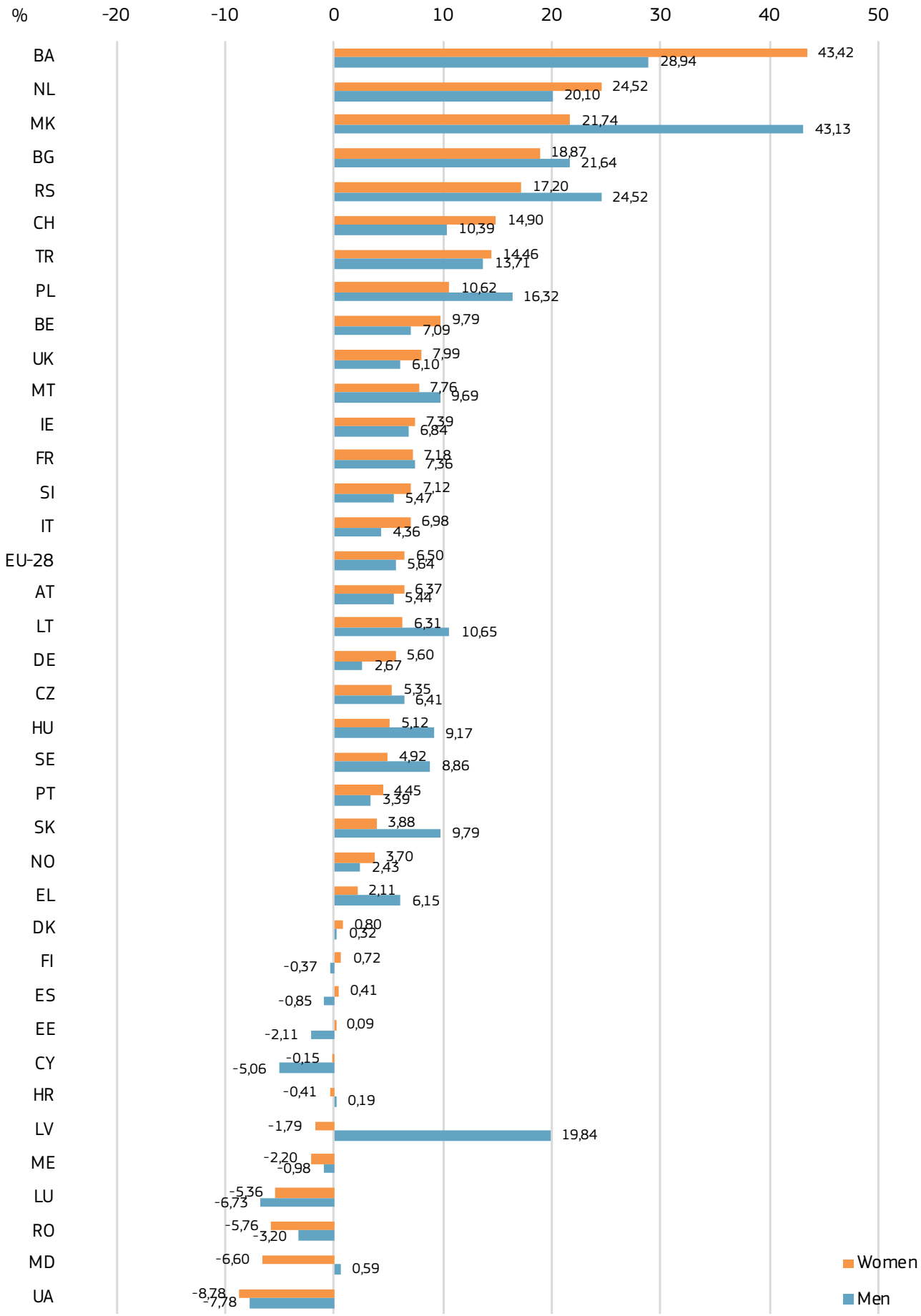
Figure 4.9 Compound annual growth rate for researchers in the government sector, by sex, 2008–2015



Notes: Exceptions to reference period: DK, LU, AT, SE, AM, MD, UA: 2009–2015; EL, ME: 2011-2015; BA: 2012-2015; FR: 2008–2014; Data unavailable for: AL, TN, GE, FO, IL; Data estimated for: EU-28 (2008, 2015); FR (2014); SE (2009, 2015); Definition differs for: CH, NL (2008, 2015); FR, NO, SK (2008); HR, ME (2015); Break in time series for: EL(2011); Excluded due to limited number of observations (< 20 for either start or end year): MT; Not computed due to lack of comparability with 2008: IS.
Other: Compound annual growth rate computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

Figure 4.10 Compound annual growth rate for researchers in the business enterprise sector, by sex, 2008–2015



Notes: Exceptions to the reference period: EU-28, DK, DE, LU, NL, AT, SE, UA, MD: 2009–2015; EL, ME: 2011-2015; BA: 2012-2015; FR: 2008-2014; Data unavailable for: AL, AM, TN, GE, FO, IL; Data estimated for: EU-28 (2009, 2015); UK(2008); Definition differs for: ME (2015); NO (2008); Break in time series for: EL (2011); SI (2008); Not computed due to lack of comparability with 2008: IS. Other: Compound annual growth rate computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_persocc), UNESCO Institute of Statistics (Researchers by sector of employment).

In all sectors of the economy, the number of women researchers in the EU grew faster than the number of men between 2008 and 2015.

The average rates at which the number of women and men researchers changed each year between 2008 and 2015 in the three main sectors of the economy (HES, GOV, BES) are presented in Figures 4.8, 4.9 and 4.10.

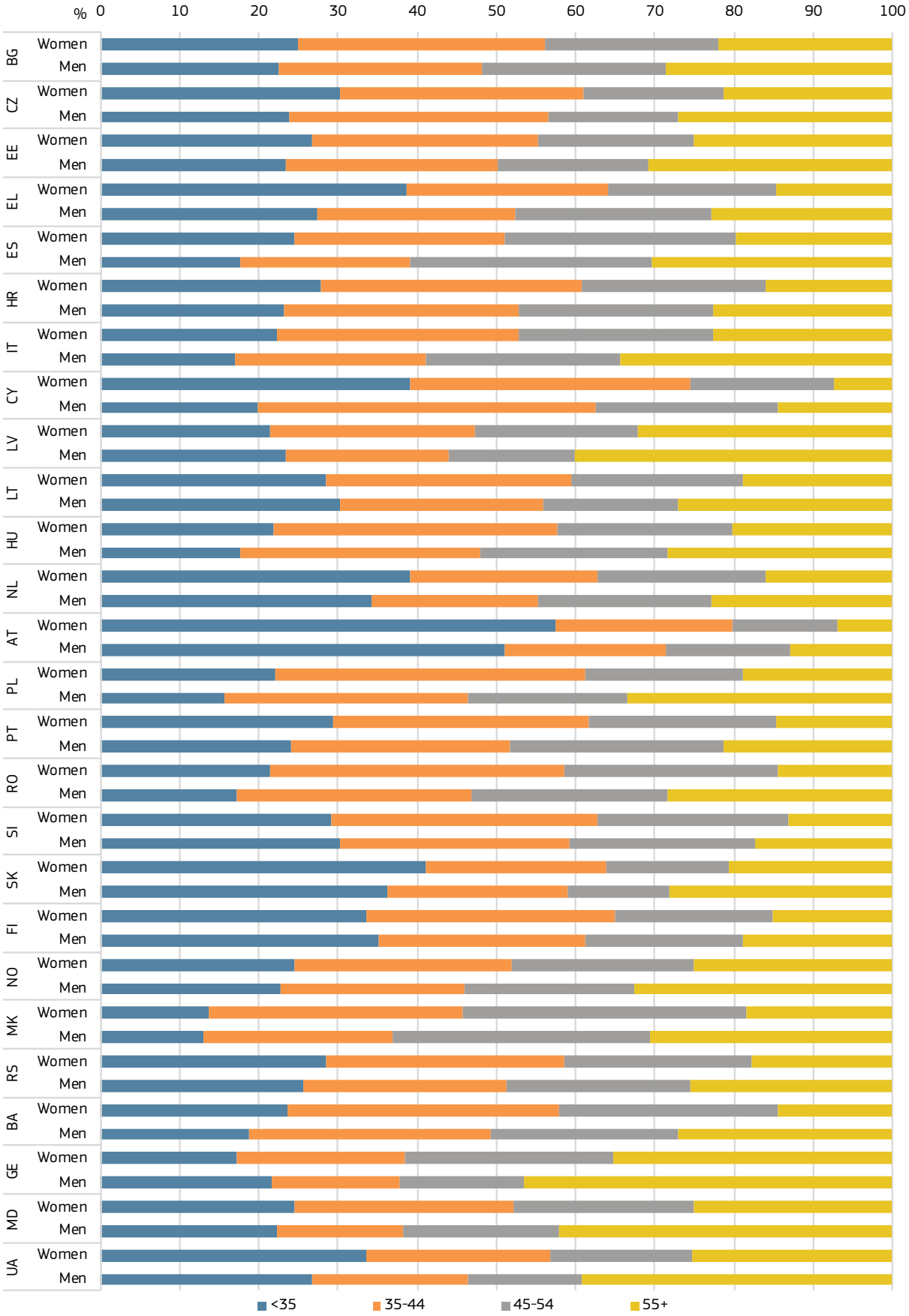
At the EU level, the average annual growth of women researchers was higher than that of men researchers in all three of the above sectors. More specifically, in the higher education sector, the number of women researchers grew by 3.1 % on average per year, while the number of men grew by 1.6 % on average per year (Figure 4.8). Similar annual growth rates were also found for the government sector; 3.4 % for women researchers and 1.8 % for men researchers (Figure 4.9). In the business enterprise sector, the average growth was higher for both sexes. The number of women researchers grew by an average rate of 6.5 % per year, while the corresponding rate for men was 5.6 % (Figure 4.10).

At the national level, the average annual rate of women researchers working in the higher education sector was higher than that of men researchers in the large majority of countries examined (35 out of 38). However, the compound annual growth rate (CAGR) was not positive in every country. In five countries (RO, HU, UA, AM, MD), the overall numbers of both women and men researchers declined, in Latvia the CAGR was negative only for women researchers, while the CAGR was negative only for men researchers in Italy, Slovenia, Spain, Poland and Croatia.

In the government sector, although in most countries the CAGR for women researchers was higher than that for men (31 out of 38), a positive growth rate for both sexes was found in less than half the countries. More specifically, in 11 out of the 38 countries (CY, FR, UK, HR, EE, FI, SI, AM, UA, BG, MK), the CAGR was either less than or equal to zero for both sexes. In two countries (CZ, MT), the CAGR was less than or equal to zero only for women researchers, and in six countries (LU, PL, LV, ES, IE, MD) it was less or equal to zero only for men researchers. The largest decline in the number of researchers was found in Malta, where the number of women researchers decreased on average by 12.5 % per year, while the rate for Maltese men researchers went up by 4.0% on average. Among EU countries, the highest growth in the number of researchers can be seen in Sweden both for women (36.5 %) and for men researchers (30.4 %).

The annual growth rate in the business enterprise sector was higher for women researchers than men in half the countries considered (19 out of 37). Positive rates for women and men researchers were found in 26 countries in total, while negative rates for both sexes were found in five countries (CY, ME, LU, RO, UA). Among EU Member States, the highest annual growth rate for men researchers was found in Bulgaria (21.6 %), while for women researchers, the highest annual growth rate was in the Netherlands (24.5 %).

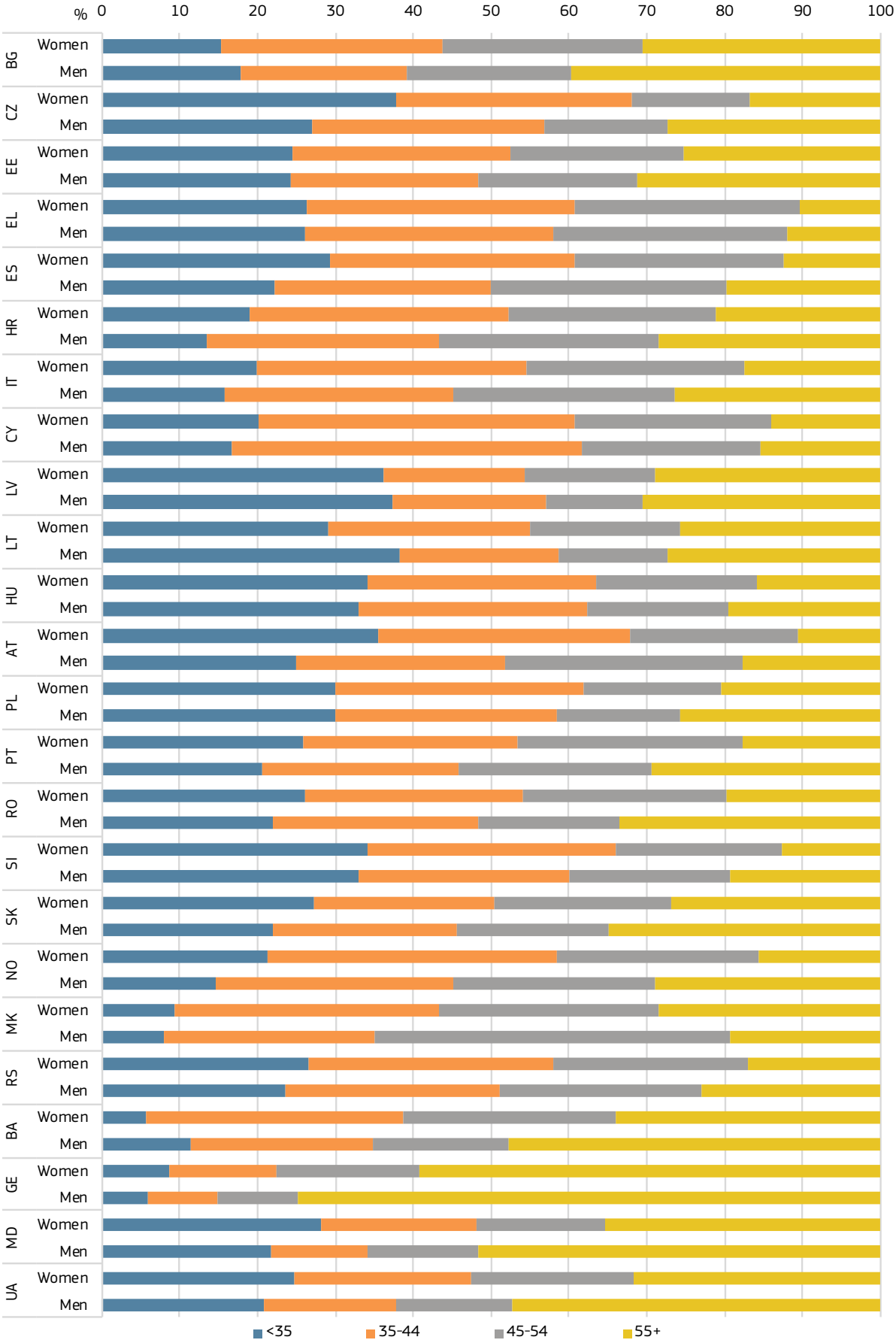
Figure 4.11 Distribution of researchers in the higher education sector across age group, by sex, 2015



Notes: Exceptions to reference year: NL, NO, PL: 2014; Data unavailable for: EU-28, BE, DK, DE, IE, FR, LU, MT, SE, UK, IS, CH, ME, AL, TR, AM, FO, IL, TN; Data estimated for: IT.
Other: Percentages computed from data in head count (HC).

Sources: Eurostat – Statistics on research and development (online data code: rd_p_persage), UNESCO Institute of Statistics (Researchers by sector of employment and age).

Figure 4.12 Distribution of researchers in the government sector across age group, by sex, 2015



Notes: Exceptions to reference period: PL, NO: 2014; Data unavailable for: EU-28, BE, DK, DE, IE, FR, LU, MT, NL, FI, SE, UK, IS, CH, ME, AL, TR, IL, FO, AM, TN; Data confidential for: PL (age categories: <25 and 65+); Definition differs for: HR.
Other: Percentages computed from data in head count (HC).

Sources: Eurostat – Statistics on research and development (online data code: rd_p_persage), UNESCO Institute of Statistics (Researchers by sector of employment and age).

Women researchers are mainly concentrated in the younger age groups (under 35 and 35-44) in both the higher education and government sectors.

In order to identify potential patterns in the age of the researchers, Figures 4.11 and 4.12 break down women and men researchers by age group; under 35s, 35-44, 45-54 and over 55, for the higher education and the government sector in 2015.

In both sectors, the pattern is similar. In about half the countries examined, the majority of women researchers were in the under 35 and the 35-44 age groups, while the majority of men researchers were in the 45-54 and the over 55 age groups. It is noteworthy that the proportion of women researchers in the 35-44 age group is higher than men researchers in almost all the countries examined, with the only exceptions being Czechia and Cyprus in the HES, and Latvia, Cyprus and Slovakia in the GOV sector.

More particularly, in the under 35s age group in higher education, women researchers have higher concentration in comparison to men in 21 out of the 26 countries considered. In the 35-44 age group, this number rises to 24 countries and decreases in the next age category (45-54) to 14 countries. In the oldest age group (over 55), no country had a higher share of women researchers than men researchers.

In the government sector, women researchers have a higher share in the under 35s age group than men researchers in 19 out of 24 countries. This number increases to 21 countries in the next age category (35-44) and drops to 16 countries in the 45-54 age group. In the highest age category (the over 55s), the share of women researchers was higher than that of men researchers only in North Macedonia.

The highest concentrations in the youngest category (under 35) in the HES can be seen in Austria for both sexes, where 57.5 % of women and 51 % of men researchers were younger than 35 years old in 2015. In the GOV sector, the highest shares of the under 35 age group were in Czechia for women researchers (37.8 %) and in Lithuania for men (38.1 %).

The highest shares of the oldest age category (over 55) can be found in Georgia for both sexes, both in the higher education and in the government sectors. 35.3 % of women researchers employed in the HES and 59.3 % of women employed in the GOV sector were over 55 in Georgia. The corresponding numbers for men researchers were 46.5 % (HES) and 74.9 % (GOV).

Table 4.1 Evolution of the dissimilarity index for researchers in the higher education sector and government sector, 2012-2015

	2012		2015	
	HES	GOV	HES	GOV
BE	0,22	0,12	0,22	0,23
BG	0,16	0,15	0,18	0,16
CZ	0,21	0,17	0,19	0,16
DK	0,18	0,22	0,19	0,11
DE	0,23	0,20	0,23	0,17
EE	0,21	0,38	0,22	0,34
IE	0,25	0,25	0,23	0,17
EL	0,10	0,28	0,08	0,14
ES	0,03	0,11	0,03	0,15
HR	0,19	0,06	0,17	0,04
IT	0,12	0,12	0,12	0,13
CY	0,12	0,33	0,12	0,35
LV	0,25	0,19	0,24	0,16
LT	0,22	0,30	0,22	0,25
LU	0,35	0,11	0,32	0,19
HU	0,18	0,17	0,19	0,17
MT	0,27	0,13	:	:
NL	0,00	0,26	0,12	0,25
AT	0,24	0,20	0,23	0,15
PL	0,18	0,19	0,17	0,14
PT	0,13	0,08	0,15	0,07
RO	0,11	0,12	0,09	0,10
SI	0,24	0,18	0,22	0,22
SK	0,16	0,13	0,16	0,16
FI	0,30	:	0,27	0,30
SE	:	0,17	0,24	0,13
UK	0,09	0,26	0,21	0,19
IS	:	:	0,21	0,17
NO	0,17	0,19	0,19	0,19
CH	:	:	0,22	:
ME	0,11	0,06	0,18	0,06
MK	0,25	0,10	0,16	0,11
RS	0,14	0,10	0,14	0,12
TR	0,09	0,12	0,09	0,12
BA	:	:	0,14	0,41
AM	:	:	0,36	0,08
GE	:	:	0,19	0,35
MD	:	:	0,22	0,07
UA	:	:	0,13	0,21

Notes: Exceptions to the reference year: UK: 2013; BG:2014 (HES); Data unavailable for: EU-28, FR, AL, IL, FO, TN; Break in time series for: DE (fields of R&D: natural sciences, engineering and technology, social sciences, humanities); Definition differs for: ME; DE (fields of R&D: social sciences, humanities); FI, NL (GOV); Data estimated for: ES; IT, UK (HES); SE (GOV); PL (2015, GOV, fields of R&D medical sciences, agricultural sciences); MT was excluded due to low number of observations (<30) in each field of R&D; IS (2012) was excluded due to lack of comparability with 2015. Others: ':' indicates that data are unavailable; In HES, ‚not specified' field of R&D was considered for countries with no available data. In GOV, no country had data in this category; Proportions are shown with two decimal digits but the text discusses them at full precision; DI computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

Dissimilarity Index (DI)

The Dissimilarity Index (DI) indicates the percentage of either women or men (all scientific fields combined) who would have to move across different scientific fields to ensure that the proportions of women (out of the total number of women across all scientific fields) and men (out of the total number of men across all scientific fields) were equal in each scientific field. Note that this does not ensure parity of the sexes in each scientific field.

The maximum value is 1, which indicates the presence of only either women or men in each of the scientific fields. The minimum value of 0 indicates that the frequency distribution of women across scientific fields is identical to the same distribution for men.

Table 4.1 shows the changes in the dissimilarity Index (DI) for researchers in the higher education and government sectors in 2012 and in 2015. When computing the DI, six fields were considered; natural sciences, engineering and technology; medical and health sciences; agricultural sciences; social sciences; humanities. For the calculation of the DI in the higher education sector, data from 'any other' field of research and development were also considered when available. For the GOV sector, no country had observations in this category.

In the higher education sector, the values of the DI range from 0.03 in Spain to 0.36 in Armenia, while in the government sector the index ranges from 0.04 in Croatia to 0.41 in Bosnia and Herzegovina. Since the ranges of the DI values are similar in both sectors for the large majority of countries, the distribution of both sexes has the same disparity in the HES and the GOV sectors across all the scientific fields.

Between 2012 and 2015, the DI decreased in 11 countries in the higher education sector and in 16 countries in the government sector. A decrease in the DI indicates a higher similarity between men and women in the population of researchers across the scientific fields in these countries. The largest decrease in the DI in the HES was in North Macedonia (0.25 in 2012 and 0.16 in 2015) and in the GOV sector the largest decrease was in Greece (0.28 in 2012 and 0.14 in 2015). However, these sorts of differences are slightly more pronounced in countries where the index increased. For example, in the United Kingdom, the DI in the HES increased from 0.09 to 0.21.

In 2015, the highest DI in the higher education sector was observed in Armenia (0.36), Luxembourg (0.32) and Finland (0.27), while the lowest DI was observed in Spain (0.03), Greece (0.08), Romania and Turkey (both 0.09). In the government sector, the highest DI was observed in Bosnia and Herzegovina (0.41), Cyprus and Georgia (both 0.35) and Estonia (0.34), while the lowest values were found in Croatia (0.04), Montenegro (0.06), Portugal and Republic of Moldova (both 0.07).

Table 4.2 Evolution of the proportion (%) of women among researchers in the higher education sector, by field of research and development, 2008–2015

	2008						2015					
	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities
BE	32	19	50	43	47	42	33	22	52	46	50	49
BG	43	30	55	35	47	57	54	34	55	42	54	60
CZ	24	24	46	36	42	37	31	22	47	35	43	40
DK	29	22	47	53	47	47	30	24	52	41	47	46
DE	26	17	44	44	33	46	32	20	50	50	44	49
EE	38	27	60	42	57	63	40	32	56	45	60	61
IE	30	18	58	49	47	48	36	26	60	53	53	52
EL	30	31	40	33	36	48	37	32	45	34	39	41
ES	39	36	41	38	40	40	42	38	44	41	43	43
HR	41	31	52	44	52	52	48	37	56	44	61	58
IT	38	23	31	35	39	50	43	27	37	40	43	53
CY	30	21	59 (10/17)	25 (2/8)	38	47	33	30	42	30 (3/10)	41	47
LV	40	30	60	50	63	70	41	37	61	58	64	68
LT	44	33	59	50	66	63	45	35	62	56	65	65
LU	25	19	-	-	46	:	21	21	40	-	57	48
HU	24	18	45	36	43	45	28	24	46	40	49	46
MT	19	14	33	14 (1/7)	35	24	30	13	47	22 (2/9)	41	28
NL	29	23	40	39	42	44	38	29	42	45	52	50
AT	28	21	44	56	47	50	31	24	47	55	51	53
PL	38	25	55	48	47	46	39	27	55	51	48	48
PT	50	28	54	49	49	48	51	29	58	55	53	51
RO	45	38	54	45	51	46	49	43	59	49	53	46
SI	38	23	49	52	42	49	30	27	54	50	47	54
SK	40	32	56	43	52	42	45	33	58	50	52	49
FI	33	25	63	55	58	56	31	31	61	59	58	57
SE	35	24	60	48	:	:	31	26	58	50	53	51
UK	44	39	50	60	39	38	38	23	60	57	45	52
IS	:	:	:	:	:	:	34	19	64	53	56	48
NO	30	21	54	51	45	45	32	24	59	52	50	48
CH	30	20	44	58	45	48	32	24	47	61	49	51
ME	51	38	90 (9/10)	52	47	53	48	37	53	50	37	59
MK	:	32	67	32	42	65	40	37	61	43	44	56
RS	51	31	56	45	50	50	52	36	46	59	51	56
TR	41	33	46	28	39	42	44	32	49	32	43	42
BA	52	30	60	40	34	29 (5/17)	52	38	66	47	40	57
AM	:	:	:	:	:	:	46	28	95	0 (0/2)	71	71
GE	:	:	:	:	:	:	47	29	61	52	51	67
MD	:	:	:	:	:	:	43	29	54	35	63	56
UA	:	:	:	:	:	:	54	34	71	58	73	58

Notes: Exceptions to the reference period: 2009-2015: AT, DK, SE; 2010-2015: PL; 2011-2015: EL, FI, ME; 2012-2015: BA, CH; 2008-2014: BG; 2010-2013: UK; Data unavailable for: EU-28, FR, AL, IL, FO, TN; Break in time series for: DE (2015 data; fields of R&D: 01, 02, 05, 06); EL, PT (2008 data; all fields of R&D); Definition differs for: ME; DE (2015 data; field of R&D: 03); all fields of R&D); Data estimated for: ES, IT, UK (2015 data; all fields of R&D); BE, UK (2008 data; all fields of R&D); IS (2008) was excluded due to lack of comparability with 2015.
Others: ':' indicates that data are unavailable; '–' indicates that denominator was zero; For proportions based on fewer than 20 graduates the numerators and denominators are displayed in brackets. Proportions are shown as integers but the text discusses them at full precision; Proportion computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

Between 2008 and 2015, the proportion of women researchers increased still further in the higher education sector.

The proportion of women researchers in the HES in 2008 and 2015, broken down by field of R&D, is presented in Table 4.2. Overall, in most countries and in most fields of R&D with available data, the presence of women researchers increased during this period. It is noteworthy that the proportion of women researchers increased in all fields of R&D in 14 countries (BE, BG, DE, IE, ES, IT, HU, NL, PT, RO, SK, NO, CH, BA).

In natural sciences, the proportion of women researchers increased in 26 (out of 34) countries. In three of those countries (EE, ES, IT), the increase resulted in a gender-balanced population of researchers as the proportion of women researchers in 2015 ranged between 40 % and 60 %, while the corresponding proportion in 2008 was below 40 %. On the other hand, in the United Kingdom, the proportion of women researchers fell below the 40 % threshold in 2015 resulting in under-representation of women researchers.

Although the proportion of women researchers increased in the fields of engineering and technology in 29 countries, only in Romania did this increase result in a gender-balanced population of researchers (43 %). In all other countries, women researchers are under-represented in this field. More specifically, the proportion of women researchers in 2015 ranged from 13 % in Malta to 38 % in both Spain and Bosnia and Herzegovina.

In the field of medical and health sciences, the presence of women researchers increased in 24 out of the 34 countries with available data. However, since gender parity already existed in this field in the majority of countries, the increase resulted in the over-representation of women researchers in three countries, namely Latvia, Lithuania and Bosnia and Herzegovina. On the other hand, in Malta, the researchers were gender-balanced in 2015 as the proportion of women researchers grew from 33 % to 47 %.

In agricultural sciences, the proportion of women researchers increased in 26 countries in 2015 compared to 2008. In six of these countries (BG, ES, IT, HU, NL, MK), the proportion of women researchers surpassed the 40 % threshold resulting in a gender-balanced population of researchers, while in 16 countries (BE, DE, EE, IE, LV, LT, PL, PT, RO, SK, FI, SE, NO, CH, RS, BA) the increase was within the 40-60 % range.

In social sciences, the proportion of women researchers increased in the vast majority of the countries with available data (29 out of 34 countries). From this rise, women researchers were found to be equally represented to men researchers in seven countries (DE, IT, CY, MT, UK, TR, BA) in 2015 while in 2008 they were under-represented. However, in Croatia, the proportion of women researchers increased to slightly over 60 % in 2015. In some countries the number of women researchers decreased, for example in Montenegro the proportion declined below 40 %.

In the field of humanities, the changes in the proportion of women researchers always resulted in more balanced populations with the exception of Lithuania where women researchers became even more over-represented. In the United Kingdom and in Bosnia and Herzegovina, the presence of women researchers increased to above 40 %, while in North Macedonia the figure decreased from a high of 65 % down to 56%.

Table 4.3 Compound annual growth rates (%) of women researchers in the higher education sector, by field of research and development, 2008-2015

	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
BE	-1,0		3,5		3,5		1,4		3,7		1,9	
BG	12,0		4,8		27,6		5,0		9,9		15,4	
CZ	14,3		0,2		0,4		-5,1		5,5		6,6	
DK	3,7		4,5		5,1		3,2		4,7		-2,3	
DE	3,8		11,3		5,0		4,1		13,9		1,9	
EE	0,1		4,0		4,6		0,9		1,9		-1,0	
IE	11,0		11,2		8,5		13,5		9,9		2,8	
EL	8,9		2,0		-6,7		3,0		17,3		8,7	
ES	-0,1		-0,4		3,1		-2,5		2,3		-0,5	
HR	2,7		3,3		1,0		-1,0		3,1		-10,2	
IT	2,1		3,0		2,7		1,9		2,0		0,5	
CY	3,1		19,4		23,2		6,0		8,1		10,4	
LV	-0,8		10,2		4,2		2,6		-4,3		-3,1	
LT	4,5		1,3		7,7		1,2		5,2		-1,1	
LU	13,9		22,8		:		:		22,1		18,9	
HU	1,9		3,2		-3,2		2,0		-2,4		-2,7	
MT	13,3		3,1		-0,2		10,4		6,0		7,7	
NL	7,8		5,5		1,9		6,3		6,0		7,9	
AT	6,0		8,5		2,9		-1,6		6,7		4,0	
PL	-2,3		-14,6		42,0		6,5		3,2		5,2	
PT	1,5		4,2		3,0		0,6		1,1		4,6	
RO	18,8		-3,3		-3,5		13,3		-5,0		-15,1	
SI	-6,5		-1,4		2,9		13,3		3,5		3,0	
SK	-3,1		4,0		1,8		6,2		0,0		17,9	
FI	-2,3		2,8		-2,7		-2,1		0,9		0,0	
SE	9,5		-1,4		2,8		-5,3		:		:	
UK	1,7		-8,6		8,3		6,2		7,8		12,4	
NO	2,2		3,7		4,7		-0,1		5,7		0,8	
CH	2,5		14,4		4,5		11,1		6,0		4,8	
ME	16,8		0,9		2,7		-1,0		-2,3		-2,5	
MK	35,6		5,9		5,8		25,5		36,5		7,7	
RS	12,6		4,9		-13,6		21,5		8,3		6,3	
TR	3,8		8,1		7,8		4,0		10,8		9,5	

Notes: Exception to the reference period: AT, DK, SE, MK(Natural sciences): 2009-2015; EL, FI, ME: 2011-2015; UK: 2009-2013; BG: 2008-2014; CH:2012-2015; Data unavailable for: EU-28, FR, AL, AM, BA, GE, IL, FO, MD, TN, UA; SE (social sciences, humanities and arts); LU (medical sciences, agricultural sciences); Data estimated for: BE, UK (2008); ES, IT (2015); UK (2013); Break in time series: EL (2011); DE (2015: Natural sciences, engineering and technology, social sciences, humanities and arts); PT (2015); Definition differs for: DE (2015: medical sciences, agricultural sciences); ME (2015); Not computed due to lack of comparability with 2015: IS.
Other: ':' indicates that data are unavailable; CAGR shows the average annual growth while ‚trend' shows the actual change in the number of women (Headcount); In the trend columns, the scale is not the same across countries.

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci).

The number of women researchers working in the higher education sector increased between 2008 and 2015, with very few exceptions.

The compound annual growth rate (CAGR) for women researchers in the higher education sector for each field of R&D in the 2008-2015 period is given in Table 4.3. The CAGR of women researchers is accompanied by the annual changes in the number of women in each field of R&D.

Overall, in each field of R&D, more than two thirds of the countries had a positive annual growth rate of women researchers between 2008 and 2015. More specifically, the CAGR of women researchers in this period was found positive or equal to zero in 23 countries in the field of humanities, 24 countries in the fields of agricultural sciences, in 26 countries in the fields of natural sciences, engineering and technology and medical sciences, and in 28 countries in the field of social sciences.

In the field of natural sciences, agricultural sciences and social sciences the number of women researchers in the higher education sector was growing the fastest on average in North Macedonia (35.6 % per year for natural sciences, 25.5% for agricultural sciences and 36.5 for social sciences). In the fields of engineering and technology, and humanities, the average annual growth rate was the highest in Luxembourg (22.8 % in engineering and technology and 18.9 % in humanities), while in the field of medical sciences, the highest CAGR could be seen in Poland (42.0 %).

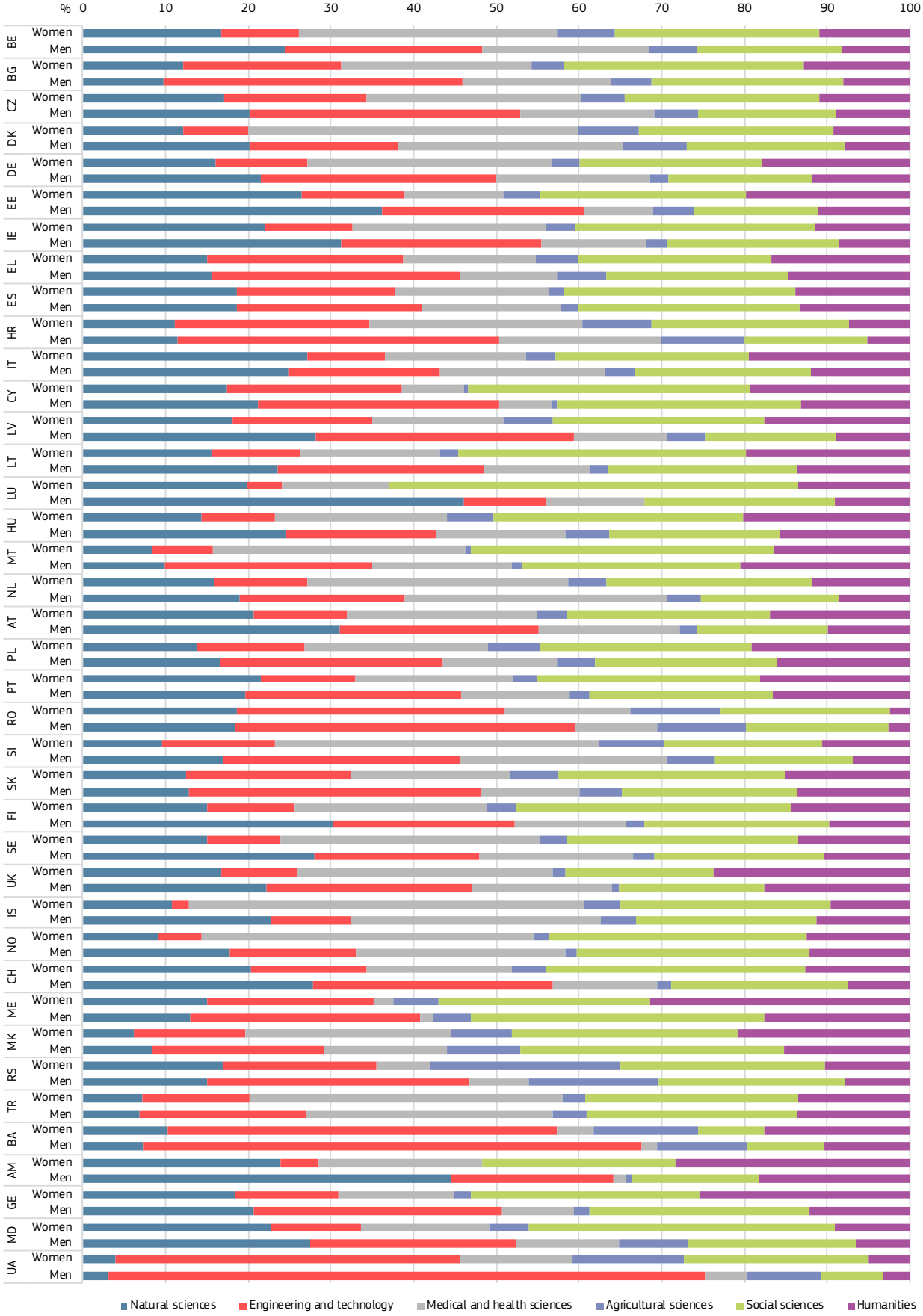
In contrast, the average annual growth rate declined the most in Slovenia in natural sciences (-6.5 %), in Poland in engineering and technology (14.6 %), in Serbia in medical sciences (-13.6 %) and in Sweden in agricultural sciences (5.3 %). In Romania, the number of women researchers declined the most between 2008 and 2015 in the fields of social sciences (-5.0 %) and humanities (15.1 %).

Women researchers seem more likely to work in the field of medical sciences or social sciences while men researchers seem more likely to work in natural sciences, and engineering and technology.

Figure 4.13 presents the distribution of women and men researchers across the different fields of science in the higher education sector in 2015. Across the various fields of research and development, women were more likely to work as researchers in medical and social sciences, while men researchers had higher concentration in engineering and technology, and in natural sciences. More specifically, out of 39 countries considered, women researchers had the highest concentration in medical sciences in 12 countries (BE, CZ, DK, DE, HR, NL, SI, SE, UK, IS, NO, TR) and in social sciences in 19 countries (BG, IE, ES, CY, LV, LT, LU, HU, MT, AT, PL, PT, SK, FI, CH, MK, RS, GE, MD). On the other hand, men researchers were more likely to work in natural sciences in 11 countries (BE, EE, IE, IT, LU, HU, AT, FI, SE, AM, MD) and in engineering and technology in 18 countries (BG, CZ, DE, EL, HR, LV, LT, PL, PT, RO, SI, SK, UK, CH, RS, BA, GE, UA). Research in agricultural sciences does not seem to be preferred by neither women nor men in any country.

However, there were a few exceptions as women researchers were more likely to work in the field of engineering and technology in four countries, namely; Bosnia and Herzegovina (47.1 %), Ukraine (41.5 %), Romania (32.4 %) and Greece (23.7 %), and in the field of natural sciences in two countries; Italy (27.1 %) and Estonia (26.5 %). In contrast, men researchers were more likely to work in the field of medical sciences in four countries; the Netherlands (31.7 %), Iceland (30.1 %), Turkey (29.8 %) and Denmark (27.18 %), and in social sciences in six countries; Montenegro (35.5 %), North Macedonia (32.0 %), Cyprus (29.4 %), Norway (28.1 %), Spain (26.8 %) and Malta (26.5 %).

Figure 4.13 Distribution of researchers in the higher education sector across fields of science, by sex, 2015



Notes: Exceptions to the reference year: UK: 2013; BG:2014; Data unavailable for: EU-28, FR, AL, IL, FO, TN; Break in time series for: DE (fields of R&D: natural sciences, engineering and technology, social sciences, humanities); Definition differs for: ME; DE (fields of R&D: social sciences, humanities); FI, NL (GOV); Data estimated for: ES; IT, UK (HES).
Other: Percentages computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D)

Table 4.4 Evolution of the proportion (%) of women among researchers in the government sector, by field of research and development, 2008–2015

	2008						2015					
	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities
BE	23	30	41	40	28	45	34	27	65	49	48	56
BG	53	37	56	60	61	66	50	41	81	63	64	66
CZ	33	26	55	49	48	45	33	26	56	48	47	42
DK	26	27	33	67 (2/3)	43	44	31	0 (0/1)	54	-	53	51
DE	28	23	48	40	44	49	34	23	51	44	52	52
EE	33	35	76	70	81	71	29	53	85	71	67	67
IE	32	28	76	34	51	-	30	29	88	39	53	-
EL	30	34	52	32	63	67	41	29	40	34	54	56
ES	42	37	52	50	47	45	44	33	57	50	49	44
HR	49	29	49	42	53	57	52	38	52	48	57	55
IT	35	31	55	40	51	52	41	39	55	48	54	58
CY	60	20 (1/5)	38	17	47	61	63	33 (1/3)	29 (2/7)	28	74	74
LV	49	33	72	50	72	71	59	21	78	65	79	65
LT	49	34	68	67	65	68	43	26	58	62	64	65
LU	42	29	50 (1/2)	25 (4/16)	40	20 (2/10)	47	24	72	-	40	58 (7/12)
HU	29	34	57	41	40	49	34	26	52	50	46	50
MT	71 (5/7)	67 (4/6)	50 (1/2)	43 (3/7)	59 (10/17)	0 (0/1)	100 (1/1)	-	60 (6/10)	9	-	0 (0/1)
NL	31	22	44	33	48	37	31	24	53	37	57	54
AT	28	38	53	27	52	52	37	41	40	38	54	53
PL	41	24	60	47	46	57	39	28	: c	54	46	57
PT	61	43	64	59	68	65	61	42	61	67	53	59
RO	51	46	72	65	55	53	44	47	70	60	55	50
SI	38	33	53	45	56	51	41	31	71	41	65	53
SK	41	31	60	46	57	52	44	28	58	54	60	56
FI	38	31	:	49	56	68	41	30	65	51	57	66
SE	42	23	47	100 (1/1)	48	49	43	28	51	-	43	57
UK	27	16	45	39	59	46	34	17	43	43	55	58
IS	:	:	:	:	:	:	42	33	36 (5/14)	11 (2/19)	50 (5/10)	65
NO	32	20	52	40	47	52	37	27	57	42	52	57
ME	70	46 (6/13)	58	-	-	26 (5/19)	54	50 (10/20)	57	0 (0/1)	60 (3/5)	19 (3/16)
MK	49	49	61	48	41	57	41	-	53	:	65	49
RS	57	45	74	50	57	45	62	46	58	73	48	56
TR	27	28	50	29	46	35	31	24	27	37	43	32
BA	48	-	0 (0/1)	-	-	11	48	44	76	-	-	19
AM	:	:	:	:	:	:	51	35	54	54	53	57
GE	:	:	:	:	:	:	73	33	64	30	59	77
MD	:	:	:	:	:	:	52	27	55	55	59	54
UA	:	:	:	:	:	:	42	39	65	57	63	68

Notes: Exceptions to the reference period: 2009-2015: AT, DK, LU; 2011: EL, FI, ME, NL, SE; 2012-2015: BA; 2008-2013: UK; 2008-2014:PL (field of R&D: agricultural sciences); Data unavailable for: EU-28, FR, CH, AL, IL, FO, TN; Break in time series for: DE (2015; Fields of R&D: natural sciences, engineering and technology, social sciences, humanities); EL, SE (2011, all fields); Definition differs for: ME (2015, all fields); DE (2015, fields of R&D: medical sciences, agricultural sciences); FI, NL (both years, all fields); NO, SK (2008, all fields); Data estimated for: ES (2015, all fields), SE (both years, all fields); Data confidential for: PL (2015, fields of R&D: medical sciences); IS (2008) was excluded due to lack of comparability with 2015.
Others: ':' indicates that data are unavailable; '-' indicates that denominator was zero; 'c' indicates that data are confidential; For proportions based on fewer than 20 graduates the numerators and denominators are displayed in brackets; Proportions are shown as integers but the text discusses them at full precision; Proportions computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

In the government sector, the proportion of women researchers increased in most fields of research and development.

Table 4.4 shows the proportion of women researchers in each field of R&D in the GOV sector for 2008 and 2015. An increase in the proportion of women researchers was found in at least half the countries with available data, in each field of R&D apart from engineering and technology field. It should be noted that in one country (Norway), there were more women researchers in all fields of R&D during that period.

In the field of natural sciences, the proportion of women researchers increased in 22 countries. This growth resulted in a gender-balanced population of researchers in four countries (EL, IT, SI, FI). In Cyprus and Serbia women researchers were over-represented in 2015 while in 2008 their proportion ranged between 40 % and 60 %.

Between 2008 and 2015, the number of women researchers grew in the field of engineering and technology in 15 out of the 30 countries with available data. In three of those countries (RO, ME, RS) gender parity continues to prevail, while in Estonia, Bulgaria and Austria the proportion of women researchers rose above the threshold of 40 % in 2015.

In medical science, the proportion of women researchers increased in 17 countries during the period 2008-2015. Since women researchers were already well represented in this field, gender parity was lost during that period in four of those countries (BE, BG, LU, SI) due to the continuous growth of the proportion of women researchers, men researchers became 'under-represented'. On the contrary, in three countries (LT, MK, RS) gender balance was reached as the presence of women researchers decreased in 2015. In two countries (DK, BA), the number of women researchers increased from previous under-representation to gender parity.

From the 21 countries where the proportion of women researchers increased in the field of agricultural sciences, in ten countries this increase was within the gender equality range of 40-60 %. In one country (the UK), this growth resulted in a gender-balanced population of researchers as the proportion of women researchers surpassed the 40 % threshold in 2015. In four countries (BG, LV, PT, RS) women researchers were over-represented in 2015, while in 2008 women and men researchers were equally distributed across this field.

In the field of social sciences, the presence of women researchers increased in 19 (out of 30) countries. This growth resulted in the over-representation of women researchers in three countries (CY, SI, MK) as the corresponding proportion surpassed the 60 % threshold. However, in Belgium, gender parity was achieved when the proportion of women researchers increased from 28% to 48 %.

Women researchers working in the humanities grew in number in 17 (out of 32) countries. In Luxembourg and in the Netherlands, this growth corresponded to gender equality in the population of researchers, while in Iceland it resulted in an over-representation of women researchers. In contrast, gender parity was created in some of the countries where the proportion of women researchers decreased, for example in Greece and Portugal the proportion of women researchers declined to below 60%.

Table 4.5 Compound annual growth rates (%) of women researchers in the government sector, by field of research and development, 2008-2015

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
BE	16,2		2,2		31,3		2,8		17,6		4,0	
BG	-0,8		-13,5		-6,7		-4,8		2,4		-1,5	
CZ	0,2		2,1		-0,3		1,9		-0,2		-1,9	
DK	3,1		-		13,7		-		9,3		9,6	
DE	5,3		1,4		3,5		4,0		10,6		-0,4	
EE	-4,4		-		5,5		-4,1		-3,7		-3,3	
IE	0,0		2,3		-7,5		1,2		3,5		:	
EL	17,4		6,3		44,3		16,0		3,4		16,2	
ES	2,1		-0,7		1,3		-3,7		-3,1		2,0	
HR	-0,5		6,0		-2,7		3,0		-0,8		-2,9	
IT	7,2		12,6		4,7		7,5		4,0		5,4	
CY	-1,8		-		-		5,4		3,2		2,3	
LV	3,0		-11,4		-6,7		9,4		-10,5		-4,5	
LT	-2,9		-6,0		-5,8		2,8		9,3		6,0	
LU	4,5		-9,1		-		-		8,5		-	
HU	2,9		-10,9		17,9		-1,1		-4,5		1,5	
MT	-		-		-		-		-		-	
NL	2,1		8,4		38,2		1,1		23,1		46,8	
AT	9,1		-8,5		1,9		9,2		5,7		3,9	
PL	-2,0		2,3		10,2		-0,4		5,6		7,1	
PT	-9,8		-5,4		9,6		-13,7		-12,5		-19,9	
RO	-3,6		1,3		5,3		18,9		6,3		-3,6	
SI	-0,1		-20,1		2,8		-11,0		-8,0		0,0	
SK	2,9		-4,2		2,1		3,1		1,5		14,6	
FI	-6,0		-5,1		:		-6,4		0,2		-11,0	
SE	20,3		27,0		46,2		-		50,8		53,8	
UK	3,0		5,1		-11,1		1,6		-1,3		-2,6	
NO	5,0		4,9		9,3		-0,5		0,0		2,4	
ME	13,4		13,6		1,4		:		-		-	
MK	15,0		0,0		4,9		3,2		-28,4		-18,3	
RS	6,8		4,4		8,9		-8,7		-10,3		14,2	
TR	2,4		4,9		-4,5		5,7		-1,5		-	

Notes: Exceptions to the reference period: 2009-2015: AT, DK, LU; 2011-2015: EL, FI, ME, NL, SE; 2008-2013: UK; 2008-2014: PL (field of R&D: agricultural sciences); 2008-2011: PL (field of R&D: medical science) 2008-2012: MK (fields of sciences: engineering and technology, agricultural sciences); Data unavailable for: EU-28, FR, CH, BA, AL, AM, GE, IL, FO, MD, TN, UA; Break in time series for: DE (2015; fields of R&D: natural sciences, engineering and technology, social sciences, humanities); EL, SE (2011, all fields); Not computed due to lack of comparability of data with 2008: IS; Definition differs for: ME (2015, all fields); DE (2015, fields of R&D: medical sciences, agricultural sciences); FI, NL (both years, all fields); NO, SK (2008, all fields); Data estimated for: ES (2015, all fields), SE (both years, all fields); Data confidential for: PL (2015, fields of R&D: medical sciences, agricultural sciences).
Others: ':' indicates that data are unavailable; '–' indicates that CAGR could not be calculated either due to low number of observations (<20) both in start and end year or due to low number of years with available data (≤3); Compound annual growth rates computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci).

The number of women researchers in the government sector grew between 2008 and 2015 in most of the countries examined.

Table 4.5 shows the average annual growth rate of women researchers in the government sector during the 2008-2015 time period, by field of research and development. As can be seen, the number of women researchers grew positively each year during that time period in more than half the countries with available data in each field.

More specifically, a positive growth rate was found in 20 (out of 31) countries in natural sciences, in 16 countries (out of 28) in engineering and technology, in 20 countries (out of 28) in medical sciences, in 17 countries (out of 27) in agricultural sciences, in 18 countries (out of 30) in social sciences and in 15 (out of 27) countries in the humanities.

In some of the countries, the average annual growth rate was particularly high. In medical sciences, seven countries (BE, DK, EL, HU, NL, PL, SE) showed a growth rate of above 10 %. This was also true for five countries in natural sciences (BE, EL, SE, ME, MK) and five countries in the humanities (EL, NL, SK, SE, RS). Growth rates of over 10 % were also observed in four countries (BE, DE, NL, SE) for social sciences, in three countries (IT, SE, ME) for engineering and technology and in two countries (EL, RO) for agricultural sciences.

It must be noted that Sweden had the highest CAGR in all fields except agricultural sciences. More specifically, in Sweden, the number of women researchers grew on average by 20.3 % per year in natural sciences, by 27.0 % per year in engineering and technology, by 46.2 % per year in medical sciences, by 50.8 % per year in social sciences and by 53.8 % per year in humanities. In agricultural sciences, the highest growth rate was found in Romania where the number of women researchers working in that field increased by 18.9 % on average per year.

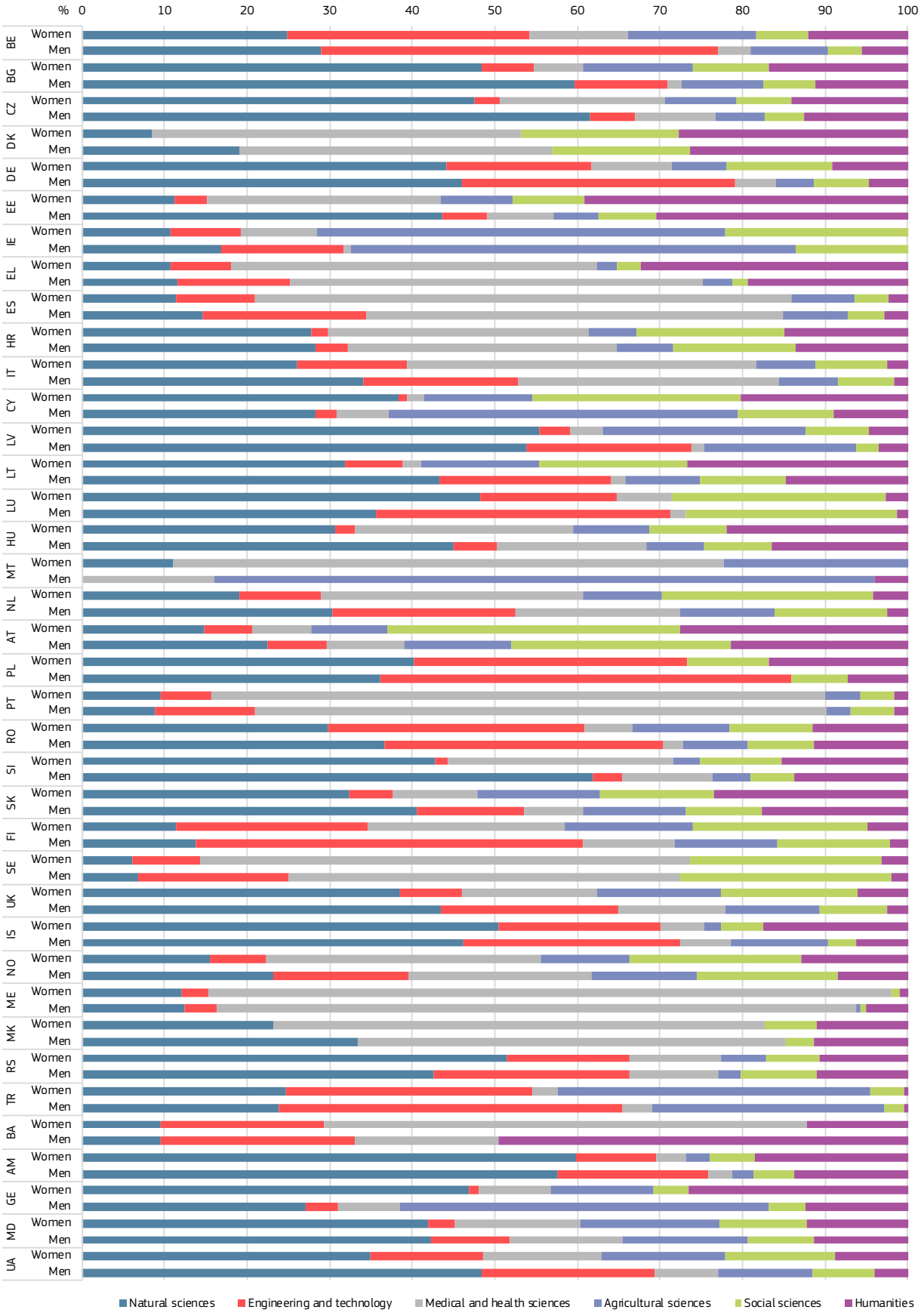
In the government sector, most women researchers work in the field of natural sciences.

The distribution of women and men researchers in the GOV sector across the main fields of R&D is presented in Figure 4.14. It is of great interest that although women researchers in the HES have a higher concentration in social sciences, in the GOV sector, in contrast, most women researchers work in the field of natural sciences. More specifically, in 18 out of the 38 countries considered, women researchers made up a higher proportion in the natural sciences compared to other fields, while for medical sciences this was true in 14 countries.

The same pattern can be seen for men researchers in the GOV sector. Despite their higher concentration in the field of engineering and technology in the HES, men researchers working in the GOV sector had a higher proportion in the field of natural sciences in 19 countries (out of 38) and in the medical sciences in eight countries.

It is evident that in the GOV sector, women and men researchers have more similarities in the fields they most commonly work in than in the HES. However, in some countries, the distribution of women and men researchers had important differences. For example, in Cyprus, 38.4 % of women researchers work in the field of natural sciences, while 42.3 % of men researchers work in the field of agricultural sciences; while in Bosnia and Herzegovina, 58.5 % of women researchers work in medical sciences, and 49.6 % of men researchers work in the humanities.

Figure 4.14 Distribution of researchers in the government sector across fields of research and development, by sex, 2015



Notes: Exceptions to the reference year: UK (2013); Data unavailable for: EU-28, FR, CH, AL, IL, FO, TN; Break in time series for: DE (fields of R&D: natural sciences, engineering and technology, social sciences, humanities); Definition differs for: ME (all fields); DE (fields of R&D: medical sciences, agricultural sciences); FI, NL (all fields); Data estimated for: ES, SE (all fields); Data confidential for: PL (fields of R&D: medical sciences, agricultural sciences).
Other: Percentages computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D)

Table 4.6 Evolution in the proportion (%) of women researchers in the business enterprise sector, by field of research and development, 2007-2014

Country	2007						2014					
	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities	Natural sciences	Engineering and technology	Medical and health sciences	Agricultural sciences	Social sciences	Humanities
BG	50	33	63	60 (6/10)	72 (13/18)	-	: c	: c	66	: c	54	: c
CZ	15	10	45	40	38	8 (1/12)	16	11	51	39	27	0
EL	39	18	81	36	61	78	47	25	61	34	44	58
FR	28	15	63	41	53	62	25	14	60	40	37	50
HR	64	25	84	36	25 (3/12)	-	70	31	80	35	50 (4/8)	50 (1/2)
CY	33	11	21	14 (1/7)	36	-	38	18	43	50 (1/2)	52	-
HU	16	22	44	26	33	17 (1/6)	15	17	36	32	33	43
MT	27	16	100 (12/12)	0 (0/3)	0 (0/2)	:	19	24	43	50 (2/4)	33 (2/6)	67 (2/3)
NL	:	:	:	:	:	:	13	11	39	21	24	23
PL	56	17	65	35	42	0	20	14	66	47	36	42
PT	35	25	63	44	38	36	28	26	71	42	45	42
RO	43	38	67	42	28	-	34	36	74	40	69	25
SI	29	19	58	43	32 (6/19)	-	38	20	55	56	48	67 (14/21)
SK	20	22	67	58	54	0	39	13	55	52	43	36
ME	:	:	:	:	:	:	54	26	:	71 (10/14)	24 (4/17)	-
MK	:	26 (5/19)	95	:	:	:	:	28	91	:	:	:
RS	49	35	78	58	60	0 (0/2)	28	35	85 (11/13)	83 (5/6)	80	-
TR	31	22	51	35	35	-	29	22	47	32	28	37
MD	:	:	:	:	:	:	12	33	-	11	-	-
UA	:	:	:	:	:	:	51	38	69	51	51	75

Notes: Exception to reference years: 2007-2013: FR, SI; 2007-2011: EL; 2007-2015: MK; 2008-2014: RS, MT; 2009-2014: RO (FORD: Humanities); Data unavailable for: EU-28, BE, DK, DE, EE, IE, ES, IT, LV, LT, LU, AT, FI, SE, UK, IS, NO, CH, AL, BA, AM, FO, GE, IL, TN; Break in time series: EL (2011).
Others: ':' indicates that data are unavailable; '–' indicates that denominator was zero; 'c' indicates data are confidential; For proportions based on fewer than 20 graduates, numerators and denominators are displayed in brackets; Proportions are shown as integers but the text discusses them at full precision; Proportion computed from data in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

In the business enterprise sector, the number of women researchers decreased in particular fields of research and development in many countries between 2007 and 2014.

Table 4.6 presents the evolution of the proportion of women researchers in each field of R&D from 2007 to 2014 in the BES. As the Table shows, the number of countries with BES data is much smaller than the other two sectors described (HES and GOV). Only 16 countries had data available for at least two fields in both years.

Taking all fields into consideration, the presence of women researchers increased in about half the countries where data were available. In natural sciences, the proportion of women researchers grew in six (out of 14) countries, and the same was true for agricultural sciences. In engineering and technology, the proportion of women researchers grew in nine (out of 15) countries, and in medical and health sciences in seven (out of 16) countries. Lastly, the proportion of women researchers grew in social sciences in eight (out of 15) countries and in the humanities in four (out of eight) countries.

Some of these increases led to a gender-balanced population of researchers for some countries in some fields of research and development. More specifically, in the field of natural sciences the proportion of women researchers rose from 39 % to 47 % in Greece; in medical sciences, the corresponding proportion increased from 21 % to 43 % in Cyprus; in agricultural sciences, it rose from 35% to 47% in Poland; in social sciences, the corresponding proportion of women researchers increased in four countries (HR, CY, PT, SI); in the humanities it increased in 6 countries (EL, FR, HR, HU, PL, PT) resulting in a gender-balanced population of researchers where previously there had been an under-representation of women researchers.

On the other hand, there are countries where the decrease in the proportion of women researchers also led to gender-balanced population, as women researchers were over-represented in these countries. More specifically, in medical sciences, the proportion of women researchers decreased in three countries (MT, FR, SK); in social sciences the corresponding proportion decreased from 72% to 54% in Bulgaria and from 61% to 44% in Greece.

However, gender balance was not always reached. In the field of engineering and technology no country achieved gender parity, and even in the country with the highest proportion of women, the Ukraine, only 38 % of engineering and technology researchers were women.

Annex 4.1 Number of researchers, by sex, 2011-2015

Country	2011		2012		2013		2014		2015	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	835 357	1694 596	863 928	:	897 964	1808 982	:	:	958 565	1908 598
BE	21 153	42 054	:	:	22 286	44 438	:	:	25 148	48 561
BG	7 259	7 535	7 398	7 821	7 999	8 096	8 804	8 991	9 268	10 070
CZ	12 936	32 966	13 102	34 549	14 537	36 918	14 815	39 678	15 252	41 353
DK	18 831	38 014	20 369	37 151	19 904	37 750	:	:	20 469	40 023
DE	139 879	382 131	:	:	153 517	395 766	:	:	164 095	421 935
EE	3 342	4 304	3 358	4 276	3 338	4 177	3 399	4 322	3 151	4 030
IE	7 298	15 060	5 022	6 758	8 210	17 183	:	:	11 896	21 196
EL	16 609	28 630	:	:	21 163	32 581	:	:	23 078	37 658
ES	85 237	135 017	83 643	131 901	82 121	126 646	83 184	126 920	85 759	128 468
FR	86 635	251 835	90 816	265 629	93 256	273 043	96 708	273 291	:	:
HR	5 417	6 037	5 440	5 962	5 333	5 835	5 246	5 480	5 424	5 665
IT	52 833	98 764	56 078	101 882	58 522	105 403	60 532	107 542	62 828	111 499
CY	716	1 226	718	1 206	854	1 374	826	1 338	804	1 315
LV	3 929	3 448	4 222	3 773	3 871	3 577	:	:	3 993	3 834
LT	9 038	8 320	9 255	8 422	9 263	8 820	9 734	9 637	8 775	8 518
LU	714	2 400	:	:	740	1 973	:	:	905	2 229
HU	11 729	25 216	11 453	25 566	11 462	26 341	11 897	27 293	11 848	26 570
MT	337	921	423	1 015	420	963	410	939	403	1 009
NL	20 373	63 699	25 674	81 510	26 097	84 439	26 116	85 679	28 671	84 275
AT	19 020	46 589	:	:	21 145	50 303	:	:	23 020	55 031
PL	38 908	61 815	39 681	63 946	41 424	68 187	42 958	72 417	43 870	74 624
PT	36 199	46 155	36 805	44 945	35 557	42 733	34 874	43 862	35 757	45 248
RO	11 738	13 751	12 565	15 273	12 611	14 989	12 669	14 866	12 598	14 655
SI	4 550	7 964	4 426	7 936	4 359	7 752	4 387	7 768	4 126	7 182
SK	10 530	14 181	10 595	14 474	10 437	14 004	10 657	14 423	10 293	14 103
FI	18 452	39 097	18 286	38 418	17 861	38 859	17 818	37 697	17 995	37 733
SE	29 847	50 307	:	:	33 876	67 944	:	:	36 673	72 088
UK	161 848	267 161	167 375	275 010	177 801	288 888	183 012	306 169	191 774	305 179
IS	1 221	2 049	:	:	1 471	1 885	:	:	1 699	2 023
NO	16 501	29 077	16 923	29 824	17 659	30 136	18 725	31 300	19 507	32 674
CH	:	:	19 537	40 741	:	:	:	:	23 762	47 072
ME	771	775	:	:	823	794	839	869	840	926
MK	1 025	818	1 174	1 057	:	:	:	:	1 850	1 922
RS	6 716	6 893	6 577	6 672	7 389	7 254	7 452	7 711	8 044	8 294
TR	48 984	88 468	56 081	99 052	60 179	105 918	66 974	114 570	71 136	119 648
BA	:	:	276	523	484	761	811	1 020	798	999
AM	1 907	2 551	1 828	2 228	1 863	2 007	2 227	1 917	2 023	1 833
GE	:	:	:	:	1 433	1 329	3 890	3 439	4 591	4 478
MD	1 618	1 754	1 605	1 733	1 559	1 691	1 586	1 729	1 655	1 713
TN	12 973	14 150	15 535	15 081	17 700	15 637	18 323	15 673	18 869	15 720
UA	32 018	38 360	31 426	37 173	30 079	35 562	26 890	31 805	24 930	28 905

Notes: Data unavailable for: AL, FO, IL; Break in time series for: EL, IS, NL, RO, SI: 2011; NL: 2012; IS, PT, SE: 2013; FR:2014; Definition differs for: ME: 2015; Data estimated for: FR, SE: 2011; EU-28, FR, UK: 2012; FR, SE: 2013; FR, UK: 2014; EU-28, SE: 2015.
Others: ':' indicates that data are unavailable; Data are in head count (HC).

Sources: Eurostat – Research and development statistics (online data rd_p_persocc) and UNESCO Institute of Statistics (Human resources in R&D).

Annex 4.2 Number of researchers in the higher education sector, by sex, 2011-2015

Country	2011		2012		2013		2014		2015	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	535 257	780 625	548 342	784 968	569 482	803 537	585 645	820 241	599 063	823 189
BE	12 573	18 780	12 774	18 663	13 139	18 938	14 150	20 827	13 270	18 639
BG	3 189	3 851	3 271	3 899	3 492	3 786	4 146	4 359	4 086	3 816
CZ	7 184	13 548	7 226	13 908	8 166	14 791	8 115	15 164	8 427	15 536
DK	10 176	15 672	11 120	14 762	11 698	15 382	10 962	16 469	11 769	16 231
DE	87 734	153 677	92 958	158 982	99 207	162 450	101 520	164 391	104 622	165 721
EE	2 149	2 489	2 223	2 519	2 273	2 519	2 276	2 535	2 183	2 427
IE	4 714	6 427	4 820	6 402	4 905	6 222	7 663	9 359	8 251	10 093
EL	11 679	21 163	:	:	15 076	23 648	:	:	14 135	23 328
ES	51 537	75 548	50 297	72 948	48 723	69 202	49 708	69 582	50 782	70 379
FR	36 694	73 455	36 974	74 062	37 546	75 512	40 120	73 097	:	:
HR	3 356	3 866	3 364	3 785	3 405	3 732	3 397	3 569	3 582	3 737
IT	29 268	45 481	30 591	46 063	31 325	46 412	31 949	47 271	31 198	45 205
CY	479	781	480	783	616	970	578	949	571	949
LV	2 859	2 602	3 125	2 768	2 884	2 503	2 935	2 604	2 953	2 719
LT	7 534	6 130	7 754	6 185	7 632	6 304	7 494	6 038	6 991	5 609
LU	236	383	268	440	317	511	:	:	492	798
HU	6 267	10 792	6 251	10 300	6 195	9 828	6 204	9 721	6 170	9 473
MT	199	466	240	516	266	540	292	557	286	577
NL	9 946	14 439	10 040	14 363	10 183	14 407	10 616	14 780	10 900	14 910
AT	12 464	19 544	:	:	13 412	20 369	:	:	14 655	22 044
PL	29 590	40 645	29 385	39 538	29 757	39 270	30 633	40 138	30 792	39 866
PT	22 538	24 479	23 562	24 445	25 568	27 259	24 958	26 966	25 428	26 897
RO	7 224	7 862	7 272	8 297	6 963	7 921	6 953	7 790	7 308	7 749
SI	2 065	2 873	1 958	2 737	1 830	2 480	1 865	2 511	1 810	2 376
SK	8 303	10 060	8 130	9 881	8 208	9 709	8 072	9 596	7 632	8 933
FI	10 818	12 175	10 964	12 209	10 488	11 916	10 601	11 673	10 583	11 590
SE	18 162	22 693	:	:	19 064	23 830	:	:	19 696	24 215
UK	136 321	170 744	140 254	174 976	147 457	182 925	151 059	191 637	157 301	189 737
IS	619	691	:	:	976	934	:	:	1 078	980
NO	9 783	12 029	10 010	11 891	10 504	12 084	11 077	12 327	11 709	12 895
CH	:	:	15 037	26 358	:	:	:	:	17 814	28 118
ME	438	480	:	:	450	500	478	591	446	555
MK	749	634	808	850	:	:	:	:	1 419	1 546
RS	5 020	5 486	4 734	5 145	5 351	5 664	5 241	5 528	5 694	5 936
TR	38 757	56 431	44 719	63 759	47 133	66 276	53 323	72 723	56 503	76 013
BA	:	:	219	390	360	626	745	939	646	836
AM	368	638	:	:	408	413	726	494	511	321
GE	:	:	:	:	1 433	1 329	3 630	3 285	4 279	4 275
MD	478	519	:	:	451	511	453	547	464	498
TN	:	:	:	:	:	:	17 189	13 712	17 656	13 621
UA	3 561	3 973	:	:	3 263	3 673	2 756	3 217	2 570	2 702

Notes: Data unavailable for: AL, FO, IL; Break in time series for: EL, IS, RO, SI: 2011; IS, PT: 2013; FR: 2014; Definition differs for: ME: 2015; Data estimated for: FR, IE: 2011; EU-28, FR, UK: 2012; FR, IE: 2013; EU-28, FR, UK: 2014; EU-28, IT, UK: 2015.
Others: ':' indicates that data are unavailable; Data are in head count (HC).

Sources: Eurostat – Research and development statistics (online data rd_p_persocc) and UNESCO Institute of Statistics (Human resources in R&D).

Annex 4.3 Number of researchers in the government sector, by sex, 2011-2015

Country	2011		2012		2013		2014		2015	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	104 654	150 926	108 487	152 827	110 789	156 412	111 032	154 657	118 277	160 057
BE	1 077	2 138	1 420	2 542	1 481	2 580	1 642	2 830	1 675	2 826
BG	3 233	2 653	3 026	2 459	3 079	2 335	3 023	2 153	2 689	2 141
CZ	3 475	5 459	3 393	5 308	3 633	5 538	3 625	5 885	3 847	6 058
DK	749	1 289	917	1 175	1 038	1 251	1 127	1 267	1 284	1 301
DE	21 507	42 772	22 548	42 990	23 137	43 127	21 389	39 835	22 247	40 543
EE	443	290	448	278	444	305	446	292	409	259
IE	214	385	202	356	195	321	209	335	235	338
EL	2 931	3 163	:	:	4 273	4 294	:	:	6 772	8 986
ES	16 021	17 257	15 599	16 593	15 115	15 903	15 094	16 000	16 257	16 114
FR	9 714	17 912	9 928	18 123	10 186	18 334	9 928	18 475	:	:
HR	1 528	1 373	1 490	1 397	1 439	1 341	1 352	1 230	1 297	1 180
IT	10 925	12 790	11 905	14 025	12 843	14 778	13 276	15 038	13 838	15 220
CY	103	112	98	104	96	92	98	76	99	78
LV	556	359	557	407	521	423	513	391	549	398
LT	880	852	870	830	871	825	928	833	963	923
LU	286	530	295	491	308	480	:	:	270	408
HU	2 565	3 672	2 377	3 349	2 403	3 367	2 688	3 569	2 698	3 592
MT	16	19	10	23	8	17	9	18	9	25
NL	2 719	5 382	4 695	6 616	4 166	7 149	4 153	6 943	4 984	6 988
AT	1 467	1 870	:	:	1 588	1 884	:	:	1 742	2 005
PL	6 457	9 641	6 501	9 127	6 597	9 036	6 718	9 332	6 469	8 999
PT	3 702	2 357	2 910	1 874	2 431	1 670	2 645	1 865	2 723	1 897
RO	2 833	3 284	3 145	3 519	3 332	3 527	3 313	3 486	3 472	3 560
SI	1 031	1 122	1 042	1 127	1 048	1 117	1 041	1 036	964	963
SK	1 598	1 921	1 725	1 958	1 569	1 755	1 937	2 038	1 958	1 999
FI	2 551	3 386	2 509	3 168	2 543	3 189	2 274	2 905	2 160	2 728
SE	3 199	3 195	:	:	3 287	6 240	:	:	5 574	6 657
UK	2 874	5 743	3 118	5 634	3 218	5 496	3 171	5 702	3 172	5 219
IS	214	292	:	:	61	107	:	:	97	145
NO	2 729	3 476	2 783	3 433	2 880	3 470	2 853	3 380	2 960	3 411
CH	:	:	326	654	:	:	379	710	394	701
ME	281	213	:	:	309	199	301	190	315	258
MK	174	118	273	180	:	:	:	:	208	210
RS	1 636	1 293	1 713	1 370	1 808	1 325	1 699	1 221	1 851	1 385
TR	2 166	4 907	2 222	5 137	2 147	4 936	2 206	5 045	2 188	5 011
BA	:	:	15	52	29	68	24	45	106	115
AM	1 539	1 913	:	:	1 455	1 594	1 501	1 423	1 512	1 512
GE	:	:	:	:	:	:	260	154	312	203
MD	1 057	1 051	:	:	1 034	998	1 055	991	1 116	1 012
TN	:	:	:	:	:	:	676	893	709	925
UA	17 601	18 150	:	:	17 513	18 090	16 006	16 478	15 288	15 399

Notes: Data unavailable for: AL, FO, IL; Break in time series for: EL, IS, RO, SE, SI: 2011; BE, NL: 2012; IS, PT, SE: 2013; DE: 2014; Definition differs for: NL, SK: 2011; CH, HR, NL, SK: 2012; HR, NL, SK: 2013; CH, HR, NL, SK: 2014; CH, DE, HR, ME, NL: 2015; Data estimated for: FR, SE: 2011; EU-28, FR: 2012; FR, SE: 2013; EU-28, FR: 2014; EU-28, SE: 2015.
Others: ':' indicates that data are unavailable; Data are in head count (HC).

Sources: Eurostat – Research and development statistics (online data rd_p_persocc) and UNESCO Institute of Statistics (Human resources in R&D).

Annex 4.4 Number of researchers in the business enterprise sector, by sex, 2011-2015

Country	2011		2012		2013		2014		2015	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	183 956	748 827	195 469	:	209 137	838 699	:	:	231 050	914 587
BE	7 390	20 935	:	:	7 572	22 802	:	:	10 030	26 917
BG	786	961	1 022	1 366	1 365	1 821	1 571	2 398	2 425	4 034
CZ	2 198	13 786	2 405	15 205	2 662	16 462	2 975	18 498	2 887	19 651
DK	7 756	20 963	8 159	21 120	7 514	20 738	:	:	7 254	22 394
DE	30 638	185 682	:	:	31 172	190 190	:	:	37 226	215 671
EE	695	1 479	616	1 423	561	1 305	616	1 445	498	1 284
IE	2 370	8 248	:	:	3 110	10 640	:	:	3 410	10 765
EL	1 805	4 053	:	:	1 591	4 413	:	:	1 962	5 145
ES	17 441	41 950	17 506	42 098	18 060	41 300	18 141	41 113	18 469	41 741
FR	38 699	158 357	42 243	170 938	43 762	176 559	44 749	179 052	:	:
HR	528	786	586	780	489	762	497	681	545	748
IT	9 927	37 889	10 796	39 154	11 315	41 395	12 106	42 110	14 337	47 833
CY	97	262	100	238	106	233	107	218	94	196
LV	514	487	540	598	466	651	:	:	491	717
LT	624	1 338	631	1 407	760	1 691	1 312	2 766	821	1 986
LU	192	1 487	:	:	115	982	:	:	143	1 023
HU	2 897	10 752	2 825	11 917	2 864	13 146	3 005	14 003	2 980	13 505
MT	122	436	173	476	146	406	109	364	108	407
NL	7 709	43 877	10 939	60 261	11 748	62 884	11 348	63 955	12 788	62 376
AT	4 859	24 875	:	:	5 908	27 735	:	:	6 320	30 664
PL	2 827	11 472	3 717	15 165	5 004	19 777	5 526	22 860	6 530	25 674
PT	6 442	14 749	7 074	14 397	7 223	13 398	6 928	14 718	7 319	16 179
RO	1 609	2 513	2 063	3 388	2 269	3 469	2 345	3 503	1 702	3 221
SI	1 445	3 962	1 421	4 059	1 476	4 143	1 480	4 209	1 350	3 834
SK	567	2 142	688	2 592	633	2 508	625	2 757	671	3 130
FI	4 702	23 258	4 445	22 780	4 465	23 512	4 540	22 827	4 849	23 128
SE	8 372	24 258	:	:	11 318	37 643	:	:	11 287	41 081
UK	20 745	87 870	22 023	91 486	25 578	98 106	27 127	106 764	28 806	107 591
IS	352	1 026	:	:	434	844	:	:	524	898
NO	3 989	13 572	4 130	14 500	4 275	14 582	4 795	15 593	4 838	16 368
CH	:	:	4 174	13 730	:	:	:	:	5 554	18 253
ME	47	78	:	:	48	88	45	78	43	75
MK	102	66	93	27	:	:	:	:	214	160
RS	52	113	129	154	227	262	508	959	495	970
TR	8 061	27 130	9 140	30 156	10 899	34 706	11 445	36 802	12 445	38 624
BA	:	:	40	80	95	67	40	34	44	48
MD	83	184	:	:	74	182	78	191	75	203
TN	:	:	:	:	:	:	458	1 068	504	1 174
UA	10 856	16 235	:	:	9 303	13 799	8 128	12 110	7 072	10 804

Notes: Data unavailable for: AL, AM, FO, GE, IL; Break in time series for: EL, IS, NL, RO: 2011; NL: 2012; IS, PT, SE, SI: 2013; Definition differs for: NO: 2011-2014; ME: 2015; Data estimated for: EU-28: 2012, 2015.
Others: ':' indicates that data are unavailable; Data are in head count (HC).

Sources: Eurostat – Research and development statistics (online data rd_p_persocc) and UNESCO Institute of Statistics (Human resources in R&D).

Annex 4.5 Number of researchers in the higher education sector, by field of research and development and sex, 2015

Country	Natural sciences		Engineering and technology		Medical and health sciences		Agricultural sciences		Social sciences		Humanities and arts		Not specified	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	2 220	4 557	1 249	4 425	4 142	3 760	921	1 093	3 276	3 263	1 462	1 541	:	:
BG	502	426	794	1 576	956	776	157	220	1 203	1 009	534	352	:	:
CZ	1 433	3 139	1 459	5 084	2 183	2 504	441	822	1 988	2 612	923	1 375	:	:
DK	1 429	3 265	917	2 920	4 698	4 412	860	1 263	2 776	3 098	1 089	1 273	:	:
DE	16 795	35 614	11 603	47 123	30 769	30 863	3 654	3 703	23 058	28 875	18 742	19 546	:	:
EE	578	879	272	589	260	206	95	118	544	363	434	272	0	0
IE	1 803	3 146	868	2 433	1 922	1 263	281	248	2 387	2 091	937	870	:	:
EL	2 131	3 618	3 346	6 998	2 266	2 765	720	1 374	3 302	5 128	2 370	3 445	:	:
ES	9 457	13 082	9 714	15 684	9 377	11 979	992	1 412	14 159	18 833	7 083	9 389	:	:
HR	396	426	844	1 457	925	728	299	376	850	554	268	196	:	:
IT	8 450	11 288	2 963	8 213	5 269	8 995	1 140	1 680	7 297	9 594	6 079	5 435	:	:
CY	99	200	121	278	43	59	3	7	195	279	110	126	:	:
LV	532	763	500	850	471	305	175	125	755	431	520	245	:	:
LT	1 081	1 318	752	1 398	1 182	719	160	125	2 423	1 283	1 393	766	:	:
LU	97	368	21	79	64	95	0	0	243	184	67	72	:	:
HU	889	2 334	547	1 712	1 277	1 472	348	514	1 861	1 952	1 248	1 489	:	:
MT	24	57	21	145	87	97	2	7	105	153	47	118	:	:
NL	1 732	2 824	1 230	2 977	3 433	4 724	498	601	2 717	2 504	1 290	1 280	:	:
AT	3 021	6 851	1 657	5 288	3 362	3 771	534	429	3 604	3 529	2 477	2 176	:	:
PL	4 241	6 597	4 001	10 713	6 851	5 546	1 901	1 853	7 913	8 738	5 885	6 418	:	:
PT	5 445	5 265	2 906	7 022	4 865	3 561	760	616	6 818	5 959	4 634	4 474	:	:
RO	1 356	1 423	2 370	3 194	1 112	760	792	829	1 505	1 343	173	200	:	:
SI	174	401	247	683	710	595	141	139	347	394	191	165	:	:
SK	951	1 150	1 516	3 146	1 471	1 070	453	456	2 087	1 892	1 154	1 219	:	:
FI	1 590	3 497	1 118	2 546	2 458	1 562	376	265	3 517	2 590	1 524	1 130	:	:
SE	2 971	6 765	1 738	4 857	6 188	4 474	631	632	5 487	4 961	2 681	2 526	:	:
UK	24 183	39 102	13 271	43 825	44 385	29 469	2 212	1 638	25 658	30 780	34 358	31 111	3 392	6 999
IS	115	222	23	96	514	295	48	43	275	213	103	111	:	:
NO	1 056	2 270	618	1 969	4 670	3 250	188	175	3 637	3 611	1 452	1 564	81	54
CH	3 406	7 302	2 356	7 590	2 929	3 287	698	448	5 262	5 562	2 115	2 004		
ME	67	72	90	154	10	9	25	25	114	197	140	98	:	:
MK	87	130	191	322	354	229	103	136	389	494	295	235	:	:
RS	957	895	1 062	1 880	366	426	1 319	928	1 401	1 335	589	472	:	:
TR	4 035	5 148	7 375	15 378	21 364	22 646	1 499	3 160	14 567	19 311	7 663	10 369	:	:
BA	66	61	304	504	29	15	81	92	52	77	114	87	:	:
AM	122	143	24	63	101	5	0	2	119	49	145	59	:	:
GE	749	850	505	1 235	565	363	82	77	1 123	1 091	1 031	503	224	156
MD	105	137	51	124	72	62	22	41	172	101	42	33	:	:
UA	38	33	398	770	132	54	129	94	214	81	48	35	1 611	1 635

Notes: Exceptions to the reference year: UK: 2013; BG:2014; Data unavailable for: EU-28, FR, AL, IL, FO, TN; Break in time series for: DE (fields of R&D: Natural sciences, engineering and technology, social sciences and humanities and arts); Definition differs for: ME; DE (fields of R&D: social sciences and humanities and arts); Data estimated for: ES, IT, UK.
Others: ':' indicates that data are unavailable; Data are in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

Annex 4.6 Number of researchers in the government sector, by field of research and development and sex, 2015

Country	Natural sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BE	415	820	492	1 356	202	111	258	265	106	115	202	159
BG	1 303	1 278	167	239	163	39	357	210	245	137	454	238
CZ	1 830	3 727	118	328	769	594	332	363	253	287	545	759
DK	109	248	0	1	574	491	0	0	244	217	357	344
DE	9 812	18 663	3 911	13 374	2 152	2 046	1 472	1 876	2 869	2 688	2 030	1 896
EE	46	113	16	14	116	21	35	14	36	18	160	79
IE	25	57	20	50	22	3	116	182	52	46	0	0
EL	721	1 045	506	1 221	2 993	4 492	165	324	192	165	2 195	1 739
ES	1 857	2 361	1 542	3 188	10 559	8 127	1 251	1 265	677	709	371	464
HR	358	330	27	45	409	379	74	79	231	174	194	158
IT	3 605	5 194	1 832	2 839	5 856	4 816	1 003	1 085	1 203	1 037	339	249
CY	38	22	1	2	2	5	13	33	25	9	20	7
LV	304	214	21	80	21	6	135	73	42	11	26	14
LT	307	400	67	192	21	15	138	83	173	97	257	136
LU	130	145	45	146	18	7	0	0	70	105	7	5
HU	826	1 614	67	189	712	654	249	248	251	292	593	595
MT	1	0	0	0	6	4	2	20	0	0	0	1
NL	953	2 117	489	1 546	1 581	1 400	475	792	1 276	956	209	177
AT	259	449	100	146	124	186	161	261	617	534	481	429
PL	1 741	2 689	1 427	3 704	: c	: c	826	698	430	495	729	547
PT	261	169	164	229	2 025	1 311	116	58	110	98	47	32
RO	1 034	1 305	1 077	1 200	202	88	411	275	349	290	399	402
SI	412	597	15	34	263	106	31	44	95	52	147	132
SK	635	811	103	259	198	143	293	250	271	182	458	354
FI	291	414	595	1 416	610	334	400	377	540	409	127	65
SE	339	456	460	1 206	3 305	3 157	0	0	1 288	1 702	179	136
UK	1 237	2 386	242	1 181	529	712	482	632	535	443	193	142
IS	49	67	19	38	5	9	2	17	5	5	17	9
NO	456	791	203	556	985	757	319	437	617	580	380	290
ME	38	32	10	10	261	200	0	1	3	2	3	13
MK	48	70	0	0	124	109	0	0	13	7	23	24
RS	953	590	275	328	203	148	103	38	119	128	198	153
RS	953	590	275	328	103	38	203	148	119	128	198	153
TR	542	1 192	651	2 087	68	181	827	1 408	90	119	11	23
BA	10	11	21	27	62	20	0	0	0	0	13	57
AM	904	871	148	275	53	45	45	39	83	73	279	209
GE	146	55	4	8	27	15	39	91	13	9	83	25
MD	467	427	36	98	170	138	189	153	118	81	136	115
UA	5 271	7 371	2 065	3 204	2 166	1 166	2 266	1 744	1 998	1 152	1 341	618

Notes: Exceptions to the reference year: UK: 2013; PL (field of R&D: agricultural sciences); Data unavailable for: EU-28, FR, CH, AL, IL, FO, TN; Break in time series for: DE (fields of R&D: natural sciences, engineering and technology, social sciences and humanities and arts); Definition differs for: ME; DE (fields of R&D: social sciences and humanities and arts); FI, NL; Data estimated for: ES, SE; Data confidential for: PL (2015, GOV, Fields of R&D: medical and health sciences).
Others: ':' indicates that data are unavailable; 'c' indicates that data are confidential; Data are in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

Annex 4.7 Number of researchers in the business enterprise sector, by field of research and development and sex, 2015

Country	Natural sciences		Engineering and technology		Medical and health sciences		Agricultural sciences		Social sciences		Humanities and arts	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
BG	127	: c	: c	: c	701	358	52	: c	34	29	: c	: c
CZ	922	4 950	1 539	12 732	249	236	128	198	138	378	0	1
EL	155	177	1 101	3 385	378	245	52	102	108	136	11	8
FR	15 654	46 628	18 495	116 187	4 899	3 225	1 849	2 788	1 129	1 912	315	311
HR	62	27	264	595	158	39	8	15	4	4	1	1
CY	53	88	18	81	10	13	1	1	12	11	0	0
HU	795	4 452	1 748	8 667	207	361	148	315	97	195	10	13
MT	44	192	46	146	10	13	2	2	2	4	2	1
NL	1 826	12 750	4 989	39 679	2 259	3 563	1 142	4 394	1 038	3 247	94	323
PL	863	3 533	2 985	18 228	1 383	727	222	249	62	108	11	15
PT	1 015	2 643	3 779	10 496	1 322	538	226	318	546	666	41	56
RO	105	208	1 694	3 063	487	171	31	46	27	12	1	3
SI	532	854	758	3 119	57	46	23	18	92	99	14	7
SK	184	288	372	2 402	41	34	15	14	9	12	4	7
ME	14	12	17	49	0	:	10	4	4	13	0	0
MK	:	:	7	18	86	9	:	:	:	:	:	:
RS	97	247	375	704	11	2	5	1	20	5	0	0
TR	1 682	4 190	8 458	30 652	794	879	273	591	102	256	136	234
BA	0	0	18	18	0	0	8	9	14	7	0	0
MD	5	37	72	146	0	0	1	8	0	0	0	0
UA	582	561	6 564	10 715	285	131	425	401	75	73	3	1

Notes: Exception to reference years: FR: 2013, EL: 2011, MK: 2012; Data unavailable for: EU-28, BE, DK, DE, EE, IE, ES, IT, LV, LT, LU, AT, FI, SE, UK, IS, NO, CH, AL, BA, AM, FO, GE, IL, TN; Break in time series for: EL.
Others: ':' indicates that data are unavailable; 'c' indicates that data are confidential; Data are in head count (HC).

Source: Eurostat – Statistics on research and development (online data code: rd_p_perssci), UNESCO Institute of Statistics (Researchers by sector of employment and field of R&D).

5 Working conditions of researchers

Main findings:

- At the EU level, 13.0 % of women researchers and 8.0 % of men researchers in the higher education sector were working part-time in 2016. In most of the countries considered, the proportion of women researchers working part-time was higher than that of men.
- In 2016, women researchers in the higher education sector were more likely than men to be employed under precarious working contracts with the respective shares in the EU being 8.1 % and 5.2 %. This pattern was found in two thirds of the countries examined.
- The mobility of women researchers in middle or senior career stages increased between 2012 and 2016, although at the EU level, men researchers in these stages were still more mobile than women.
- However, women researchers in early career stages are slightly more mobile than men at the EU level, though this pattern varies between countries.
- Women employed in scientific R&D activities earned on average 17 % less than their male colleagues in 2014. In the economy as a whole, the gender pay gap was marginally lower, at 16.6 %. Higher hourly earnings on average for men were also found at national level in the vast majority of countries in both the scientific R&D activities and in the economy as a whole.
- The gender pay gap increases with age in the EU. The same pattern was observed in nine countries for scientific R&D activities, and in 13 countries for the total economy.
- In 2015, R&D expenditure per researcher seems to have an inverse relationship with the proportion of female researchers. Most of the countries which spent high amounts per researcher had some of the lower shares of women in researchers.
- 56 % of the 313 Research Performing Organisations (RPOs) in the EU that provided relevant information to the Monitoring the evolution and benefits of Responsible Research and Innovation (MoRRI) project had adopted gender equality plans in 2016. The corresponding proportion of research staff working for these RPOs was 79.5 %.

Surveys on academic researchers (Fumasoli et al, 2015) point to a feeling of career insecurity among young scientists as they cannot see a predictable career pathway towards a permanent position after obtaining their PhD. The precariousness of research careers makes them less attractive to new and talented PhD graduates. This lack of job security can also have a negative impact on the scientific output of researchers already in the system, especially women in the early stages of their careers. It can reduce many sorts of opportunities, including obtaining research funding, working with leading scientists, achieving tenure or long-term contracts, or having sufficient time for research.

Now that the European Research Area (ERA) is completed, the EU aims to achieve a 'unified research area open to the world based on the internal market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological basis, their competitiveness and their capacity to collectively address grand challenges' (European Commission, 2012). Two of the ERA's key priorities, namely a) an open labour market for researchers and b) gender equality and gender mainstreaming in research, require, amongst other things, equally good working conditions for researchers of both sexes. Moreover, the EU has established a clear regulatory framework on equal pay and work-life balance (Directive 2006/54/EC; European Commission, 2017b).

This Chapter investigates the propensity of women and men researchers to be employed with certain types of contract, their career mobility, the extent of the gender pay gap in scientific R&D, the adoption of gender equality plans by Research Performing Organisations (RPOs) and the levels of R&D expenditure in individual countries. It must be noted that whilst this chapter gives an insight into the relative quality of the working conditions for women and men researchers, it does not provide the contextual information necessary to assess the reasons why particular individuals are working in specific conditions. Furthermore, it does not offer a final value judgement as to the merits of different forms of employment.

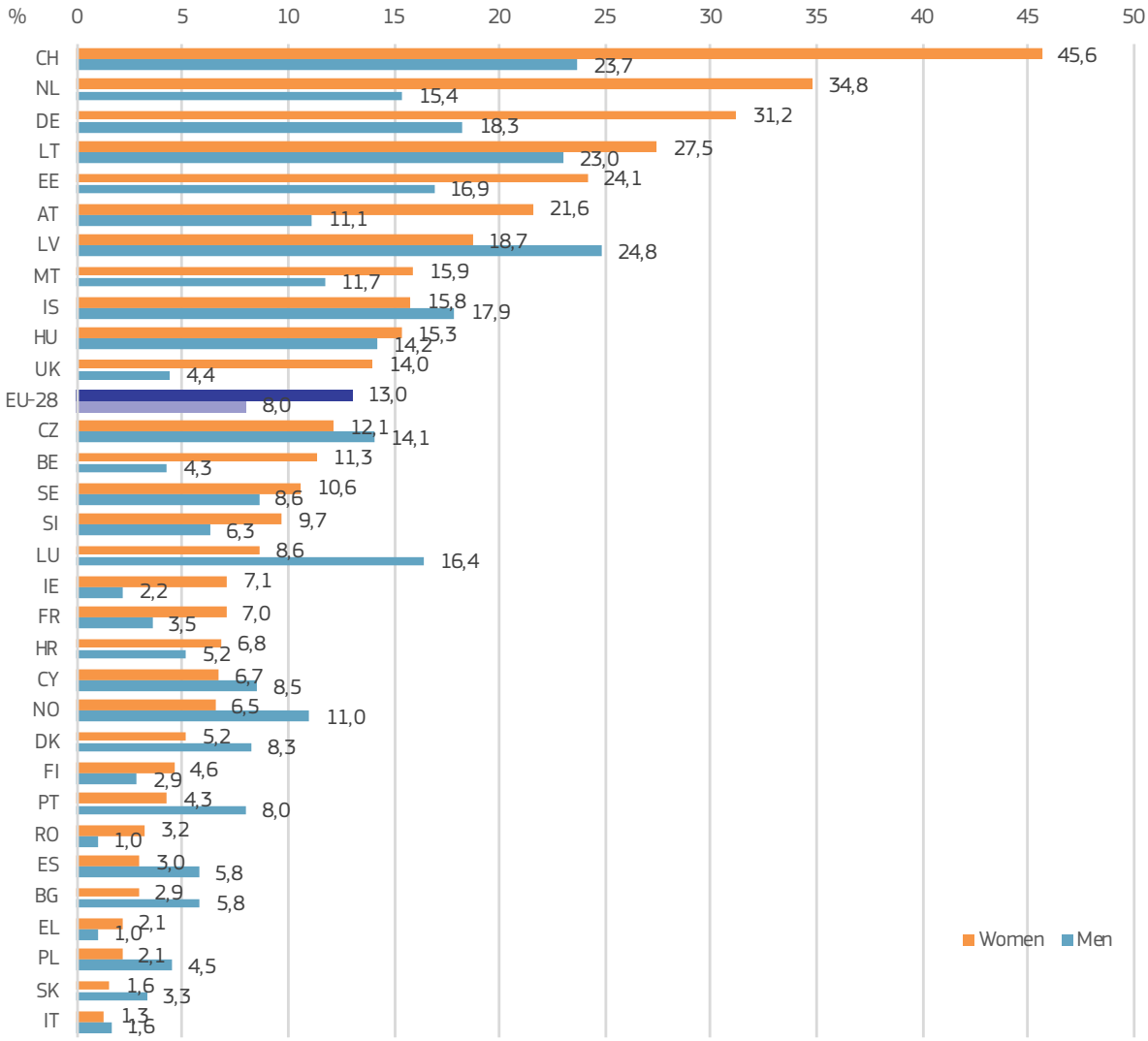
In almost two thirds of the countries, women researchers in the higher education sector are more likely than men researchers to be in part-time employment.

Part-time work is an important feature of working conditions with noteworthy gender aspects. The predominance of women in part-time work is on the one hand often explained by gender stereotypes related to family responsibilities but is also linked to gender segregation in employment. On the other hand, part-time work might be seen as an instrument that increases the labour market participation – and therefore, to a certain extent at least - the economic independence of women (European Commission, 2014a). Different types of work flexibility may have fewer negative, gender-specific consequences, as a recent critical analysis of part-time work in the Netherlands shows (Vinkenburg et al, 2015).

Figure 5.1 presents the proportion of women and men researchers in part-time employment in the higher education sector by country of employment. Part-time employment was self-declared by the researchers who participated in the MORE 3 survey. Readers should note that this is based on weighted MORE Survey data, as opposed to the Labour Force Survey (LFS). It should be noted that there may be some comparability issues between MORE 3 and LFS data from Eurostat, due to: 1) the age classifications in use and 2) the part-time/full-time distinction. In terms of the first issue, the MORE Survey data cover researchers of all ages whereas the LFS data cover researchers aged 15–74. As such, there may be small differences due to the exclusion of the 75+ age group from the LFS rates. In terms of the second issue, the full-time/part-time distinction in the Eurostat LFS data is made 'on the basis of a spontaneous answer given by the respondent in all countries' (except for the Netherlands, Iceland and Norway, where other criteria are used relating to the usual number of hours worked). However, in the MORE Survey, the full-time/part-time distinction was made, based on the spontaneous answer of respondents, regardless of their country.

Figure 5.1

Part-time employment of researchers in the higher education sector out of total researcher population, by sex, 2016



Notes: Data unavailable for: ME, MK, AL, RS, AM, GE, UA; Excluded due to small sample size: TR, BA, FO, IL, TN.
Others: This indicator compares the part-time employment rate amongst women researchers and men researchers respectively (each calculated as a percentage of the respective total number of women and men researchers). It includes researchers at all career stages and in all fields of education; Countries are defined by researchers' country of current employment; Weighting applied to increase representativeness of sample.

Source: MORE 3 Survey (Q2, Q31, Q33).

MORE 3

Two large-scale MORE 3 surveys were carried out (European Commission, 2017c). The EU Higher Education Survey, data from which are used in this publication, is a survey of more than 10,000 individual researchers currently working in higher education institutions (HEI) in the EU and three Associated Countries. The survey was conducted from May to June 2016, and observed researchers with EU and non-EU citizenship, and also researchers who were mobile outside the EU but then returned to work inside the EU. It did not include EU and non-EU researchers who were working outside the EU. The sampling and the survey strategy guarantee representative data at country level.

At EU-28 level, 13.0 % of women researchers and 8.0 % of men researchers in the higher education sector were employed part-time.

Women researchers have a higher share of part-time employment than men in 18 of the 31 countries considered, with the highest differences found in Switzerland (21.9 percentage points), the Netherlands (19.4 percentage points) and Germany (12.9 percentage points). The same countries have also the highest part-time employment rate of women researchers in the higher education sector (45.6 %, 34.8 % and 31.2 % respectively). The lowest proportion of part-time employment among women researchers can be found in Italy (1.3 %), Slovakia (1.6 %) and Poland (2.1 %).

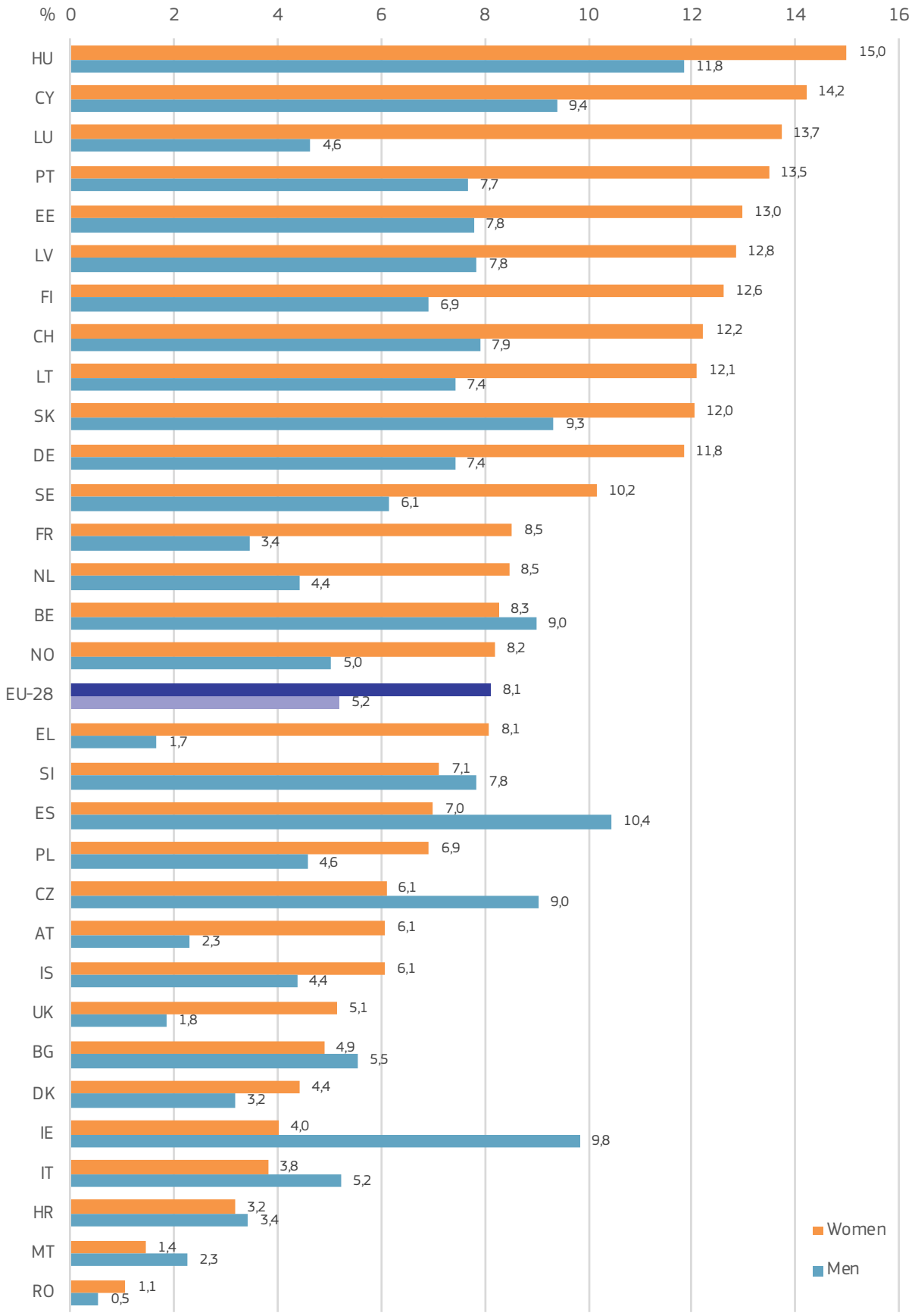
On the opposite site, for countries where part-time employment rates are higher for men than for women researchers, differences between women and men employed as part-time researchers were much smaller; Luxembourg and Latvia had the largest gap with 7.8 and 6.1 percentage points respectively. The lowest difference between part-time employment rates of women and men, regardless of the pattern, was found in Italy (1.3 % for women compared to 1.6 % for men).

In the higher education sector, women researchers are more likely than men to be employed under 'precarious' contracts.

The existence and increase of precarious employment are subject to debate throughout the EU (European Parliament, 2016). Researchers with 'precarious working contracts' are those without contract, with fixed term contracts of up to one year, or with other non-fixed term, non-permanent contracts. This definition of 'precarious' working contracts differs from that of the Labour Market and Labour Force Statistics of Eurostat, which describes 'precarious' contracts as being for three months or less. Further details are provided at: **http://ec.europa.eu/eurostat/web/labour-market/quality-of-employment.**

The most affected are junior academic positions or other positions relying on third-party funding. The provision of research jobs that are associated with precariousness is in sharp conflict with the EU-wide goal to provide attractive and secure positions in academia to fully exploit Europe's talent pool for the higher education sector within the ERA and Horizon 2020 initiatives (European Commission, 2017d).

Figure 5.2 Proportion of researchers in the higher education sector working under 'precarious' working contracts, by sex, 2016



Notes: Data unavailable for: ME, MK, AL, RS, AM, GE, UA; Excluded due to small sample size: TR, BA, FO, IL, TN.
Others: The indicator compares the proportion of women researchers and the proportion of men researchers on 'precarious working contracts' (each calculated as a percentage of the respective total number of women and men researchers) in the higher education sector. Researchers with 'precarious working contracts' includes those with no contracts, fixed-term contracts of up to one year, or other contracts; Countries refer to researchers' country of current employment; Weighting applied to increase representativeness of sample.

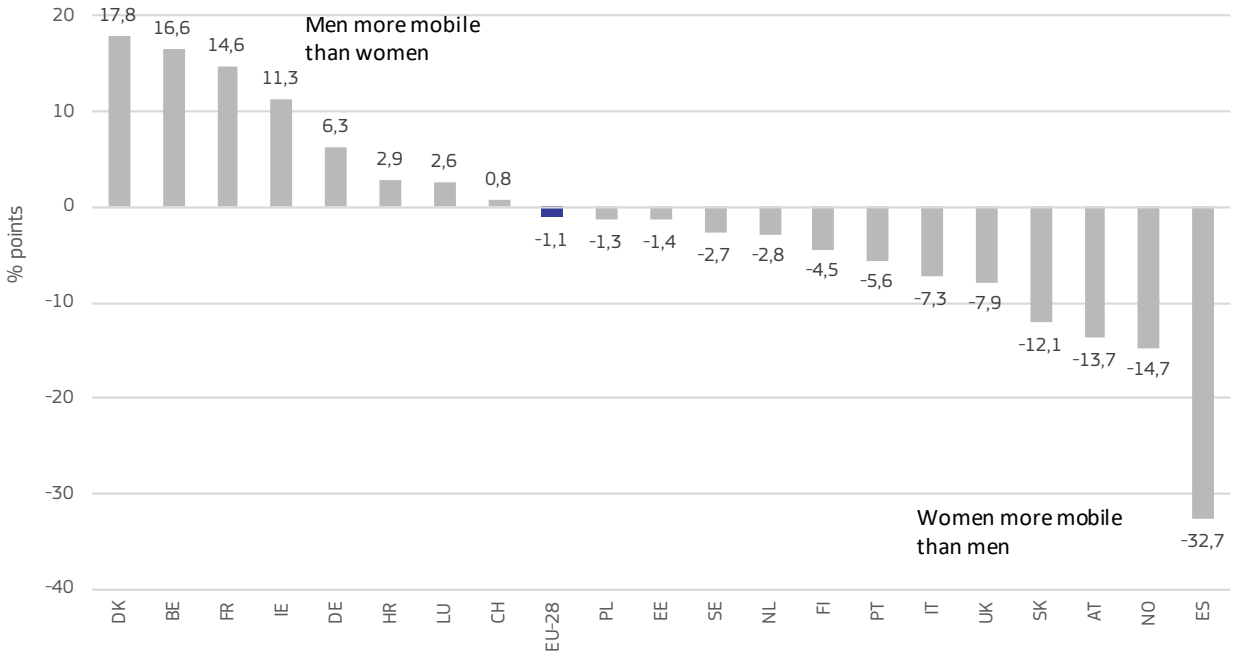
Source: MORE 3 Survey (Q2, Q31, Q32).

Figure 5.2 shows the proportion of researchers in the higher education sector employed on 'precarious' working contracts. Researchers were considered to be in precarious employment if they replied that they worked under the conditions listed in the previous paragraph. Self-employed researchers were not included in the category of precarious working contracts.

In the EU, 8.1 % of women and 5.2 % of men researchers in the higher education sector worked under precarious contracts. As can be seen, women had higher proportions of precarious employment than men in two thirds of the countries considered, with Luxembourg (9.1 %) and Greece (6.4 %) having the largest differences. For women researchers, the highest proportions of employment under precarious contracts were found in Hungary (15.0 %), Cyprus (14.2 %) and Luxembourg (13.7 %).

The opposite can also be observed, although in fewer countries and with smaller differences. The highest difference among the countries where the proportion of men researchers working under precarious contracts was higher than the corresponding proportion of women was in Ireland (5.8 percentage points). The lowest differences between sexes, regardless of pattern, were found in Croatia (0.3 percentage points) and Romania (0.5 percentage points).

Figure 5.3 Sex differences in the international mobility of researchers during their PhD, 2016



Notes: Data unavailable for: CY, EL, IS, LV, MK, MT, RO, TR, ME, AL, RS, BA, AM, IL, GE, FO, MD, TN, UA; CZ, HU (women); BG, LT, SI (men).
Others: The indicator is calculated by subtracting the share (%) of internationally mobile women researchers from the share (%) of internationally mobile men researchers. In this context, 'internationally mobile' researchers are those who during their PhD studies have moved for three months or more to a country other than the one where they completed or will obtain their PhD; The indicator covers researchers at career stages R1 and R2 in all fields of education; The country of the researcher is the country where they completed or will complete their PhD; Weighting applied to increase the representativeness of sample.

Source: MORE3 survey (online database, flag GMD3).

International mobility of researchers in the early stages of their careers follows no gender-associated pattern.

Mobility is seen as a research policy instrument to foster scientific quality. Some of the perceived benefits of mobility for individuals include greater opportunities for collaboration, access to new kinds of research equipment and exposure to new disciplines. Barriers to greater mobility in Europe include administrative and social complexities such as the transferability of research qualifications, research grants and pensions, as well as transparent, open and merit-based recruitment (European Commission, 2014b).

The difference in the proportions of women and men researchers who – during their PhD – moved for at least three months to a country other than that where they attained (or will attain) their PhD is shown in Figure 5.3. The figure refers only to researchers in the early stages of their careers (i.e. R1 – first-stage researchers, and R2 – recognized researchers of the European Framework for Research Careers, see box below). A positive result indicates that men's rate of mobility is higher, whilst a negative result shows that women's rate is higher (Annex 5.1 presents the individual mobility rates for each sex).

Sex differences in the international mobility of early stage researchers vary according to country. At the EU-28 level, women seem to be slightly more mobile than men (18.8 % of women compared to 17.7 % of men), while at country level, the mobility of women researchers ranges from 32.7 percentage points higher than that of men in Spain (70.4 % of women compared to 37.7 % of men) to 17.8 percentage points lower in Denmark (31.2 % of women compared to 49.0 % of men).

The European Framework for Research Careers

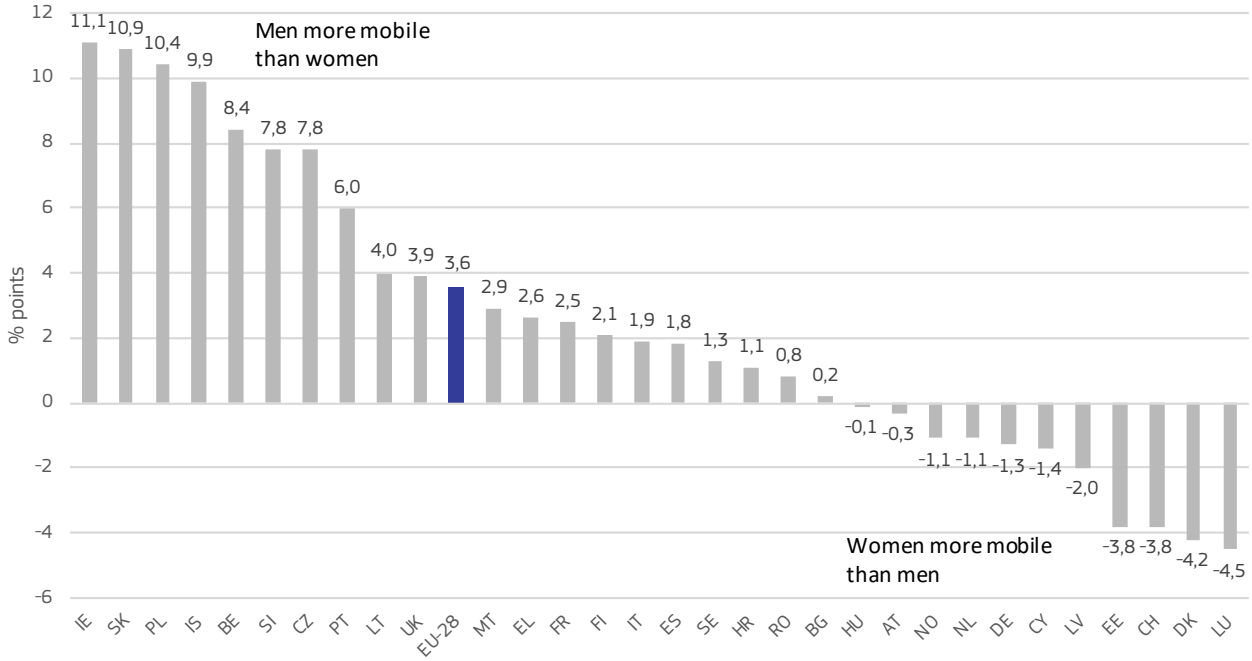
The European Framework for Research Careers classification (European Commission, 2011) aims to communicate the various characteristics that researchers may have throughout their career. It is intended to provide a classification that is independent of a particular career path or sector. It identifies characteristics typically required for highly diverse careers in the education, research, public and private sectors. Four categories are defined:

- First-stage researchers ('R1'): researchers up to the point of PhD
- Recognized researchers ('R2'): PhD holders (or equivalent) who are not yet fully independent
- Established researchers ('R3'): researchers who have developed a level of independence
- Leading researchers ('R4'): researchers leading their research area or field.

At senior stages of their careers, men researchers seem to be more mobile than women researchers.

Figure 5.4 explores the sex differences in the mobility of researchers at more advanced stages in their careers (i.e. R2, R3 and R4 of the European Framework for Research Careers). It presents the difference between the proportions of women and men researchers who reported that they have worked for at least three months in the last decade in a country other than the one where they attained their highest educational degree. A positive result indicates that men's rate of mobility is higher, whilst a negative result shows that women's rate is higher (Annex 5.2 presents the individual mobility rates for each sex). The difference between the mobility of women researchers and men researchers in the EU was 3.6 percentage points in favour of men (25.1 % mobility for women and 28.7 % for men). It is worth noting that this difference has decreased since 2012 when it was 9 percentage points (European Commission, 2016b).

Figure 5.4 Sex differences in the international mobility of researchers during their PhD, 2016



Notes: Data unavailable for: ME, MK, AL, TR, RS, BA, AM, FO, GE, IL, MD, TN, UA.
Others: The indicator is calculated by subtracting the share (%) of internationally mobile women researchers (out of the total number of women researchers) from the share (%) of internationally mobile men researchers (out of the total number of men researchers). 'Internationally mobile' researchers are those who have worked abroad for three months or more at least once in the last decade. The indicator combines researchers at career stages R2–R4 (post-PhD) in all fields of education; The country of the researcher is their 'panel country' (i.e. the country identified as their country of current employment during the collection of researchers' contact details before the survey); Weighting and non-response calibration applied to increase representativeness of sample.

Source: MORE3 Survey (flag GML1).

The mobility of women has also increased since 2012 at country level (European Commission, 2016b); women are more mobile internationally than men in more countries in 2016 than they were in 2012 (11 and 5 countries respectively). Moreover, sex differences in the countries where men researchers are more mobile than women have decreased since 2012. The largest differences in mobility between women and men researchers in favour of men for 2016 were found in Ireland with 11.1 percentage points, Slovakia with 10.9 percentage points and Poland with 10.4 percentage points. The highest sex difference in mobility in favour of men for 2012 was in Cyprus with 25.2 percentage points.

Table 5.1 Gender pay gap (%) in the economic activity 'Scientific research & development' (NACE Rev. 2, Division 72) and in the total economy, 2014

	Scientific research and development (NACE rev.2, division 72)	Total economy
EU-28	17,0	16,6
BE	16,3	6,6
BG	-1,4	14,2
CZ	25,4	22,5
DK	18,3	16,0
DE	19,4	22,3
EE	22,4	28,1
IE	30,5	13,9
EL	23,1	12,5
ES	16,6	14,9
FR	17,1	15,5
HR	18,1	8,7
IT	6,4	6,1
CY	18,9	14,2
LV	16,5	17,3
LT	5,8	13,3
LU	-3,8	5,4
HU	25,0	15,1
MT	:	10,6
NL	25,0	16,1
AT	16,5	22,2
PL	16,6	7,7
PT	14,6	14,9
RO	-6,7	4,5
SI	3,5	7,0
SK	20,6	19,7
FI	17,3	18,4
SE	17,1	13,8
UK	18,3	20,9
IS	:	16,6
NO	15,9	14,4
CH	20,9	17,4
ME	22,5	7,7
MK	-21,8	9,1
RS	-0,8	8,7
TR	35,7	-1,3

Notes: Reference year: 2014 (latest available data from SES).
Others: ‚:' indicates that data are unavailable; EU-28 calculation for 'Scientific Research & Development' does not include MT; Scientific Research & Development are based on NACE Rev. 2 Division 72; Total economy is based on NACE Rev. 2 Sections B to S, excluding Section O (public administration and defence; compulsory social security); Data were computed by Eurostat (NACE 72 data are not available online).
Values shown may differ slightly from the written analysis, which was conducted at a higher level of precision than data presented in the table.

Source: Eurostat – Structure of Earnings Survey (SES) (custom extraction based on online data code: earn_ses14_12).

In the vast majority of countries, women working in scientific R&D earn less on average than men, with the gender pay gap being slightly wider than in the total economy.

Equal pay between women and men for work of equal value is one of the main principles in the EU Treaties. However, the gender pay gap (GPG) persists (European Commission, 2010). The GPG is the consequence of various inequalities in the labour market, such as different working patterns, differences in institutional mechanisms and systems of wage setting. It is linked to a number of legal, social and economic factors which go far beyond the single issue of equal pay for equal work.

It is acknowledged that closing the gender pay gap will have a positive impact on economic growth in the EU (European Institute for Gender Equality, 2017a) so in 2017 the Commission presented a concrete Action Plan (European Commission, 2017d) to reduce the GPG by 2019. The Action Plan (European Commission 2017b) includes a call to the European Parliament and the Member States to swiftly adopt the work-life balance proposal for a directive of April 2017 (COM/2017/0253 final). The European Parliament Committee on Women's Rights and Gender Equality held a hearing in July 2018 aimed at analysing the proposals included in the EU Action Plan 2017-2019 on Tackling the Gender Pay Gap (European Parliament, 2018b). The 2018 Report on equality between women and men in the EU (European Commission, 2018b) also takes stock of the main initiatives either launched or accomplished in 2017 in all the five thematic areas of the Strategic engagement, including equal pay for work of equal value.

Table 5.1 presents the unadjusted GPG for scientific R&D activities and for the total economy in 2014. This indicator is not adjusted for individual or other observable characteristics that may explain part of the earnings difference and it gives an overall picture of gender differences in remuneration. Positive numbers indicate higher earnings for men while negative results indicate higher earnings for women.

At the EU-level, women's average gross hourly earnings were 16.6 % lower than those of men in the total economy, and 17.0 % lower in scientific R&D activities. In all countries considered, except Turkey, women earned on average less than men in the total economy, with the minimum GPG being 4.5 % in Romania and the maximum being 28.1 % in Estonia. Turkey was the exception with women earning on average 1.3 % more than men in 2014.

In scientific R&D activities, women had higher earnings than men in five countries: North Macedonia (GPG: -21.8 %), Romania (-6.7 %), Luxembourg (-3.8 %), Bulgaria (-1.4 %) and Serbia (-0.8 %). However, in most of the countries where the average gross hourly earnings of men surpass those of women, the GPG was wider than that of the total economy. The most notable differences in the GPG between scientific R&D and the total economy are found in Turkey with 37.0 percentage points and in North Macedonia with 31.0 percentage points. Turkey, although it is the exception in its total economy, had the highest GPG (in favour of men) in scientific R&D (35.7 %) followed by Ireland (30.5 %) and Czechia (25.4 %). In total, 10 out of the 35 countries examined had a GPG larger than 20.0 % in favour of men.

Table 5.2 Gender pay gap (%) in the economic activity 'Scientific research & development' (NACE Rev. 2, Division 72) and in the total economy, by age group, 2014

Country	Scientific research and development (NACE rev.2, division 72)					Total economy			
	<35	35–44	45–54	55+	Total	<35	35–44	45–54	55+
EU-28	9,2	15,0	19,8	21,7	17,0	9,7	19,1	20,9	21,1
BE	8,0	9,4	22,9	33,7	16,3	1,5	7,0	9,5	19,6
BG	3,7	-12,2	-1,8	0,7	-1,4	13,6	19,9	13,8	2,2
CZ	18,3	40,7	24,1	26,6	25,4	17,9	30,1	23,9	16,4
DK	10,9	18,9	20,3	21,4	18,3	11,8	18,6	19,2	15,4
DE	9,3	18,8	31,5	30,2	19,4	13,2	25,8	28,5	24,8
EE	13,7	24,4	31,3	34,3	22,4	26,4	31,0	27,4	24,8
IE	7,0	40,5	c	c	30,5	4,5	15,6	21,8	26,0
EL	8,0	36,1	22,8	c	23,1	3,6	10,1	17,2	14,9
ES	9,6	14,8	17,3	10,0	16,6	7,5	15,0	20,1	22,6
FR	11,4	9,3	16,0	22,3	17,1	7,7	16,8	19,1	25,3
HR	1,8	31,8	25,3	13,5	18,1	3,0	16,3	9,7	9,1
IT	1,5	4,5	-0,5	24,9	6,4	5,2	7,8	7,4	9,2
CY	c	c	c	c	18,9	0,4	18,5	27,4	30,2
LV	16,9	5,6	2,8	32,2	16,5	17,6	17,2	15,0	16,1
LT	-27,7	-15,4	31,7	42,6	5,8	13,6	15,9	11,8	10,5
LU	c	c	c	c	-3,8	-4,0	6,1	11,6	13,0
HU	21,6	29,5	25,3	30,9	25,0	12,4	20,6	13,3	11,5
MT	:	:	:	:	:	6,4	17,9	11,1	5,6
NL	17,1	18,1	29,5	30,5	25,0	2,5	19,4	24,3	22,6
AT	11,9	16,7	26,0	14,0	16,5	15,2	25,1	27,5	35,1
PL	13,8	13,0	23,5	16,4	16,6	9,2	11,9	3,5	7,0
PT	15,2	10,1	29,8	c	14,6	6,1	16,1	18,8	29,9
RO	-18,1	-4,0	-6,7	-4,6	-6,7	1,4	7,2	3,3	2,8
SI	5,0	-0,5	6,1	-2,5	3,5	5,3	10,5	7,2	-6,6
SK	11,0	25,0	23,4	20,3	20,6	16,0	25,6	20,0	16,1
FI	14,6	18,1	18,7	20,3	17,3	13,3	21,4	21,7	24,6
SE	12,8	16,2	16,3	30,2	17,1	10,0	17,1	16,5	15,3
UK	1,0	24,6	25,1	21,6	18,3	11,4	25,6	29,5	26,7
IS	:	:	:	:	:	8,3	22,6	24,8	19,6
NO	8,1	14,3	16,8	24,5	15,9	9,2	15,8	19,0	19,5
CH	9,7	16,5	25,4	22,9	20,9	9,3	19,5	22,9	24,7
ME	c	c	c	c	22,5	1,9	7,2	11,5	13,2
MK	-14,2	-30,8	-6,1	c	-21,8	5,6	14,4	7,0	8,2
RS	1,3	-4,3	-9,0	0,5	-0,8	7,4	9,7	9,8	0,6
TR	31,6	19,7	47,4	c	35,7	-6,1	-2,2	13,2	19,5

Notes: Reference year: 2014 (latest available data from SES).
Others: ':' indicates that data are unavailable; 'c' that data are confidential; EU-28 calculation for 'Scientific Research & Development' does not include MT; Scientific Research & Development is based on NACE Rev. 2 Division 72; Total economy is based on NACE Rev. 2 Sections B to S, excluding Section O (public administration and defence; compulsory social security); Data were computed by Eurostat (NACE 72 data are not available online); Values shown may differ slightly from the written analysis, which was conducted at a higher level of precision than the data presented here.

Source: Eurostat – Structure of Earnings Survey (SES) (custom extraction based on online data code: earn_ses14_13).

Gender pay gap

The gender pay gap (GPG) is defined as the difference between the average gross hourly earnings of paid women and men employees expressed as percentage of the average gross hourly earnings of paid men employees. All GPG data originate from the Structure of Earnings Survey, conducted every four years in the EU and available through Eurostat. Economic activities are defined using the Statistical Classification of Economic Activities in the European Community, Rev. 2 (NACE Rev. 2). Classification no 72 is used for scientific research & development; it falls under 'M. Professional, Scientific and Technical Activities'. More information may be found at: http://ec.europa.eu/eurostat/web/microdata/structure-of-earnings-survey

Overall, the gender pay gap in scientific R&D widens with age.

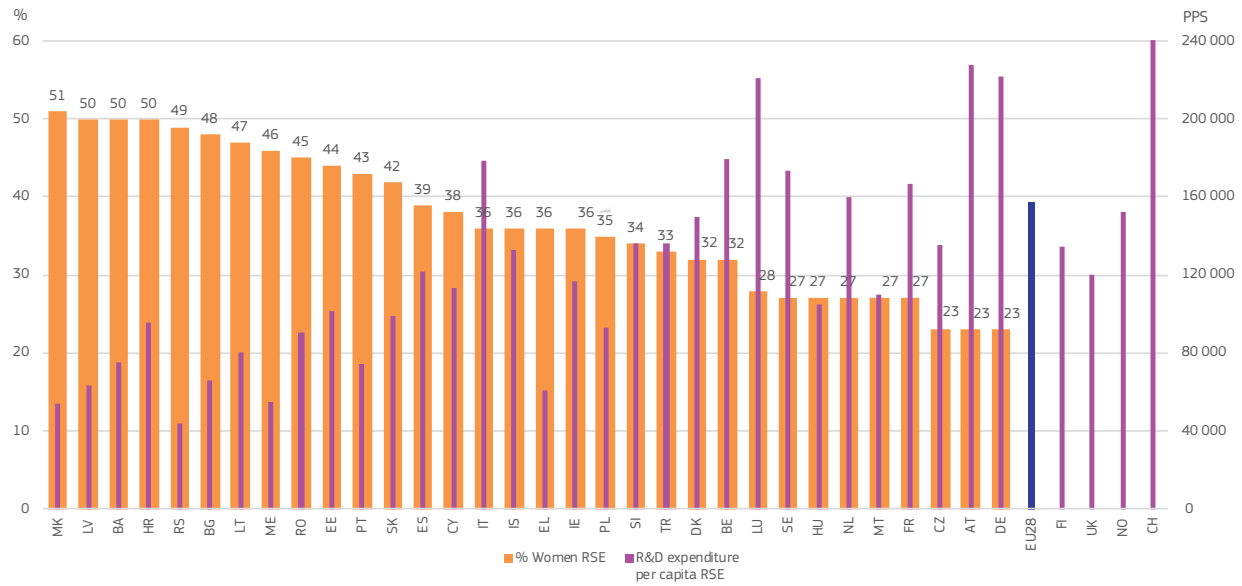
The gender pay gap for scientific R&D activities and the total economy in 2014, broken down in four age categories (younger than 35; 35–44 years old; 45–54 years old; 55 years old and older), is presented in Table 5.2.

As the table shows, at the EU level the GPG widens as employees get older in both the scientific R&D activities and in the total economy. In scientific R&D, the average gross hourly earnings of women were lower than those of men by 9.2 % in the lowest age category (younger than 35). The GPG increased to 15 % for ages 35-44, to 19.8 % for ages 45-54 and to 21.7 % for those aged 55 or more. The relative GPG in total economy followed the same pattern with age; 9.7 % for younger than 35, 19.1 % for those 35-44, 20.9 % for those 45-54 and 21.1 % for those 55 or older.

In nine countries, when age increased, the gender pay gap widened in favour of men in scientific R&D activities. The most prominent trend can be seen in Lithuania where the GPG was -27.7 % for the under 35s, it increased to -15.4 % for those aged 35-44, to 31.7 % for those aged 45-54 and to 42.6 % for the over 55s. The overall difference between the lower and higher age categories was 70.3 percentage points. In the total economy, the same trend was true for 13 countries, some of which had confidential data in the economic activity of scientific R&D and could not be examined.

A GPG that favours women is not common, either in the scientific R&D activity or in the total economy. The most notable exceptions of GPG for those working on scientific R&D activities can be seen in Lithuania (-27.7 %) for those aged younger than 35, in North Macedonia (-30.8 %) for those aged 35-44, in Serbia (-9 %) for those aged 45-54 and in Romania (-4.6 %) for those aged 55 or more.

Figure 5.5 Proportion of women researchers in FTE and R&D expenditure in purchasing power standards (PPS) per researcher, 2015



Notes: Exceptions to the reference years (% women): BE, IS: 2011; BA, FR: 2014; Exceptions to the reference years (R&D exp. per capita RSE): BA: 2014; Data unavailable for % women: EU-28, FI, UK, NO, CH, AL, AM, FO, GE, IL, MD, TN, UA; Data unavailable for R&D exp. per capita RSE: AL, AM, GE, IL, FO, MD, TN, UA; Break in time series: FR (% women), IS (% women); Data estimated for: FR (% women); SE (both indicators); Data provisional for: FR (R&D exp. per capita RSE).
Other: Values shown may differ slightly from the written analysis, which was conducted on a higher level of precision than what is presented; RSE=Researchers.

Source: Eurostat – Statistics on research and development (online data codes: rd_p_persocc and rd_e_gerdtot).

In most countries, the presence of women in research, and R&D expenditure per researcher, have an inverse relationship.

Figure 5.5 explores the relationship between the proportion of women researchers in full-time equivalents (FTE) with R&D expenditure per researcher, in 2015. Both variables cover all sectors of the economy (higher education, government, business enterprise and private non-profit). R&D expenditure is expressed in purchasing power standards (PPS), an artificial common currency used to eliminate the differences in price levels between countries - one unit of PPS buys the same volume of goods and services in all countries. R&D expenditure per researcher for each country was calculated as the total R&D divided by the total number of researchers in FTE.

At the EU-28 level, R&D expenditure per researcher was 157 138 PPS, an amount surpassed only by one quarter of the countries considered (NL, FR, SE, IT, BE, LU, DE, AT, CH). As shown in Figure 5.5 most of the countries that spend high amounts per researcher have a low representation of women researchers. In Austria, Germany and Luxembourg, countries that spend over 200 000 PPS per researcher, women represent less than 30 % of the FTE researchers' population.

Conversely, in countries with low spending on R&D per researcher, women have the highest presence. For example, in the countries that spent under 80 000 PPS per researcher (BA, PT, BG, LV, RS, EL, ME, MK), the women's share in researchers ranged from 36 % (Greece) to 51 % (North Macedonia). Similar results were also found in 2012 (EC, 2016).

Head count (HC) v. full time equivalent (FTE)

Units for measuring R&D personnel as proposed by the Frascati Manual (OECD, 2015) are:
HC (§329): *Head count.* The number of persons engaged in R&D at a given date
or the average number of persons engaged in R&D during the (calendar) year
or the total number of persons engaged in R&D during the (calendar) year.
FTE (§333): *Full time equivalent.* The full-time equivalent of R&D personnel is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group. That means that one FTE corresponds to one year's work by one person in R&D. The unit makes employees comparable, while taking into account any differences in the number of hours they work.

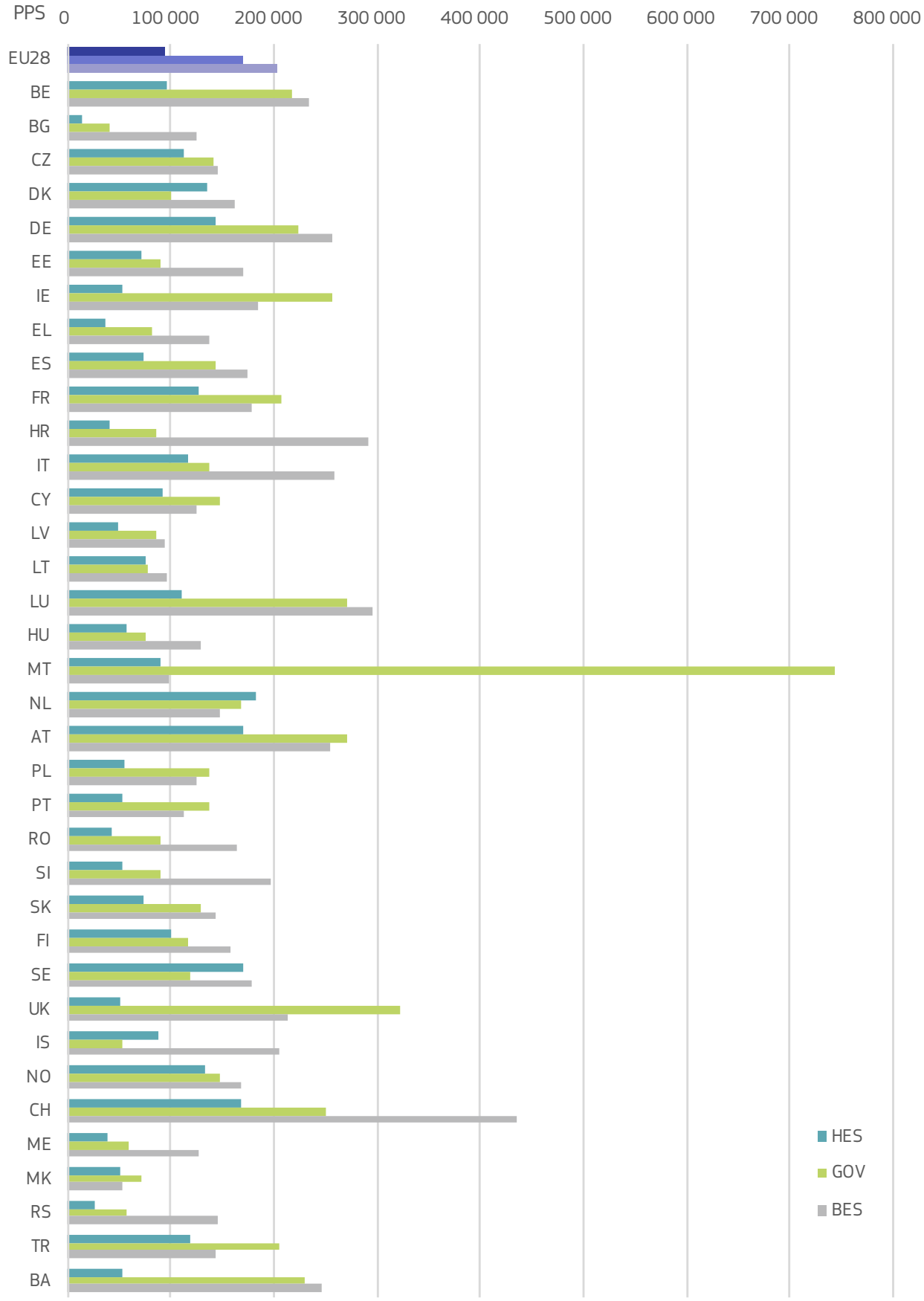
The business enterprise sector, a sector in which women researchers are under-represented, spends the highest amounts per researcher on R&D.

R&D expenditure per researcher (in PPS) for each of the three main sectors (higher education, government and business enterprise) is given in Figure 5.6. At the EU-28 level, 203 299 PPS were spent per researcher in the business enterprise sector, whereas the amounts spent in the government and higher education sectors were 171 112 PPS and 92 249 PPS respectively.

As can be seen in the table, in 25 of the 36 countries considered (all except IE, FR, CY, MT, NL, AT, PL, PT, UK, MK and TR), the highest spending per researcher was in the business enterprise sector. Moreover, in the majority of countries (every country except DK, NL, SE and IS) the R&D expenditure per researcher is higher in the government sector than in the higher education sector, the Netherlands being the only country that spends the most in the higher education sector.

Comparing these results with those in Figure 4.7, it can be seen that in countries which are big spenders per researcher in the business enterprise sector (e.g. CH, LU, IT and DE), the proportion of women researchers in the same sector is very low, ranging from 12.3 % in Luxembourg to 23.3 % in Switzerland. An exception to this is Croatia which is the third highest spender in R&D per researcher in the business enterprise sector (~ 292 thousand PPS) and has a good gender balance in the population of the sector's researchers (42.2 % women).

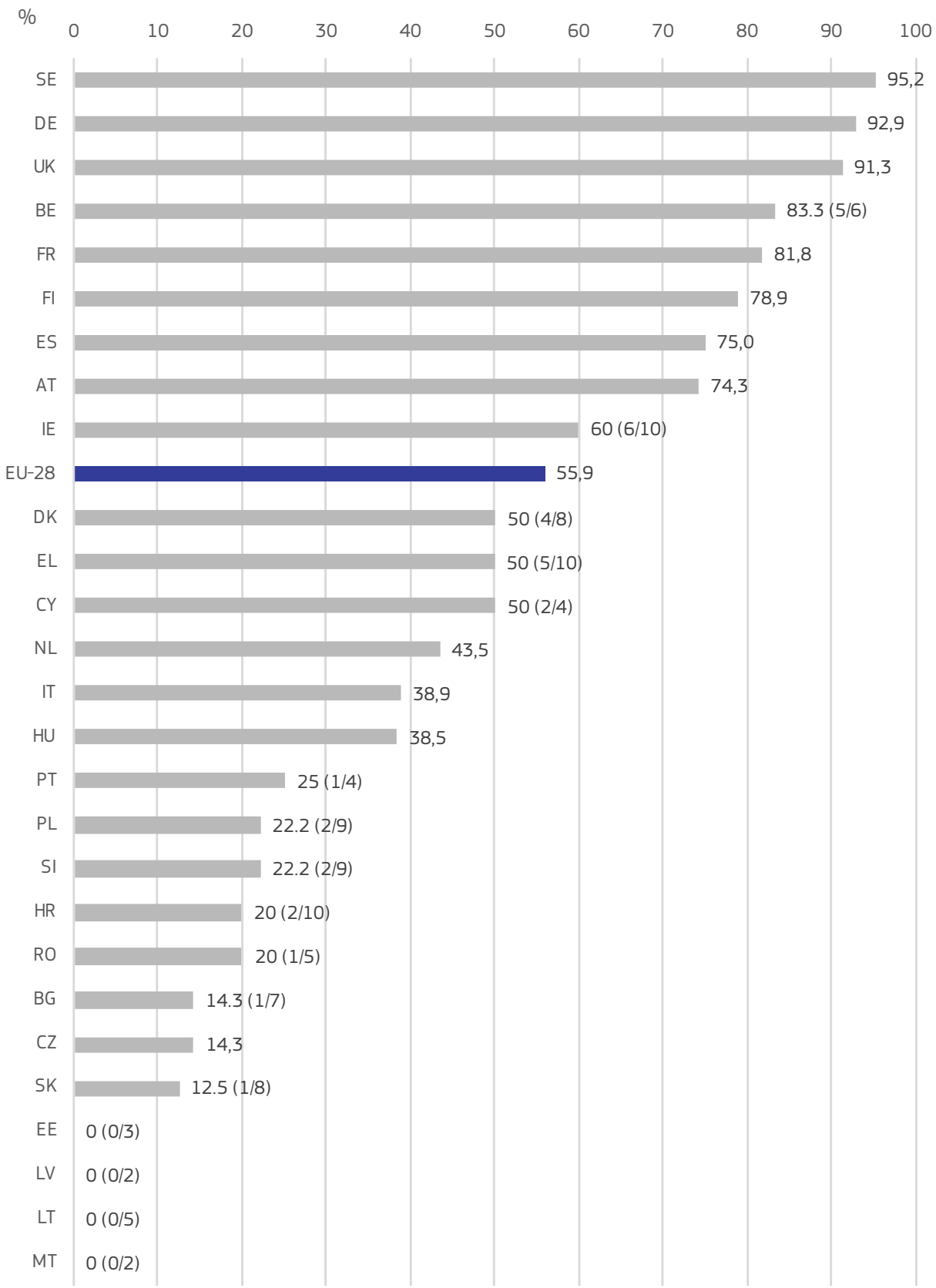
Figure 5.6 R&D expenditure in purchasing power standards (PPS) per researcher in FTE, by sector, 2015



Notes: Exception to the reference year: BA: 2014; Data unavailable for: AL, AM, IL, FO, GE, MD, TN, UA; Data estimated for: IT (HES), SE (GOV); Definitions differ for: DE (GOV), HR (GOV), HU, NL (GOV); Data provisional for: FR.
Other: Values shown may differ slightly from the written analysis, which was conducted at a higher level of precision than the data presented here; HES: Higher Education Sector; GOV: Government Sector; BES: Business Enterprise Sector.

Source: Eurostat – Statistics on research and development (online data codes: rd_e_gerdtot and rd_p_persocc).

Figure 5.7 Proportion of RPOs that adopted gender equality plans, 2016



Notes: Data unavailable for: LU, IS, NO, CH, ME, MK, AL, RS, TR, BA, AM, FO, GE, IL, MD, TN, UA; For proportions based on up to 10 respondents, numerators and denominators are displayed in the figure; the EU-28 calculation does not include Luxembourg as no data were available.
Other: A research performing organisation (RPO) is defined as a higher education institute (HEI) or a public research organisation (PRO); A Gender Equality Plan is a 'consistent set of provisions and actions aiming at ensuring gender equality'; The indicator is calculated as the proportion of the RPOs which responded positively to the survey question 'Does your organisation have a gender equality plan' out of the total respondent RPOs; Values shown may differ slightly from the written analysis, which was conducted on a higher level of precision than what is presented.

Source: HEI and PRO surveys, MoRRI project (custom extraction of data).

Half the research performing organisations (RPOs) in the EU that provided relevant information to the MoRRI project adopted gender equality plans. However, at the country level, the situation varies widely.

In the context of the ERA's priority 'gender equality and gender mainstreaming in research' organisations have been invited to 'implement institutional change relating to human resource management, funding, decision-making and research programmes through Gender Equality Plans'. In addition, the European Commission committed to produce 'guidelines on institutional change to promote gender equality in universities and research institutions' (European Commission, 2012). Furthermore, the Competitiveness Council invited in December 2015 Member States and research funding organisations to 'provide incentives to encourage research performing organisations, including universities, to revise [...] gender equality plans [...] and mobilise adequate resources to ensure their implementation' (European Council, 2015, p. 5).

Gender Equality Plans

A Gender Equality Plan (GEP) is a set of actions aiming to:

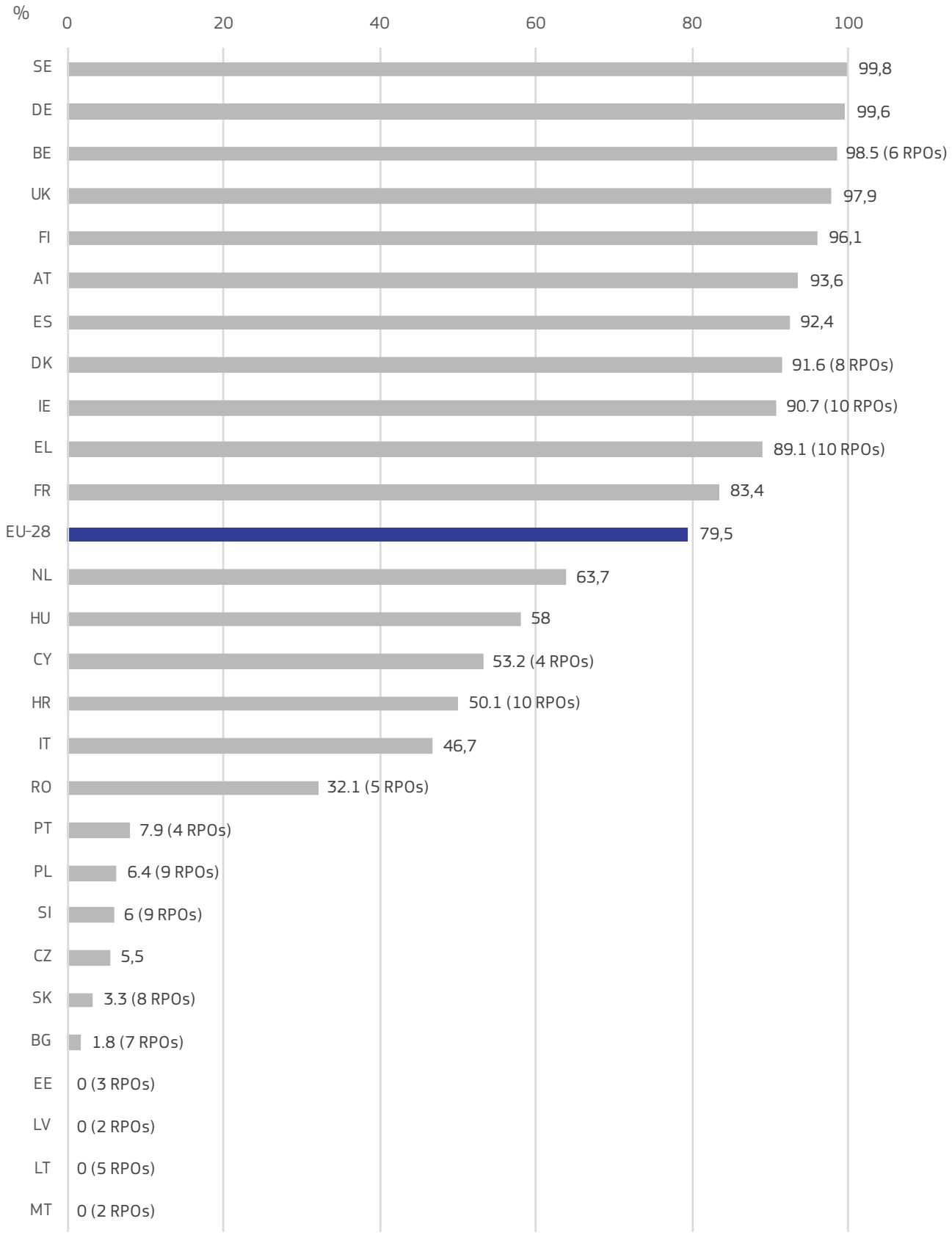
- Conduct impact assessment/audits of procedures and practices to identify gender bias;
- Identify and implement innovative strategies to correct any bias;
- Set targets and monitor progress via indicators.

(European Commission, 2012)

The European Institute for Gender Equality has developed the GEAR tool (**https://eige.europa.eu/gender-mainstreaming/toolkits/gear**), a guide for research organisations and higher education institutions that plan to set up, implement, monitor and evaluate GEPs. The tool identifies the areas that may need to be addressed by the organisations, depending on their situation and it provides both the resources, instruments and activities for each area that the organisation can deploy, and also a set of good practice examples that they could borrow from.

The Monitoring the Evolution and Benefits of Responsible Research and Innovation (MoRRI) study (European Commission, 2018a) contributes to the development and compilation of indicators that will help identify the impact of RRI. MoRRI carried out two surveys of research performing organisations (RPOs): one among higher education institutes (HEIs) and a second one among public research organisations (PROs). They covered reference years 2014, 2015 and 2016 and all EU member states. A MoRRI correspondent in each member state was asked to select a sample of 20 HEIs or PROs, representative in terms of size (turnover), HEI/PRO distribution and geographical location. If the total population was smaller than 20, all institutions were included in the survey. In other words, the sampling of organisations was not random.

Figure 5.8 Proportion of research staff working in RPOs that adopted gender equality plans, 2016



Notes: Data unavailable for: LU, IS, NO, CH, ME, MK, AL, RS, TR, BA, AM, FO, GE, IL, MD, TN, UA; the EU-28 calculation does not include Luxembourg as no data were available; When the population of responding RPOs is up to 10 the actual numbers are presented in parentheses next to the proportion, so as to highlight results that are more prone to yearly fluctuations.
Others: A research performing organisation (RPO) is defined as a higher education institute (HEI) or a public research organisation (PRO); A Gender Equality Plan is a 'consistent set of provisions and actions aiming at ensuring gender equality'; The indicator is calculated as the proportion of research staff that work in the RPOs which responded positively to the survey question 'Does your organisation have a gender equality plan' out of the research staff that work in all responding RPOs (excluding the RPOs that gave a 'Not known' response); The total number of responding organisations was 313.

Source: HEI and PRO surveys, MoRRI project (custom extraction of data).

One of the indicators produced was the share of RPOs with GEPs. In total, 313 RPOs employing approximately 320 000 research staff provided information. Figure 5.7 presents the proportion of these 313 RPOs that had adopted GEPs in 2016. As it can be seen, at the EU level, 55.9% of the responding RPOs had adopted GEPs. The proportion of RPOs with a GEP shows large variation between countries, ranging from under 20 % in Slovakia, Bulgaria and Czechia to over 90 % in Sweden, Germany and the United Kingdom. This wide variation is partly due to the fact that in some countries it is legally obligatory for RPOs to have a GEP. The very small number of responding RPOs in Estonia, Latvia, Lithuania and Malta do not allow drawing any conclusions from the 0 % reported for these three countries.

Figure 5.8 shows the proportion of research staff who are employed in the responding RPOs that had GEPs. The figure refers to the same 313 RPOs as figure 5.7. As shown, nine countries have a high proportion (above 90%) of their research staff working in RPOs that have adopted GEP (SE, DE, BE, UK, FI, AT, ES, DK, IE). In the EU as a whole, the corresponding proportion was 79.5%; more than half of the countries considered had a proportion lower than that.

Since both these figures are produced from data from just 313 RPOs, the indicators are liable to show a large yearly variation. It should also be kept in mind that these RPOs, besides not being a random sample (in the probabilistic sense) are a very small subset of all European RPOs. For instance, the European Tertiary Education Register (ETER) project listed 2 764 HEIs alone in the EU Member States and another eight countries (IS, LI, NO, CH, ME, RS, TR and MK) in 2014 (European Commission, 2017e).

Annex 5.1 International mobility rates of higher education sector researchers during their PhD, by sex, 2016

	Women	Men
EU-28	18,8	17,7
BE	4,7	21,3
BG	29,4	:
CZ	:	21,1
DK	31,2	49,0
DE	6,3	12,6
EE	28,8	27,4
IE	2,7	14,0
ES	70,4	37,7
FR	13,3	27,9
HR	21,3	24,2
IT	44,4	37,1
LT	25,0	:
LU	7,7	10,3
HU	:	21,1
NL	13,7	10,9
AT	28,1	14,4
PL	13,5	12,2
PT	29,8	24,2
SI	24,6	:
SK	38,3	26,2
FI	26,4	21,9
SE	11,6	8,9
UK	13,3	5,4
NO	29,2	14,5
CH	16,8	17,6

Notes: Data unavailable for: CY, EL, IS, LV, MK, MT, RO, TR, ME, AL, RS, BA, AM, IL, GE, FO, MD, TN, UA; CZ, HU (women); BG, LT, SI (men).
Others: ':' indicates that data are not available; The indicator covers researchers at career stages R1 and R2 in all fields of education; 'Internationally mobile' researchers are those who during their PhD studies have moved for three months or more to a country other than the one where they completed, or will obtain, their PhD; The country of the researcher is the country where they completed or will complete their PhD; Weighting applied to increase representativeness of sample.

Source: MORE3 survey (flag GMD3).

Annex 5.2 International mobility rates of higher education sector researchers in post-PhD career stages, by sex, 2016

	Women	Men
EU-28	25,1	28,7
BE	27,5	35,9
BG	21,2	21,4
CZ	13,6	21,4
DK	33,1	28,9
DE	34,2	32,9
EE	29,9	26,1
IE	25,7	36,8
EL	22,1	24,7
ES	28,0	29,8
FR	33,2	35,7
HR	18,3	19,4
IT	21,4	23,3
CY	39,4	38,0
LV	13,0	11,0
LT	14,7	18,7
LU	64,5	60,0
HU	33,2	33,1
MT	14,8	17,7
NL	33,3	32,2
AT	38,6	38,3
PL	13,5	23,9
PT	13,9	19,9
RO	12,9	13,7
SI	19,2	27,0
SK	17,1	28,0
FI	23,4	25,5
SE	27,2	28,5
UK	22,8	26,7
IS	25,0	34,9
NO	41,1	40,0
CH	50,4	46,6

Notes: Data unavailable for: ME, MK, AL, TR, RS, BA, AM, FO, GE, IL, MD, TN, UA.
Others: The indicator combines researchers at career stages R2–R4 (post-PhD) in all fields of education; 'Internationally mobile' researchers are those who have worked abroad for three months or more at least once in the last decade; The country of the researcher is their 'panel country' (i.e. the country identified as their country of current employment during the collection of the researcher's contact details before the survey); Weighting applied to increase representativeness of sample.

Source: MORE3 Survey (flag GML1).

Annex 5.3 Total intramural R&D expenditure for the business, government and higher education sectors in million PPS, 2015

	BES	GOV	HES
EU-28	184 550	35 948	67 155
BE	6 668	876	1 938
BG	692	195	51
CZ	2 792	1 049	1 281
DK	4 069	143	2 176
DE	59 056	12 097	14 867
EE	195	46	175
IE	2 075	126	710
EL	695	593	797
ES	7 825	2 849	4 188
FR	29 464	5 898	10 167
HR	311	149	147
IT	13 103	2 959	5 748
CY	22	13	48
LV	57	59	114
LT	180	112	365
LU	289	167	104
HU	1 948	352	321
MT	46	15	29
NL	7 109	1 514	4 072
AT	7 086	455	2 332
PL	3 566	1 868	2 211
PT	1 332	186	1 307
RO	693	602	275
SI	821	145	110
SK	397	396	622
FI	3 361	412	1 230
SE	8 065	395	3 091
UK	22 613	2 271	8 672
IS	167	12	79
NO	2 517	703	1 451
CH	9 535	118	3 583
ME	9	5	13
MK	17	13	65
RS	204	176	263
TR	6 473	1 338	5 134
BA	14	14	47

Notes: Exception to the reference year: BA: 2014; Data unavailable for: AL, AM, IL, FO, GE, MD, TN, UA; Data estimated for: IT (HES); Definitions differ for: DE (GOV), HR (GOV), HU, NL (GOV); Data provisional for: FR.
Other: Values shown may differ slightly from the written analysis, which was conducted on a higher level of precision than what is presented; PPS: Purchasing Power Standards; HES: Higher Education Sector; GOV: Government Sector; BES: Business Enterprise Sector.

Source: Eurostat – Statistics on research and development (online data code: rd_e_gerdtot).

Annex 5.4 Number of RPOs and R&D Personnel covered by the MoRRI Survey, 2016

	Total number of respondent RPOs, 2016	Total number of researchers in respondent organisations, 2016	Total number of organisations who adopted Gender Equality Plans, 2016
EU-28	313	322 141	175
BE	6	11 299	5
BG	7	1 431	1
CZ	14	7 271	2
DK	8	10 095	4
DE	14	41 067	13
EE	3	1 849	0
IE	10	2 176	6
EL	10	12 918	5
ES	20	46 312	15
FR	11	28 196	9
HR	10	1 470	2
IT	18	18 587	7
CY	4	372	2
LV	2	54	0
LT	5	353	0
HU	13	4 016	5
MT	2	25	0
NL	23	24 680	10
AT	35	23 591	26
PL	9	2 759	2
PT	4	4 040	1
RO	5	2 672	1
SI	9	5 034	2
SK	8	7 529	1
FI	19	16 945	15
SE	21	16 519	20
UK	23	30 882	21

Notes: Data unavailable for: LU, IS, NO, CH, ME, MK, AL, RS, TR, BA, AM, FO, GE, IL, MD, TN, UA; the EU-28 calculation does not include Luxembourg as no data were available.
Others: A Gender Equality Plan (GEP) is a 'consistent set of provisions and actions aiming at ensuring gender equality'; A research performing organisation (RPO) is either a higher education institute (HEI) or a public research organisation (PRO).

Source: MoRRI survey (custom data).

6 Career advancement and participation in decision-making

Main findings:

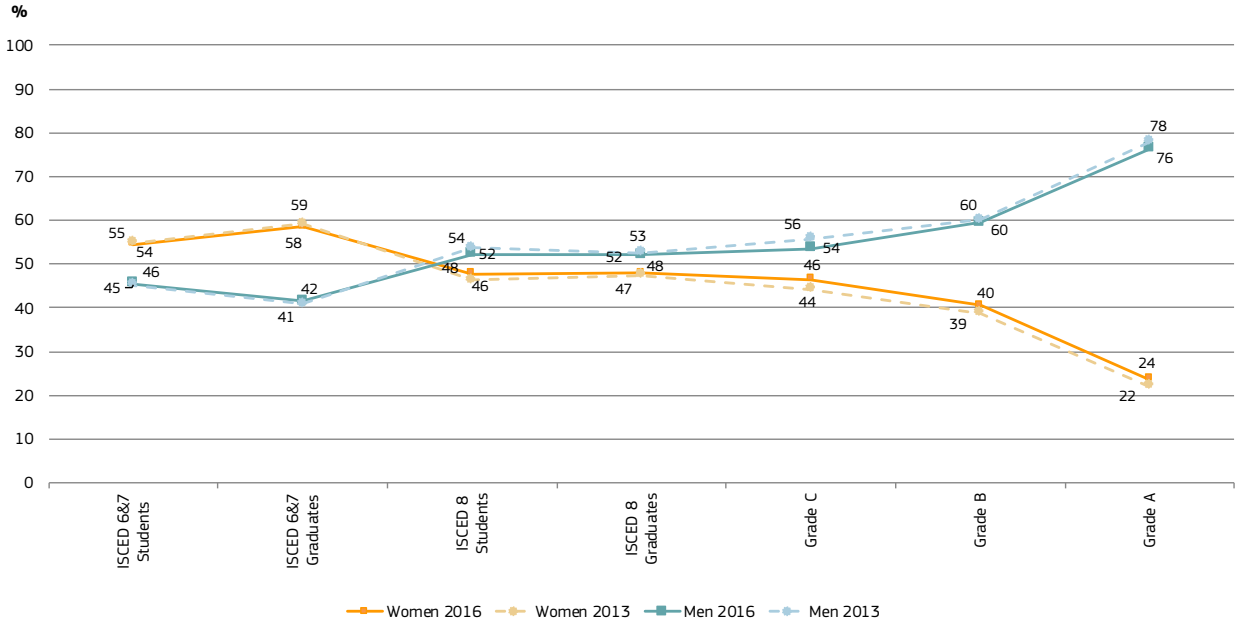
- There is a diminishing representation of women as a standard academic career progresses. In the EU-28 in 2016, women constituted 54 % of students and 58 % of graduates at the B.Sc. and M.Sc. levels (or their equivalent - ISCED 6 and 7). However, women made up 48 % of students and graduates at doctoral level (ISCED 8), 46 % of grade C academic staff, 40 % of grade B and 24 % of grade A academic staff.
- The share of women was even smaller in STEM. There, women made up 32 % of students and 36 % of graduates at the B.Sc. and M.Sc. levels, 37 % of students and 39 % of graduates at doctoral level and 35 % of grade C, 28 % of grade B and 15 % of grade A academic staff.
- At the national level, the proportion of women among grade A staff ranged from 13 % to 54.3 %, exceeding 50 % in only one country. It is however encouraging that since 2013 the proportion of grade A women had increased in almost all countries examined.
- While 7.4 % of women academic staff were at grade A, the corresponding proportion for men was 16.7 %.
- The highest proportions of women among grade A staff were observed in the humanities (32.1 %), the social (28.1 %) and the medical sciences (27.5 %). The smallest proportions were observed in engineering and technology (12.0 %) and in natural sciences (18.1 %).
- Women were better represented among grade A staff of a younger age. Among grade A academic staff, women made up 36.2 % of staff less than 35 years old, 27.5 % of staff aged 35 to 44, 25.8 % of staff aged 45 to 54 and just 22.6 % of staff aged 55 or older.
- The proportion of women among heads of institutions in the higher education sector in the EU increased from 20.1 % in 2014 to 21.7 % in 2017. The respective proportion among the heads of universities or assimilated institutions accredited to deliver PhDs increased slightly over the same period from 14.1 % to 14.3 %.
- Women made up 27 % of board members (including leaders) in the EU in 2017. This proportion ranged from 12 % to 54 % at the national level, while in nine of the countries examined it was 40 % or higher.

There are striking imbalances between the number of women and men at the highest levels of academia in the great majority of EU countries. The overall numbers of women and their ratios to those of men in senior academic and decision-making positions are much lower than what would be expected given the growing numbers of women among higher education graduates in recent decades (EIGE, 2017b; OECD, 2018).

Furthermore, data available across the broad STEM field level may hide discipline-specific causes of gender imbalances in career progression. For example, in the life sciences, where at the EU level, women make up the majority of graduates up to doctoral level, they are less successful than men in obtaining research grants (European Research Council, 2018, p. 57; van der Lee, 2015) and their numbers progressively decline at each progressive career stage (Helmer, 2017).

This chapter discusses the presence of women in the different grades of an academic career, with emphasis on the highest grade (i.e. the highest post at which research is normally conducted) across the different fields of research and development and in top-level positions (i.e. as heads of institutions or as members of boards).

Figure 6.1 Proportion (%) of men and women in a typical academic career, students and academic staff, EU-28, 2013-2016



Notes: Reference years for Eurostat data: 2012-2016; Exceptions to the reference year for WiS data: CZ (Grade A), EE (Grade A): 2014-2015; FR: 2012-2015; HR: 2014-2017; LU: 2015-2016; RO, UK: 2014-2016; IE, CY, HU, AT, SI, SE: 2013-2015; BG: 2013-2017; MT (Malta College for Arts, Science and Technology): 2017; Eurostat data unavailable for: NL (ISCED 8 graduates): 2016; WiS data unavailable for: LT (2013), MT (2013), IE (Grade D); Eurostat data for 2013: ISCED 6&7 corresponds to ISCED 5A of ISCED-97; ISCED 8 corresponds to ISCED 6 of ISCED -97. Others: Data are in headcounts (HC); Break in time series: DE (Grades B - C): 2016; ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; The same person may be counted in several grades: BE (French speaking community), SE; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; Grade C data include some persons with M.Sc. only: LT, SK; The base reference population of WiS data is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE.

Source: Women in Science database, DG Research and Innovation; Eurostat – Education Statistics (online data codes: educ_enrl5, educ_grad5, educ_uoe_enrt03, educ_uoe_grad02).

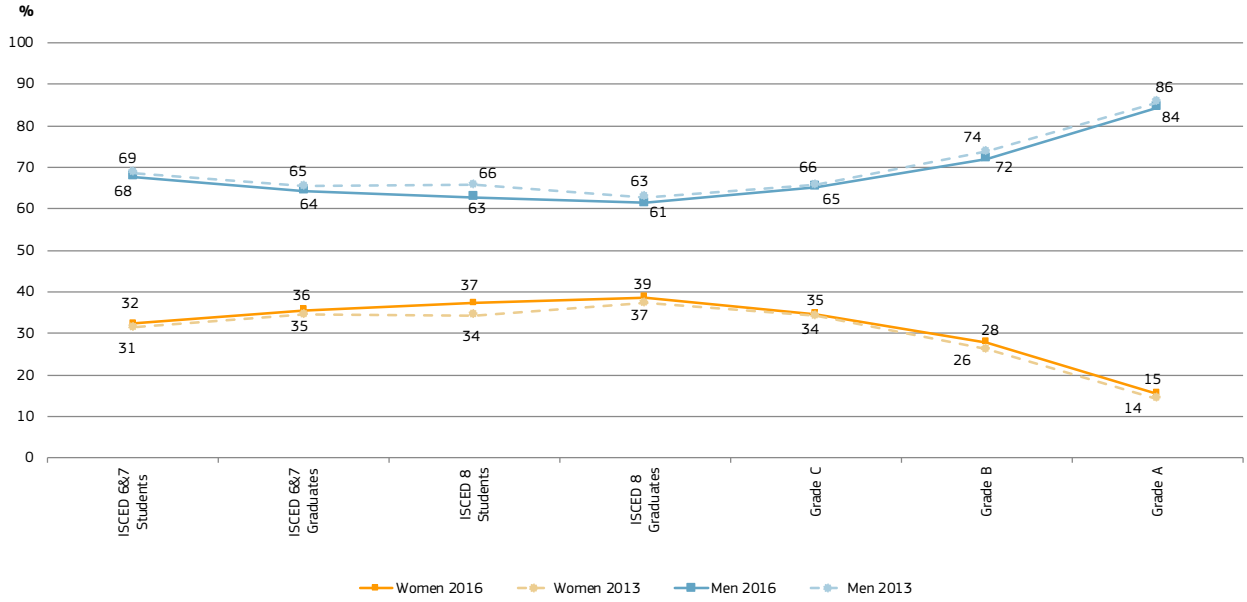
Women make up less than 50 % of doctoral students, doctoral graduates and academic staff. In the top academic grade in particular, women are a clear minority and their position since 2013 has improved only slightly.

Research identifies institutional and field-related research cultures that favour the advancement of men. Some of the issues stopping women's advancement to top decision-making roles include women's lower success rates in securing prestigious grants and the preponderance of part-time and short-term contract research positions among women's careers (Milojevic, 2018). In addition, implicit gender bias in performance assessment, gender stereotypes, gendered perceptions of leadership and leadership styles, the 'glass ceiling', and the 'gender pay gap' are among the factors that can influence the recruitment and promotion of women to grade A positions, evaluation committees and university oversight bodies and scientific committees responsible for research funding.

As Figure 6.1 shows, women were the majority of students and graduates at Bachelor's and Master's or equivalent levels (ISCED 6 and 7), in the EU in 2016. In fact, their share among graduates (58 %) was higher than that among students (54 %), pointing to the better performance of women rather than men in their studies. One should keep in mind however, that the students of 2016 are not the same people as the graduates of 2016. The gap between women and men has narrowed by two percentage points since 2013. The opposite picture was evident in doctoral students and graduates (ISCED 8). There were slightly fewer women than men in both groups, accounting for 48 % of each one. This represents a mild improvement since 2013 when women were 46 % of doctoral students and 47 % of graduates.

The share of women among academic staff in the EU however, rapidly declines as they advance to higher positions in research organisations. In 2016, women were 46 % of Grade C staff, defined as the first grade or post into which a newly qualified PhD (ISCED 8) graduate would normally be recruited. This is slightly smaller than their share among ISCED 8 graduates. The share of women dropped to 40 % among grade B staff and to slightly less than a quarter (24 %) of grade A staff. Their gap with men has been reduced slowly since 2013, when the proportion of women in grade C was 44 %, in grade B it was 39 % and in grade A it was as low as 22 %.

Figure 6.2 Proportion (%) of men and women in a typical academic career in science and engineering, students and academic staff, EU-28, 2013-2016



Notes: Reference years for Eurostat data: 2012-2016; Exceptions to the reference year for WiS data: HR: 2014-2017; LU: 2015-2016; UK: 2014-2016; CY, AT, SI, SE: 2013-2015; MT (Malta College for Arts, Science and Technology): 2017; Eurostat data unavailable for: PL (ISCED 8 graduates): 2012; MT (Women ISCED 8 graduates): 2012; NL (ISCED 8 students and graduates): 2016; WiS data unavailable for: BG, CZ, EE, IE, FR, LT (2013), LV, HU, MT (2013), RO;
Others: Data are in headcounts (HC); Break in time series: DE (Grades B - C): 2016; ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; The same person may be counted in several grades: BE (French speaking community), SE; The same person may be counted in several fields: SE; Data do not include persons of unknown sex: PL; Grade C data include some persons with M.Sc. only: LT, SK; Eurostat data for 2013: ISCED 6&7 corresponds to ISCED 5A of ISCED-97; ISCED 8 corresponds to ISCED 6 of ISCED -97; The base reference population of WiS data is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE.

Source: Women in Science database, DG Research and Innovation; Eurostat – Education Statistics (online data codes: educ_enrl5, educ_grad5, educ_uoe_enrt03, educ_uoe_grad02).

The share of women is considerably smaller in science, technology, engineering and mathematics than over all pooled fields of R&D, across the career path.

In the field of science, technology, engineering and mathematics (STEM), the gap between women and men is wider than the gap for all fields of R&D considered together. This affects all tertiary education levels and all the three higher grades.

More specifically, as shown in Figure 6.2, in the EU in 2016, women were 32 % of students and 36 % of graduates in STEM at ISCED 6 and 7 levels. These proportions are 23 percentage points lower than the respective ones over all fields of education. At ISCED level 8, women were 37 % of students and 39 % of graduates in STEM, eleven and nine percentage points respectively below their corresponding shares over all fields.

The same picture of a wider gap between women and men emerges among academic staff. In the EU in 2016, women were 35 % of grade C staff, 28 % of grade B staff and 15 % of grade A staff in STEM. These shares are considerably smaller than the respective ones over all fields together. Even if the gaps remain large, the situation has, nonetheless, improved slightly since 2013, when the respective shares were 34 % (grade C), 26 % (grade B) and 14 % (Grade A).

Table 6.1 Proportion (%) of women among academic staff, by grade and total, 2016

Country	Grade A	Grade B	Grade C	Grade D
EU-28	23,7	40,5	46,4	46,9
BE	18,3	30,4	37,5	48,5
BG	36,6	45,7	:	54,2
CZ	14,6	:	:	:
DK	20,7	33,2	42,9	53,1
DE	19,4	25,6	44,1	43,2
EE	24,3	:	:	:
IE	20,6	34,2	48,9	:
EL	21,6	32,5	37,2	45,7
ES	21,3	42,4	48,4	48,8
FR	21,9	40,9	36,1	42,0
HR	40,6	51,7	62,1	58,4
IT	22,2	37,2	46,4	50,9
CY	13,0	31,6	39,7	47,0
LV	41,4	53,3	58,6	:
LT	39,3	54,3	63,8	67,3
LU	17,7	34,2	31,6	41,8
HU	20,1	32,8	44,5	42,2
MT	40,0	43,7	50,0	30,4
NL	18,7	28,2	40,8	46,2
AT	22,7	26,1	42,4	43,3
PL	24,1	37,4	50,5	50,1
PT	26,3	40,8	47,8	52,5
RO	54,3	59,0	54,5	53,2
SI	28,9	35,3	48,9	48,2
SK	25,3	40,9	50,3	58,6
FI	29,4	49,1	50,7	49,0
SE	25,4	45,8	45,7	49,7
UK	26,4	45,7	51,3	59,4
IS	26,3	36,0	51,2	:
NO	27,9	45,6	49,6	57,1
CH	23,3	33,9	41,5	43,6
TR	:	:	:	:
BA	45,1	40,4	47,3	54,4
IL	14,3	32,5	52,7	50,7

Notes: Exceptions to the reference year: IS: 2012; CZ (Grade A), EE (Grade A), IE, FR, CY, HU, AT, SI, SE: 2015; BG, HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: ME, AL, RS, AM, FO, GE, MK, MD, TN, UA;
Others: ':' indicates that data are unavailable; Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; The same person may be counted in several grades and fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE, IS, IL.

Source: Women in Science database, DG Research and Innovation.

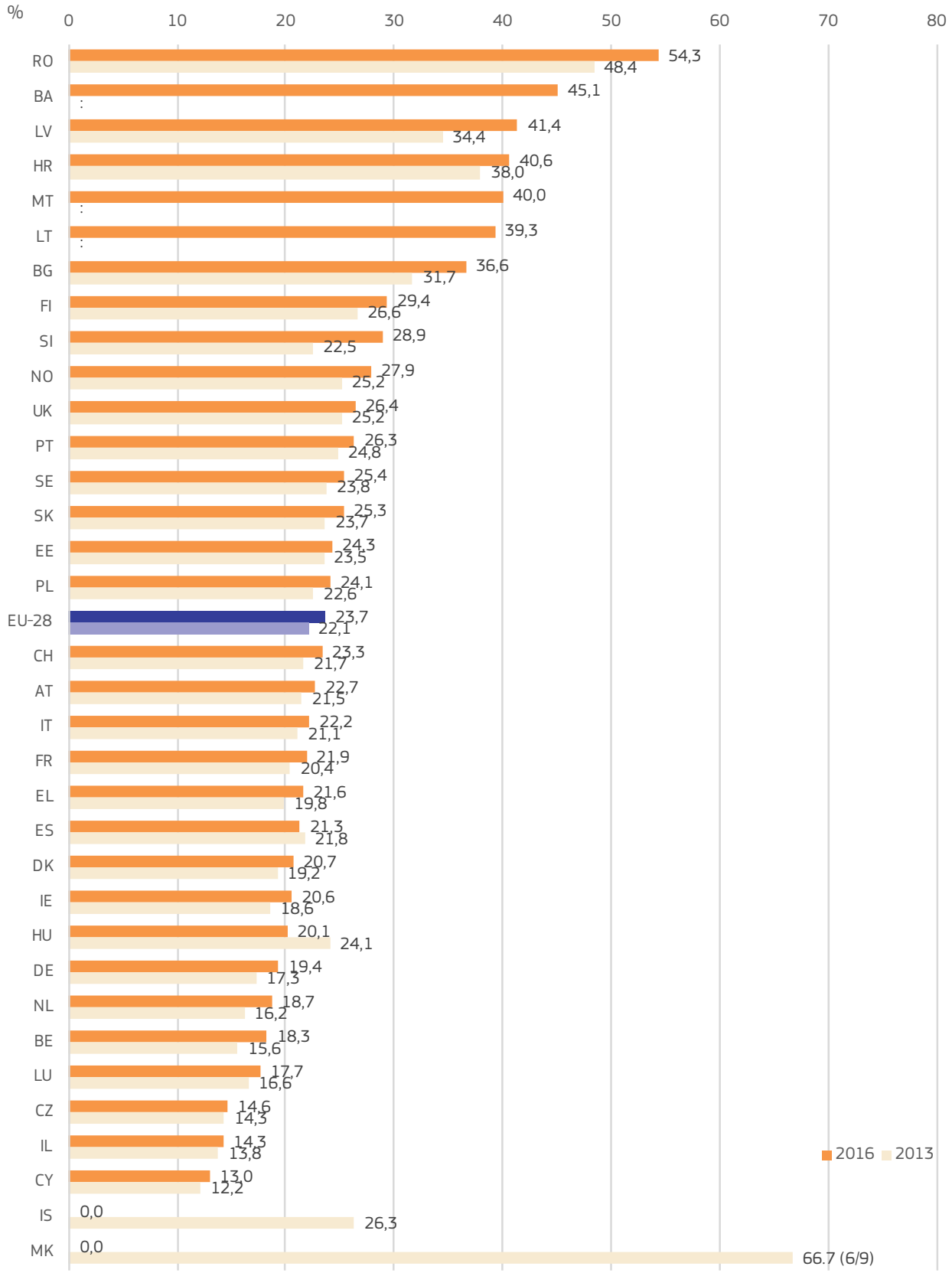
The proportion of women among grade A staff at the national level ranges from 13 % to 54.3 %. The proportion is 40 % or higher in just five countries.

Table 6.1 shows the proportion of women among academic staff for each grade at the national level. Next to grades A-C, the table also shows grade D, which corresponds to academic posts that do not normally require a PhD, e.g. postgraduate students not yet holding a PhD degree who are engaged as researchers. Due to the variability in the application of the grading definitions in the different national systems, it is difficult to compare the proportions observed for grades B–D across countries. In the majority of the countries, however, Grade A either corresponds to the rank of full professor, or to the highest post at which research is normally conducted.

As Table 6.1 shows, women's share among grade A staff at the national level, ranged from 13 % to 54.3 % in 2016. The largest proportions of women were observed in Romania (54.3 %), Bosnia and Herzegovina (45.1 %) and Latvia (41.4 %). The smallest proportions were in Cyprus (13 %), Israel (14.3 %) and Czechia (14.6 %).

The share of women among all academic staff, irrespective of grade, in the EU, was 41.3 %, while at national level it ranged from 34.4 % to 57.4 %. The largest proportions of women were observed in Lithuania (57.4 %), Latvia (55.8 %) and Romania (54.6 %). The smallest ones were found in Czechia (34.4 %), Greece (35.1 %) and France (36.5 %).

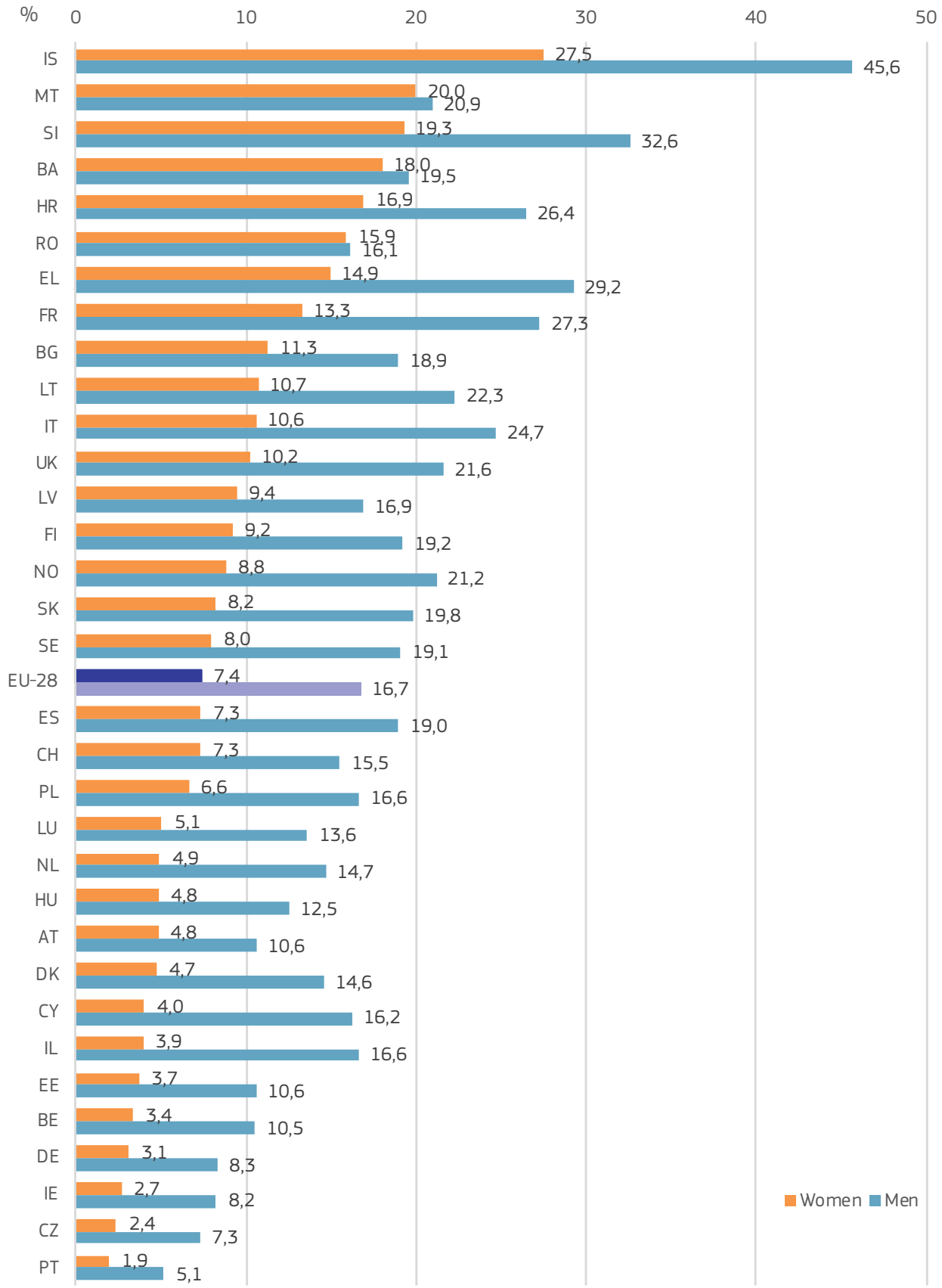
Figure 6.3 Evolution of the proportion (%) of women among Grade A positions, 2013 vs. 2016



Notes: Exceptions to the reference years: FR: 2012-2015; IE, CY, HU, AT, SI, SE: 2013-2015; BG: 2013-2017; CZ, EE: 2014-2015; RO, UK: 2014-2016; HR: 2014-2017; LU, IL: 2015-2016; IS, MK: 2012; MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: LT (2013), MT (2013), IS (2016), ME, AL, RS, TR, AM, FO, GE, MK (2016), MD, TN, UA.
Others: Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; Estimated data: RO (2014); The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE, IS, IL.

Source: Women in Science database, DG Research and Innovation.

Figure 6.4 Proportion (%) of grade A staff among all academic staff, by sex, 2016



Notes: Exceptions to the reference year: IS: 2012; CZ (Grade A), EE (Grade A), IE, FR, CY, HU, AT, SI, SE: 2015; BG, HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: ME, AL, RS, TR (Grade A), AM, FO, GE, MK, MD, TN, UA;
Others: Data are in headcounts (HC); Break in time series: DE (Grades B - D): 2016; ES: 2015; UK: 2014; The same person may be counted in several grades and fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE, IS, IL.

Source: Women in Science database, DG Research and Innovation.

In almost all countries examined, the proportion of women in grade A positions increased between 2013 and 2016.

The proportion of women among grade A academic staff increased slightly between 2013 and 2016, from 22.1 % to 23.7 % (Figure 6.3). The proportion also increased in all countries examined in She Figures and where data are available for both 2013 and 2016. The only exceptions were Hungary, where the proportion fell from 24.1 % to 20.1 % and Spain, where it fell from 21.8 % to 21.3 %. The largest increases, exceeding five percentage points, were observed in Latvia (from 34.4% to 41.4 %), Slovenia (from 22.5 % to 28.9 %) and Romania (from 48.4 % to 54.3 %).

Relatively fewer women than men among academic staff reach grade A positions in their career.

Figure 6.4 compares the proportion of women and men in the higher education sector that are in grade A positions. In the EU as a whole, 7.4 % of women and 16.7 % of men academic staff were in grade A positions. At the national level, the proportion of women academic staff in grade A positions ranged in 2016 between 1.9 % and 27.5 %. The highest proportions were observed in Iceland (27.5 %), Malta (20 %), Slovenia (19.3 %) and Bosnia and Herzegovina (18 %), while the smallest ones were found in Portugal (1.9 %), Czechia (2.4 %) and Ireland (2.7 %). It should be noted however, that the large variations across countries could be partly attributable to differences in their respective grading systems.

Comparing the situation between women and men it is observed that the proportion of women among grade A academic staff was smaller than the corresponding proportion of men in all the countries examined. The difference between the two proportions, everywhere in favour of men, ranged from 0.2 to 18.1 percentage points. The smallest differences were found in Romania (0.2 percentage points), Malta (0.9 percentage points) and Bosnia and Herzegovina (1.5 percentage points), while the largest ones were observed in Iceland (18.1 percentage points), Greece (14.3 percentage points) and Italy (14.1 percentage points).

Table 6.2 Proportion (%) of women among grade A staff, by main field of R&D, 2016

Country	% Women					
	NS	ET	MS	AS	SS	H
EU-28	18,1	12,0	27,5	25,5	28,1	32,1
BE	17,0	11,7	19,4	18,2	20,1	21,1
DK	11,6	8,3	22,8	27,0	23,8	33,1
DE	14,1	9,1	13,7	20,4	23,5	29,3
EL	16,0	12,3	27,0	16,4	26,1	36,1
ES	21,1	12,2	23,8	15,9	22,0	28,9
HR	43,3	21,7	47,0	44,7	47,8	44,7
IT	22,7	12,1	14,6	17,5	25,7	36,5
CY	10,2	17,1	26.3 (5/19)	0 (0/1)	6,5	14.8 (4/27)
LT	12,1	14,8	41,8	-	49,2	59,1
LU	9,8	10.5 (2/19)	14.3 (1/7)	-	26,3	13.3 (2/15)
MT	50 (1/2)	28.6 (2/7)	50 (2/4)	0 (0/1)	66.7 (4/6)	50 (1/2)
NL	11,8	11,6	15,5	16,3	21,4	29,2
AT	12,8	9,6	21,0	20,4	26,6	36,0
PL	18,5	10,3	32,5	30,6	27,5	28,6
PT	30,2	10,6	26,0	28,8	27,0	36,6
SI	14,7	16,0	37,5	37,2	34,8	31,1
SK	17,9	14,9	26,3	15,1	33,8	27,0
FI	13,7	10,5	33,5	37,5	37,0	43,8
SE	16,2	15,1	29,9	31,1	31,0	36,8
UK	15,6	11,8	32,8	26,7	31,8	32,5
NO	16,6	11,7	40,1	27,9	31,3	32,7
CH	13,7	13,5	20,7	28,7	30,1	36,7
BA	41,1	34,8	65,6	21.7 (5/23)	60,5	38,2
IL	10,7	10,3	26,7	0 (0/24)	23,3	13,4

Notes: Exceptions to the reference year: CY, AT, SI, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, EE, IE, FR, LV, HU, RO, IS, ME, AL, RS, TR, AM, FO, GE, MK, MD, TN, UA.
Others: ‚-' indicates that denominator was zero; Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; Estimated data: SI; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data do not include persons of unknown sex: PL; Veterinary science included in Medical Sciences: NL; Medical sciences staff employed in university medical centres is not included: NL; Humanities includes only sciences of culture & art while Social Sciences includes social sciences and humanities: SK; For proportions based on low numbers of headcounts (i.e. <30), the numerators and denominators are presented in parentheses in the table; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE, EL, IT, LT, NL, SI, SK, SE, IL; Fields of R&D: NS = natural sciences; ET = engineering and technology; MS = medical sciences; AS = agricultural sciences; SS = social sciences; H = humanities.

Source: Women in Science database, DG Research and Innovation.

The under-representation of women among grade A positions affects every field of R&D, but the highest effect is in the fields of Engineering and Technology and Natural Sciences.

Data on the proportion of women among grade A staff by field of R&D (Table 6.2) show a clear differentiation between fields. In 2016, in the EU as a whole, women represented only 12.0 % of grade A academic staff in engineering and technology and 18.1 % of the grade A academic staff in the natural sciences. Their highest shares among grade A academic staff were observed in the humanities (32.1 %), the social sciences (28.1 %) and the medical sciences (27.5 %).

At the national level, the highest shares of women among grade A academic staff were found in the field of humanities in 13 of the 24 examined countries (BE, DK, DE, EL, ES, IT, LT, NL, AT, PT, FI, SE and CH); the medical sciences in seven countries (CY, PL, SI, UK, NO, BA and IL); and the social sciences in four countries (HR, LU, MT and SK). At the same time, the smallest shares of women among grade A academic staff were observed in engineering and technology (in 17 countries, namely BE, DK, DE, EL, ES, HR, IT, NL, AT, PL, PT, SK, FI, SE, UK, NO and CH), the agricultural sciences (in four countries, namely CY, MT, BA and IL, with only one grade A member of staff in the first two) and the natural sciences (three countries, namely LT, LU and SI).

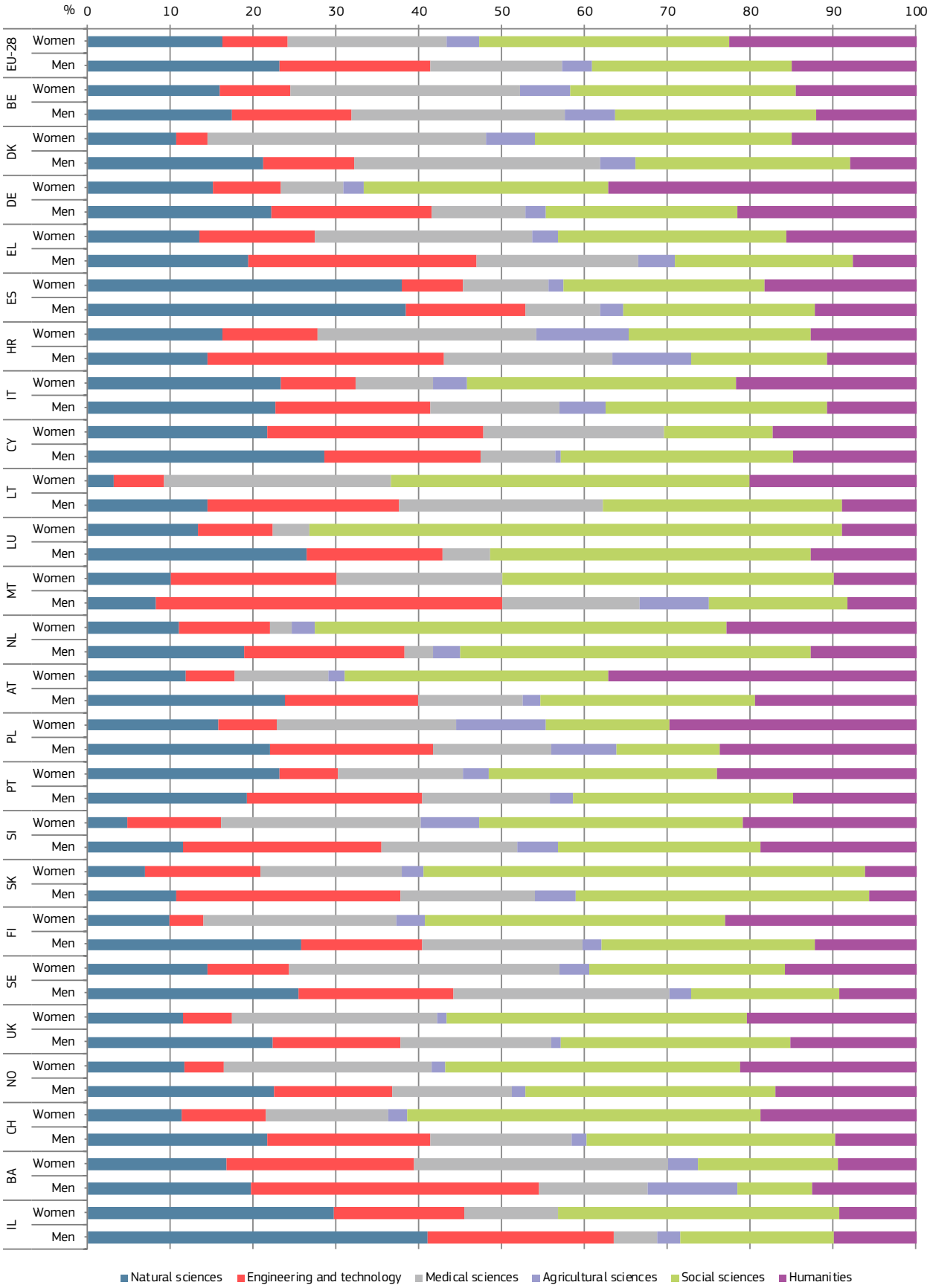
Women in grade A positions are relatively more likely than men of the same grade to work in the medical, agricultural, social sciences or the humanities, and relatively less likely than men to work in the natural sciences, or in engineering and technology.

Figure 6.5 shows how women and men in grade A positions are spread across fields of R&D. The field in which most grade A staff worked in 2016, in the EU as a whole, were the social sciences, which occupied 30.2 % of women and 24.2 % of men in this grade. The least popular field for both sexes were the agricultural sciences, where 3.9 % of women and 3.5 % of men worked in grade A positions. The second most popular field however differs between women and men. It is the humanities for women (22.6 %) and the natural sciences for men (23.2 %).

At national level, the social sciences are the most popular field of both women and men in grade A in 10 countries (IT, LT, LU, NL, PT, SI, SK, UK, NO and CH), while the agricultural sciences were the least popular for both sexes in 19 countries (BE, DE, EL, ES, HR, IT, CY, LT, LU, MT, AT, PT, SK, FI, SE, UK, NO, CH and IL). The share of women in grade A that work in each field ranged as follows across countries in 2016: from 3.1 % to 37.8 % in the natural sciences; from 3.8 % to 26.1 % in engineering and technology, from 2.7 % to 33.6 % in the medical sciences, from 0 % to 11.1 % in the agricultural sciences, from 13 % to 64.3 % in the social sciences; and from 6.2 % to 37.2 % in the humanities.

It is also interesting to compare the proportions of women at grade A who had chosen a specific field with the corresponding proportions of men. At the EU level, relatively more women than men worked in medical sciences (19.2 % of women, 15.9 % of men), agricultural sciences (3.9 % of women, 3.5 % of men), social sciences (30.2 % of women, 24.2 % of men) and the humanities (22.6 % of women, 15 % of men). In the two remaining fields women were less concentrated than men. In grade A positions, 7.8 % of women worked in engineering and technology, as opposed to 18.1 % of men and 16.3 % of women who worked in the natural sciences and to 23.2 % of men. At the national level, relatively more women than men in grade A positions worked in engineering only in Cyprus, and in natural sciences only in Croatia, Italy, Malta and Portugal. In the agricultural sciences there were relatively more women in grade A in 11 countries (DK, DE, HR, PL, PT, SI, FI, SE, UK, NO and CH), while in the medical sciences there were relatively more women in grade A in 17 countries (BE, DK, EL, ES, HR, CY, LT, MT, PL, SI, SK, FI, SE, UK, NO, BA and IL). At the other end, relatively more men than women in grade A worked in humanities only in Luxembourg, Bosnia and Herzegovina and Israel and in social sciences only in Cyprus.

Figure 6.5 Distribution of grade A staff across fields of R&D, by sex, 2016

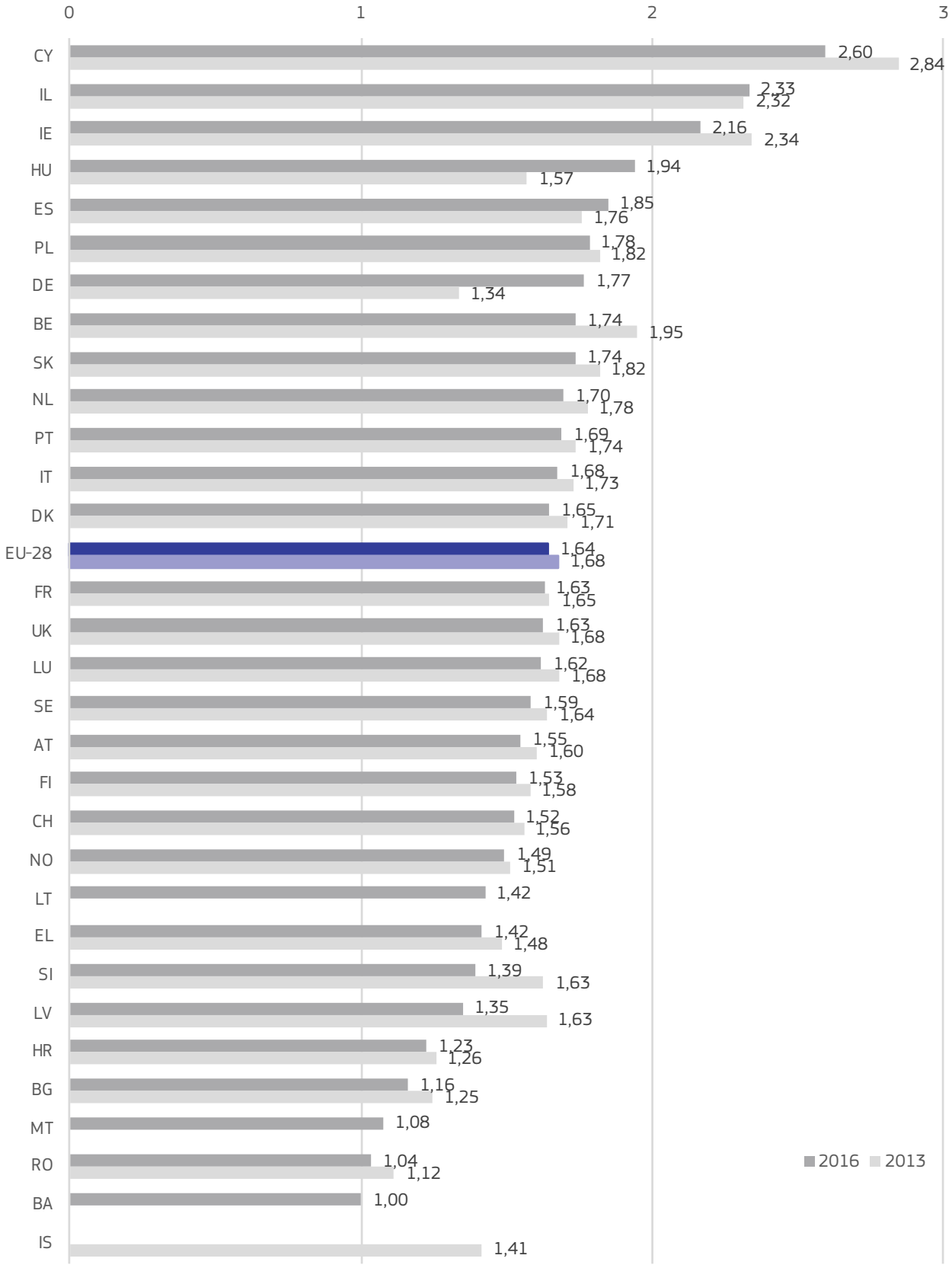


Notes: Exceptions to the reference year: CY, AT, SI, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, EE, IE, FR, LV, HU, RO, IS, ME, AL, RS, TR, AM, FO, GE, MK, MD, TN, UA.

Others: Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; Estimated data: SI; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; Veterinary science included in Medical Sciences: NL; Medical sciences staff employed in university medical centres is not included: NL; Humanities includes only sciences of culture & art while Social Sciences includes social sciences and humanities: SK; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE, EL, IT, LT, NL, SI, SK, SE, IL.

Source: Women in Science database, DG Research and Innovation.

Figure 6.6 Glass Ceiling Index, 2013-2016



Notes: Exceptions to the reference years: FR: 2012-2015; IE, CY, HU, AT, SI, SE: 2013-2015; BG: 2013-2017; CZ, EE: 2014-2015; RO, UK: 2014-2016; HR: 2014-2017; LU, IL: 2015-2016; IS: 2012; MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: CZ, EE, LT (2013), MT (2013), IS (2016), ME, AL, RS, TR, AM, FO, GE, MK, MD, TN, UA.
Others: Data are in headcounts (HC); Break in time series: DE (Grades B - C): 2016; ES: 2015; UK: 2014; Estimated data: RO (Grade A, 2014); The same person may be counted in several grades and fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; Grade C data include some persons with M.Sc. only: LT, SK; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE, IS, IL.

Source: Women in Science database, DG Research and Innovation.

The Glass Ceiling Index

The Glass Ceiling Index (GCI) is a relative index comparing the proportion of women in academia (grades A, B, and C) with the proportion of women in top academic positions (grade A positions; equivalent to full professors in most countries) in a given year. The GCI can range from 0 to infinity. A GCI of 1 indicates that there is no difference between women and men in terms of their chances of being promoted. A score of less than 1 means that women are more represented at the grade A level than in academia generally (grades A, B, and C) and a GCI score of more than 1 indicates the presence of a glass ceiling effect, meaning that women are less represented in grade A positions than in academia generally (grades A, B, and C). In other words, the interpretation of the GCI is that the higher the value, the stronger the glass ceiling effect and the more difficult it is for women to move into a higher position.

Women face greater difficulties than men in advancing to the highest academic positions in all the countries examined. Nevertheless, the situation for women has improved, albeit slightly, since 2013 in most countries.

Figure 6.6 shows the GCI at EU and national level in 2013 and 2016. At the EU level, the GCI stood at 1.64 in 2016, 0.04 points lower than in 2013. It is notable however, that in all countries for which data were available for 2016 the GCI was higher than 1.00, indicating that women face greater difficulties than men in advancing to the highest academic posts. The countries with the smallest GCI in 2016 were Bosnia and Herzegovina (1.00), Romania (1.04) and Malta (1.08). At the other end, the highest GCIs were observed in Ireland (2.16), Israel (2.33) and Cyprus (2.60).

In comparison with 2013, the situation has improved, i.e. the GCI has decreased in most of the countries shown in Figure 6.6. The greatest improvements were observed in Latvia (from 1.63 to 1.35), Cyprus (from 2.84 to 2.60), Slovenia (from 1.63 to 1.39) and Belgium (from 1.95 to 1.74). In four countries, the situation for women had deteriorated since 2013. These were Germany, where the GCI increased from 1.34 to 1.77, Hungary (from 1.57 to 1.94), Spain (from 1.76 to 1.85) and Israel (from 2.32 to 2.33).

Table 6.3 Proportion (%) of women among grade A staff, by age group, 2016

	<35	35–44	45–54	55+	Total
EU-28	36,2	27,5	25,8	22,6	24,1
BE	100 (1/1)	21,8	21,4	14,7	18,3
DE	37,9	26,3	21,7	13,9	19,4
ES	-	13,0	22,2	21,2	21,3
HR	-	40,2	47,3	36,1	40,6
IT	-	16,0	21,4	22,6	22,2
LT	100 (1/1)	41,4	48,0	34,4	39,3
LU	50 (1/2)	24,5	13,1	19,2	17,7
MT	40 (4/10)	37.5 (6/16)	50 (2/4)	-	40,0
NL	0 (0/5)	26,0	21,7	14,5	18,7
AT	23,1	25,6	26,7	18,0	22,7
PL	100 (1/1)	20,4	26,1	23,9	24,1
PT	66.7 (4/6)	31,3	23,8	26,7	26,3
RO	80,0	56,1	59,8	46,7	54,3
FI	33.3 (1/3)	31,2	28,8	29,3	29,4
SE	33.3 (1/3)	27,0	25,5	25,1	25,4
UK	26,3	28,7	28,1	24,3	26,4
NO	22.2 (2/9)	23,0	33,0	26,1	27,9
CH	32,3	28,7	24,1	17,8	23,3

Notes: Exceptions to the reference year: AT, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, DK, EE, IE, EL, FR, CY, LV, HU, SI, SK, IS, ME, AL, RS, TR, BA, AM, FO, GE, IL, MK, MD, TN, UA;
Others: ‚-' indicates that denominator was zero; Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data do not include persons of unknown sex: PL; For proportions based on low numbers of headcounts (i.e. <20), the numerators and denominators are presented in parentheses in the table; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE, IT, LT, NL, SE.

Source: Women in Science database and, DG Research and Innovation.

Women are least represented among grade A staff aged 55 years or more, but no other clear generational pattern is evident amongst younger age groups.

Table 6.3 presents the proportion of women among grade A staff by age group. In 2016, across the EU as a whole, the pattern shows a decreasing proportion of women among grade A staff as they get older. Women were 36.2 % of grade A staff aged under 35; 27.5 % of grade A staff between the ages of 35 and 44; 25.8 % of grade A staff aged between the ages of 45 and 54; and 22.6 % of grade A staff aged 55 or older. The total population of grade A staff less than 35 years old was very small - only 97 women and 166 men in total in the countries examined. Focusing on grade A staff aged 35 or more, women's share was smallest among age group 55+ in 10 countries (BE, DE, HR, LT, NL, AT, RO, SE, UK and CH). No other clear pattern was apparent however. For instance, the share of women among grade A staff is higher in the 45-54 age group than the 35-44 age group in nine countries (ES, HR, IT, LT, MT, AT, PL, RO and NO). The availability of data by age for more countries would help shed more light on the issue.

Women in grade A positions are relatively younger than men in the same grade. For both sexes however, the oldest age group is the most numerous among grade A staff.

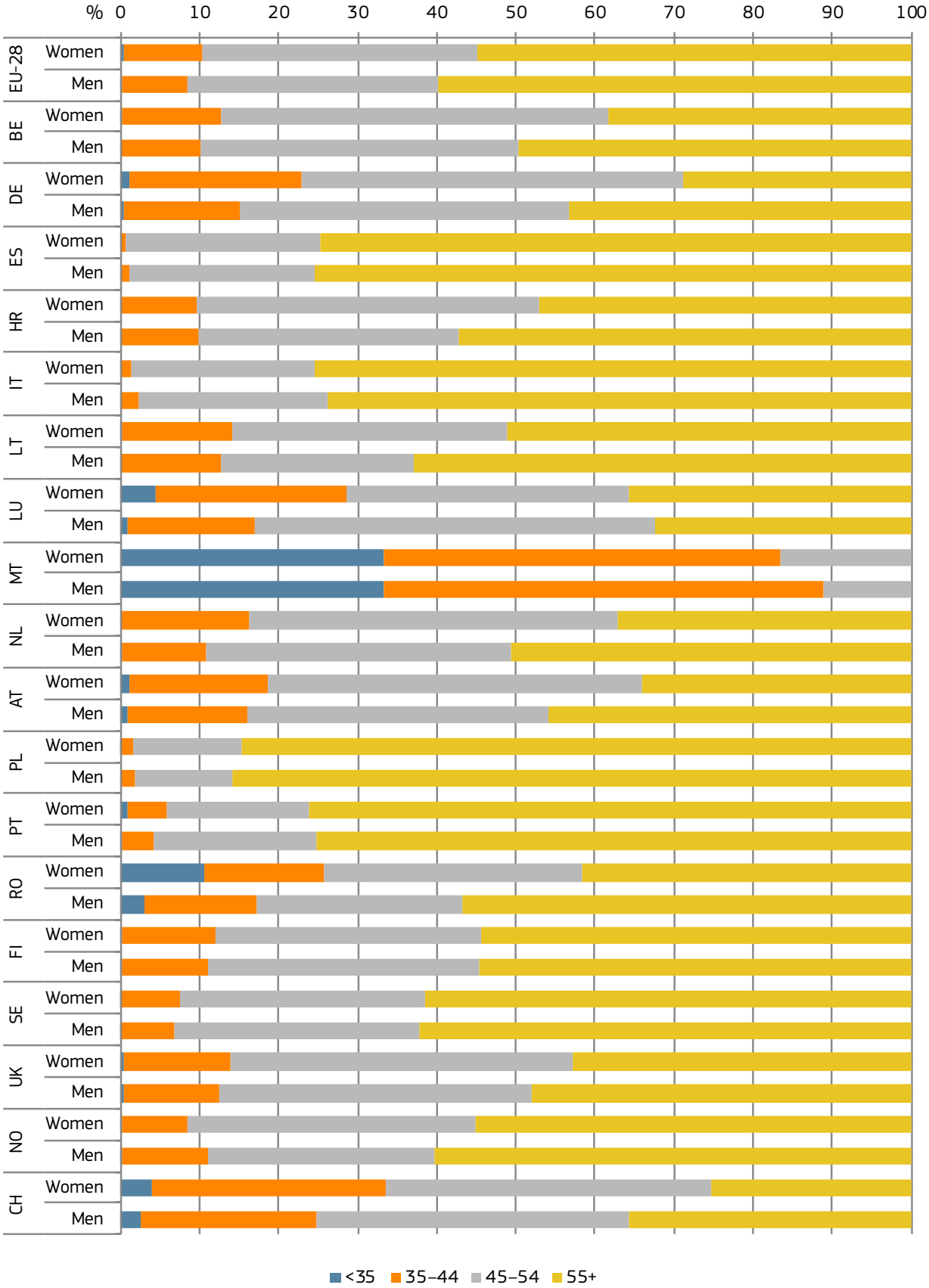
Figure 6.7 shows the women and men in grade A positions broken down by age group. In 2016, across the EU as a whole, most grade A staff of either sex were in the oldest age group, which represented 54.9 % of women and 59.8 % of men. The least numerous age group was the youngest one, which represented 0.4 % of women and 0.2 % of men in grade A positions. This is to be expected if one takes into account that advancement to grade A positions usually requires a number of years of academic experience. The 35-44 age group made up 9.9 %, and the 45-54 age group made up 34.7 % of grade A women in the EU.

At the national level, grade A academics were most likely to be over 55 in almost all countries. The 35-44 age group was only the most numerous for both sexes in Malta (50 % of women and 55.6 % of men). The 45-54 age group was the most numerous for women in grade A positions in six countries (BE, DE, NL, AT, UK and CH) and for men in two countries (LU and CH). The share of women in grade A posts according to age group across countries in 2016 ranged: from 0 % to 33.3 % in the youngest age group; from 0.6 % to 50 % in the 35-44 age group; from 13.7 % to 48.9 % in the 45-54 age group; and from 0 % to 84.8 % for the 55+ age group.

At the EU level, relatively more women than men in grade A positions fall in the three younger age groups: 0.4 % of women are younger than 35 as opposed to 0.2 % of men; 9.9 % of women are aged 35-44 as opposed to 8.3 % of men; and 34.7 % of women are aged 45-54 as opposed to 31.7 % of men.

At national level, relatively more women than men in grade A positions are in the 35-44 age group in 12 countries (BE, DE, LT, LU, NL, AT, PT, RO, FI, SE, UK and CH). The same happened in the 45-54 age group in 14 countries (BE, DE, ES, HR, LT, MT, NL, AT, PL, RO, SE, UK, NO and CH). Relatively more women than men fell in the older age group in only three countries (IT, LU and PT).

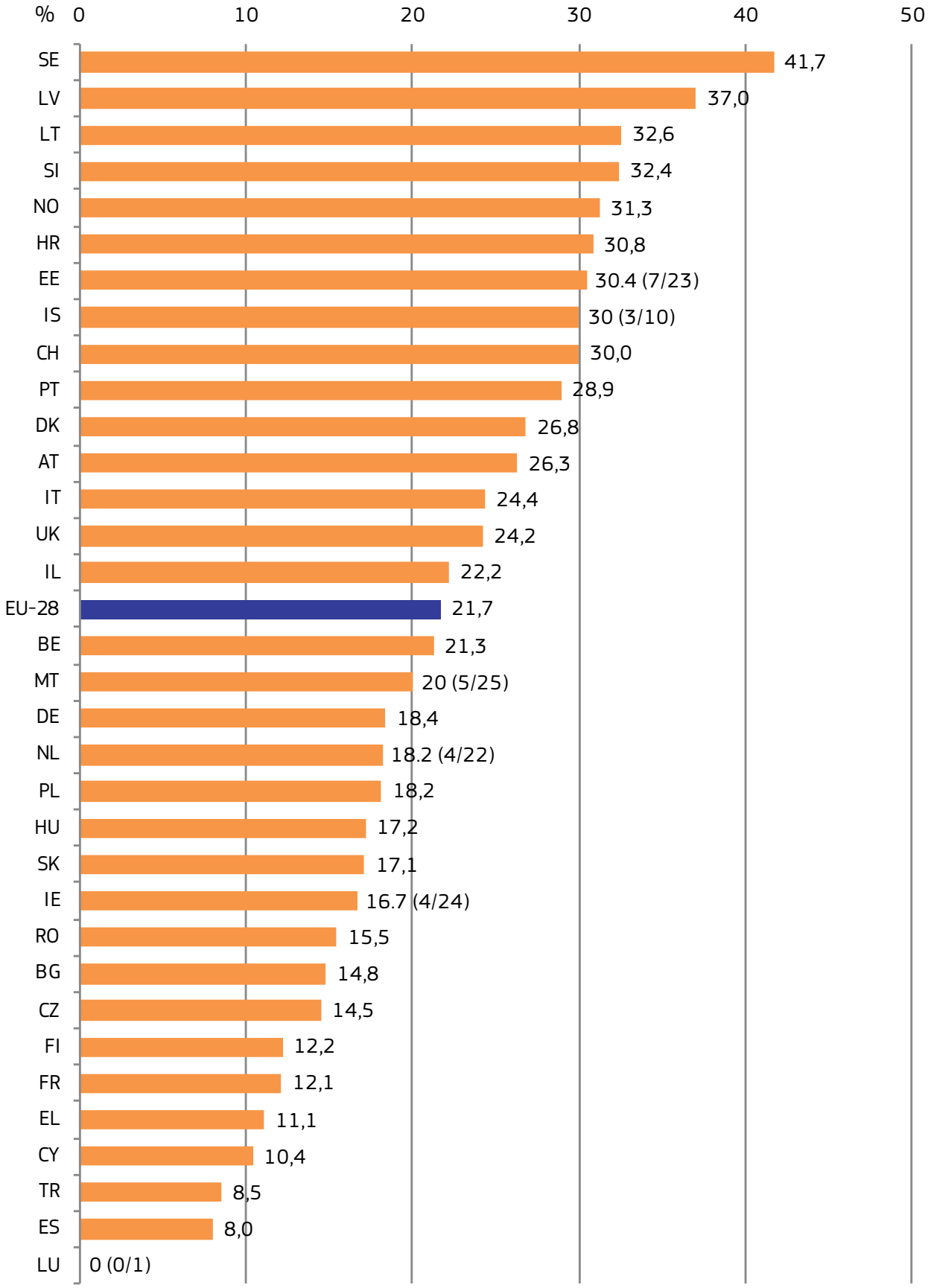
Figure 6.7 Distribution of grade A staff across age groups, by sex, 2016



Notes: Exceptions to the reference year: AT, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, DK, EE, IE, EL, FR, CY, LV, HU, SI, SK, IS, ME, AL, RS, TR, BA, AM, FO, GE, IL, MK, MD, TN, UA;
Others: Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE, IT, LT, NL, SE.

Source: Women in Science database and, DG Research and Innovation.

Figure 6.8 Proportion (%) of women among heads of institutions in the Higher Education Sector (HES), 2017



Notes: Exceptions to the reference year: BE (French speaking community Hautes Écoles): 2013; BE (French speaking community universities), CZ, PT, RO, SI, UK: 2016; CY: Acad. year 2015-2016; Data unavailable for: ME, MK, AL, RS, BA, AM, FO, GE, MD, TN, UA;
Others: Data are in headcounts (HC); Data about heads of scientific organisation are not available: BG; Private colleges and other smaller institutions are not included: IE; For proportions based on low numbers of headcounts (i.e. <30), the numerators and denominators are presented in parentheses in the table.

Source: Women in Science database, DG Research and Innovation.

The proportion of women among heads of institutions in the higher education sector increased from 20.2 % in 2014 to 21.7 % in 2017. However, the picture is mixed at the national level, where several countries with high proportions experienced a decrease in women heads of institutions.

The under-representation of women in leadership positions has broad implications for scientific advancement and for industries with a strong need for a technologically educated workforce. In recent years an increasing number of scientific institutions have been adopting a variety of measures to make improvements (Gvozdanović and Maes, 2018), such as leadership training, implicit bias training, Gender Equality Plans (see Chapter 5 of this publication) and the Human Resources Strategy for Researchers (Cameron et al, 2015). So far, these measures have not led to significant increases in the presence of women in senior decision-making roles. To speed up the pace of change, a number of scientific bodies and research organisations have been discussing introducing gender quotas along the different stages in academic career pathway (Wallon et al, 2015), while in September 2018 the EU Commissioner for Research, Science and Innovation, Carlos Moedas, called for quotas for management positions in universities and science labs (Moedas, 2018). It should be noted, however, that research also shows that unconscious gender bias in favour of men is not limited to male faculty members (Grogan, 2018).

Figure 6.8 shows the proportion of women among the heads of higher education institutions. Across the EU as a whole this proportion stood at 21.7 % in 2017, which is 1.6 percentage points higher than the proportion for 2014 (20.2 %) (Annex 6.4). In all the countries presented in the figure, women are less than half of the heads of institutions. The highest proportions were found in Sweden (41.7 %), Latvia (37 %), Lithuania (32.6 %), Slovenia (32.4 %), Norway (31.3 %), Croatia (30.8 %), Estonia (30.4 %) and Iceland and Switzerland (30 %), in other words mostly in Nordic, Baltic and Western Balkan countries. The lowest proportions (excluding Luxembourg which has only one higher education institution) were observed in Spain (8 %), Turkey (8.5 %), Cyprus (10.4 %) and Greece (11.1 %).

It must also be noted that although the situation has improved since 2014 in the EU as a whole, the picture is mixed at the national level (Annex 6.4). Among the countries that currently have the highest proportions of women, Lithuania experienced a rise in this proportion from 27.1 % to 32.6 %, Slovenia from 30.5 % to 32.4 % and Croatia from 21.2 % to 30.8 %. On the other hand, among the 'top' countries of 2014, Sweden saw a drop from 50% to 41.7 %, Iceland from 40 % to 30 % (this corresponds to only one position), Norway from 41.3 % to 31.3 % and Denmark from 32.7 % to 26.8 % (the drop in Denmark, was primarily due to a merger of various institutions between 2014 and 2017).

Table 6.4 Proportion (%) of women among heads of universities or assimilated institutions based on capacity to deliver PhDs, 2017

	Women	Men
EU-28	14,3	85,7
BE	9,1 (1/11)	90,9 (10/11)
BG	7,3	92,7
CZ	6,5	93,5
DK	27,3 (3/11)	72,7 (8/11)
DE	15,8	84,2
EE	0 (0/7)	100 (7/7)
EL	13,6 (3/22)	86,4 (19/22)
ES	8,0	92,0
FR	11,8	88,2
HR	20 (2/10)	80 (8/10)
IT	8,2	91,8
CY	0 (0/8)	100 (8/8)
LV	31,3 (5/16)	68,8 (11/16)
LT	22,2 (6/27)	77,8 (21/27)
LU	0 (0/1)	100 (1/1)
HU	6,7	93,3
MT	0 (0/1)	100 (1/1)
NL	14,3 (2/14)	85,7 (12/14)
AT	27,6 (8/29)	72,4 (21/29)
PL	11,8	88,2
PT	22,7	77,3
RO	7,3	92,7
SI	23,2	76,8
SK	18,5 (5/27)	81,5 (22/27)
FI	13,3 (2/15)	86,7 (13/15)
SE	31,3 (5/16)	68,8 (11/16)
UK	20,0	80,0
IS	0 (0/3)	100 (3/3)
NO	37,5 (3/8)	62,5 (5/8)
CH	33,3 (4/12)	66,7 (8/12)
TR	7,5	92,5
BA	19,5	80,5
IL	12,5 (1/8)	87,5 (7/8)

Notes: Exceptions to the reference year: BG: 2013; BE (French speaking community), CZ, PT, RO, SI, UK: 2016; CY: Acad. year 2015-2016; Data unavailable for: IE, ME, MK, AL, RS, AM, FO, GE, MD, TN, UA. Others: Data are in headcounts (HC); For proportions based on low numbers of headcounts (i.e. <30), the numerators and denominators are presented in parentheses in the table; Figures rounded to the nearest multiple of 5: UK.

Source: Women in Science database, DG Research and Innovation.

The proportion of women among heads of universities or assimilated institutions accredited to deliver PhDs has slightly increased from 14.1 % in 2014 to 14.3 % in 2017.

Table 6.4 focuses on a narrower group of higher education institutions, namely the universities or assimilated institutions that are accredited to deliver PhDs. At the EU level, the proportion of women among institution heads was 14.3 % in 2017, slightly larger than the 14.1 % observed in 2014 (Annex 6.5). At national level the proportion of women ranged from 0 % in Estonia, Cyprus, Iceland (small number of institutions in all these countries), Luxembourg and Malta (one institution in each country) to 37.5 % in Norway. The proportion was higher than 30% in another three countries, namely Switzerland (33.3 %), Latvia (31.3 %) and Sweden (31.3 %). Compared to the situation reported for 2014 (Annex 6.5) 13 countries have experienced an increase in the proportion since then. These were EL, ES, HR, IT, LV, LT, HU, AT, PL, PT, SK, UK and CH while the largest increase, by 25 percentage points, was observed in Switzerland. A decrease was experienced in 11 countries (CZ, DE, EE, NL, RO, SI, FI, SE, IS, NO and TR). The largest decrease was seen in Finland (26.7 percentage points). Iceland experienced a drop from 33.3 % to 0 %, but this only corresponds to one position.

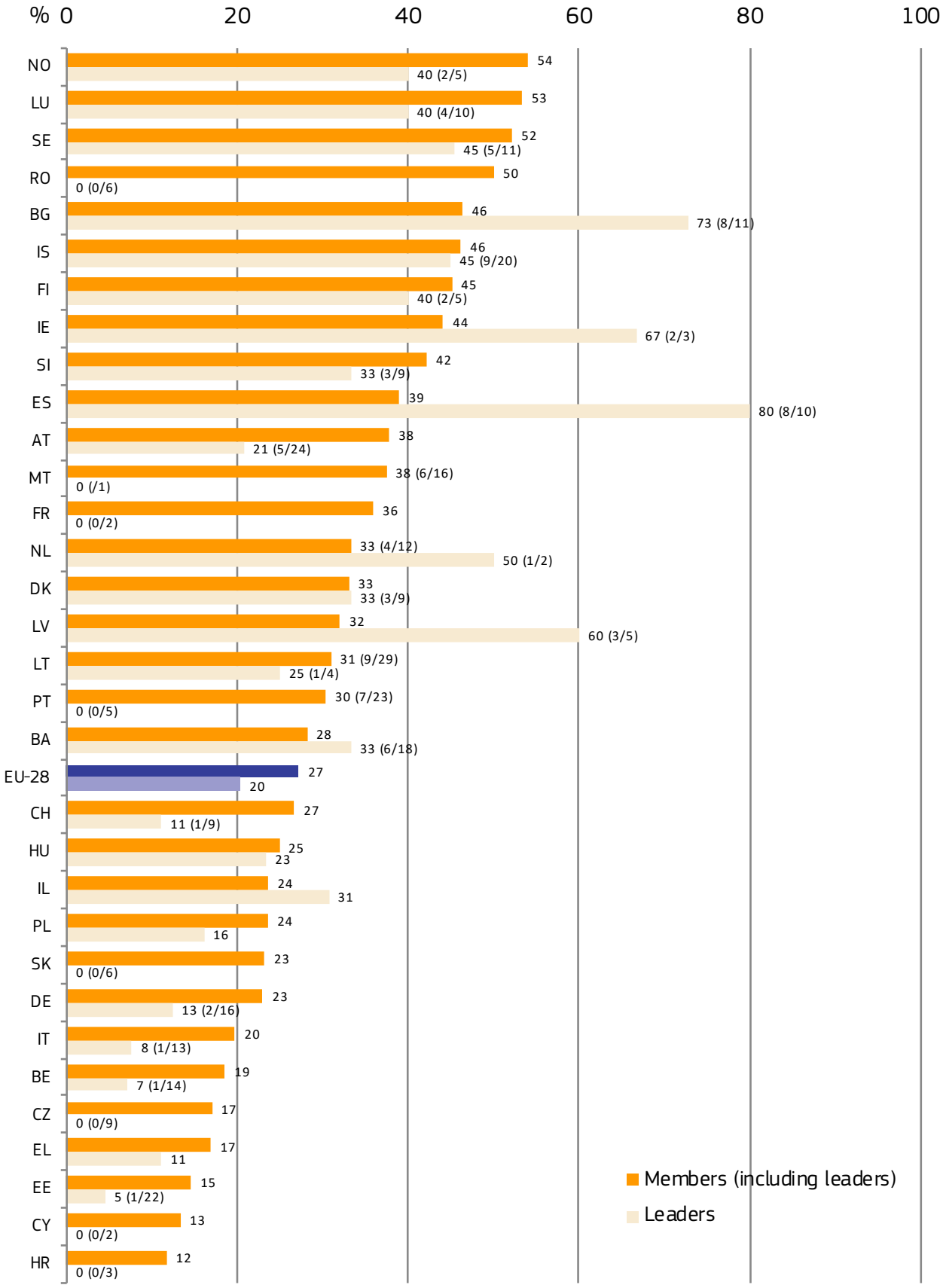
In 2017, women made up 27 % of board, members and leaders in the EU.

Figure 6.9 focuses on the presence of women on boards such as scientific or R&D commissions, councils, committees, foundations or academic assemblies, which usually hold a large degree of decision-making power. In She Figures 2015 (European Commission, 2016b), the definition of boards was revised to include only national-level boards. It should therefore be noted that the figures presented here are only directly comparable with She Figures 2015 but not with previous editions.

At the EU level (i.e. for the group of member states with available data), women made up 27 % of the members (including leaders) of boards in 2017. The respective proportion at the national level ranged from 12 % in Croatia to 54 % in Norway. Furthermore, in nine out of the 32 countries with available data (NO, LU, SE, RO, BG, IS, FI, IE and SI) women constituted at least 40 % of board members. This picture is very similar to what was reported in 2014.

Gender equality is far from being achieved among the leaders of boards. Women represented 20 % of board leaders in the EU in 2017. At the national level, the proportion of women among board leaders ranged from 0 % (CZ, FR, HR, CY, MT, PT, RO and SK) up to 73 % in Bulgaria and 80 % in Spain. Seven countries in total (SE, IS, NL, LV, IE, BG and ES) had more than 40 % of women among board leaders. However, the fact that 15 countries either have no women or less than 20 % of women (the eight countries mentioned earlier - CZ, FR, HR, CY, MT, PT, RO and SK, together with EE, BE, IT, EL, CH, DE and PL), among board leaders shows that the pace of progress towards gender equality remains too slow.

Figure 6.9 Proportion (%) of women on boards, members and leaders, 2017



Notes: Exceptions to the reference year: AT (CLIF - Jury): 2013; BG (Bilateral Cooperation), CY (CySC), LV, LT (Research Council of Lithuania), AT (Austrian Science Board, FWF - Managing Director): 2014; DE (DFG - Senate), IE, IL (GIF, ISF): 2016; Data unavailable for: UK, AL, MK, ME, RS, TR, MD, FO, UA, TN, GE, AM.
Others: Data are in headcounts (HC); Break in time series: BA: 2017; For proportions based on low numbers of headcounts (i.e. <30), the numerator and denominator are presented in parentheses in the chart.

Source: Women in Science database, DG Research and Innovation.

Annex 6.1 Number of academic staff, by grade and sex, 2016

	Grade A		Grade B		Grade C		Grade D		Total	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	35.896	115.885	156.551	230.118	111.329	128.556	164.438	186.155	487.807	693.118
BE	472	2.109	1.498	3.435	2.747	4.587	9.344	9.908	14.061	20.039
BG	1.236	2.142	2.884	3.428	:	:	6.799	5.734	10.919	11.304
CZ	383	2.232	:	:	:	:	:	:	16.128	30.756
DK	554	2.121	1.536	3.092	1.962	2.612	7.637	6.737	11.689	14.562
DE	2.935	12.230	10.253	29.846	25.396	32.181	56.003	73.554	94.587	147.811
EE	153	477	:	:	:	:	:	:	4.132	4.506
IE	110	425	598	1.150	3.429	3.582	:	:	4.137	5.157
EL	765	2.774	868	1.806	1.517	2.560	1.979	2.355	5.129	9.495
ES	2.136	7.881	17.264	23.473	3.179	3.393	6.493	6.803	29.072	41.550
FR	7.671	27.366	36.882	53.192	3.820	6.749	9.410	13.017	57.783	100.324
HR	1.202	1.757	3.455	3.227	730	445	1.707	1.214	7.094	6.643
IT	2.880	10.093	7.409	12.514	9.897	11.442	7.096	6.850	27.282	40.899
CY	23	154	68	147	274	416	206	232	571	949
LV	274	388	313	274	2.320	1.637	:	:	2.907	2.299
LT	453	701	1.273	1.073	1.864	1.057	645	314	4.235	3.145
LU	22	104	46	88	68	146	308	428	443	767
HU	299	1.185	1.070	2.193	3.945	4.921	856	1.174	6.170	9.473
MT	12	18	38	49	3	3	7	16	60	86
NL	609	2.648	761	1.938	2.335	3.394	8.652	10.089	12.357	18.069
AT	580	1.970	935	2.641	3.782	5.128	6.755	8.845	12.052	18.584
PL	2.600	8.181	6.884	11.530	20.683	20.303	9.197	9.153	39.364	49.167
PT	496	1.388	2.322	3.373	8.100	8.862	14.752	13.332	25.670	26.955
RO	151	127	190	132	120	100	488	429	949	788
SI	458	1.126	405	742	1.343	1.406	172	185	2.378	3.459
SK	437	1.288	1.142	1.649	3.256	3.223	501	354	5.336	6.514
FI	780	1.877	2.240	2.321	2.047	1.988	3.436	3.579	8.503	9.765
SE	1.630	4.798	6.387	7.555	1.417	1.681	11.140	11.263	20.449	25.147
UK	6.575	18.325	49.830	59.250	7.095	6.740	855	590	64.350	84.905
IS	80	224	80	142	131	125	:	:	291	491
NO	1.083	2.801	3.737	4.456	1.312	1.335	6.172	4.641	12.304	13.233
CH	1.283	4.215	1.911	3.719	5.322	7.506	9.033	11.699	17.549	27.139
TR	:	:	:	:	:	:	:	:	53.326	71.393
BA	137	167	120	177	321	358	184	154	762	856
IL	142	854	869	1.807	566	507	2.032	1.974	3.609	5.142

Notes: Exceptions to the reference year: IS: 2012; CZ (Grade A), EE (Grade A), IE, FR, CY, HU, AT, SI, SE: 2015; BG, HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: TR; Break in time series: ES, Grade A, break in series in 2015; UK, Break 2014 in grades data.
Others: ‚:' indicates that data are unavailable; Data are in headcounts (HC); Break in time series: DE (Grades B-D): 2016; ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; The same person may be counted in several grades and fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data do not include persons of unknown sex: PL; Private colleges and other smaller institutions are not included: IE; Grade C data include some persons with M.Sc. only: LT, SK; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): BG, DE, IE, EL, IT, LV, LT, NL, SI, SK, SE, IS, IL.

Source: Women in Science database, DG Research and Innovation.

Annex 6.2 Number of senior academic staff (grade A), by field of R&D and sex, 2016

	Natural sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities		Unknown		Total	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	4.146	18.821	1.996	14.676	4.890	12.914	983	2.876	7.687	19.635	5.741	12.127	191	539	25.619	81.543
BE	75	365	40	302	130	540	28	126	128	508	68	254	3	14	472	2.109
DK	59	450	21	231	186	631	33	89	172	552	83	168	0	0	554	2.121
DE	439	2.675	234	2.325	218	1.369	73	285	856	2.794	1.073	2.594	42	188	2.935	12.230
EL	103	539	107	763	200	542	24	122	211	596	120	212	:	:	765	2.774
ES	808	3.030	158	1.139	221	706	40	211	516	1.829	392	963	1	3	2.136	7.881
HR	195	255	139	501	316	357	134	166	265	289	153	189	:	:	1.202	1.757
IT	673	2.287	260	1.894	268	1.567	119	560	933	2.695	627	1.090	:	:	2.880	10.093
CY	5	44	6	29	5	14	0	1	3	43	4	23	:	:	23	154
LT	14	102	28	161	124	173	0	0	196	202	91	63	0	0	453	701
LU	3	28	2	17	1	6	0	0	14	40	2	13	0	0	22	104
MT	1	1	2	5	2	2	0	1	4	2	1	1	2	6	12	18
NL	66	492	66	503	16	87	17	87	298	1.097	137	332	9	50	609	2.648
AT	69	468	34	319	66	248	11	43	184	508	216	384	0	0	580	1.970
PL	409	1.801	184	1.607	564	1.172	279	634	391	1.031	773	1.934	0	2	2.600	8.181
PT	115	266	35	295	75	214	15	37	137	370	119	206	0	0	496	1.388
SI	22	128	51	267	110	183	32	54	145	272	95	210	3	12	458	1.126
SK	30	138	61	348	75	210	11	62	233	457	27	73	:	:	437	1.288
FI	77	484	32	274	182	362	27	45	282	481	180	231	0	0	780	1.877
SE	238	1.233	161	906	536	1.256	60	133	389	864	260	447	1	4	1.630	4.798
UK	745	4.035	375	2.790	1.595	3.275	80	220	2.330	5.005	1.320	2.740	130	260	6.575	18.325
NO	126	631	53	399	270	403	19	49	384	843	231	476	0	0	1.083	2.801
CH	143	902	128	821	186	712	29	72	537	1.246	238	411	22	51	1.283	4.215
BA	23	33	31	58	42	22	5	18	23	15	13	21			137	167
IL	42	349	22	191	16	44	0	24	48	158	13	84	1	4	142	854

Notes: Exceptions to the reference year: CY, AT, SI, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, EE, IE, FR, LV, HU, RO, IS, ME, AL, RS, TR, AM, FO, GE, MK, MD, TN, UA.
Others: ‚:' indicates that data are unavailable; Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; Data rounded to nearest multiple of 5: UK; Estimated data: SI; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data do not include persons of unknown sex: PL; Veterinary science included in Medical Sciences: NL; Medical sciences staff employed in university medical centres is not included: NL; Humanities includes only sciences of culture & art while Social Sciences includes social sciences and humanities: SK; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE,EL, IT, LT, NL, SI, SK, SE, IL.

Source: Women in Science database, DG Research and Innovation.

Annex 6.3 Number of academic staff (grade A), by age group and sex, 2016

	<35		35–44		45–54		55+		Total	
	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
EU-28	97	166	2.338	6.150	8.172	23.521	12.921	44.360	23.528	74.196
BE	1	0	59	212	231	849	181	1.048	472	2.109
DE	36	59	636	1.784	1.413	5.101	850	5.286	2.935	12.230
ES	0	0	13	87	527	1.847	1.596	5.947	2.136	7.881
HR	0	0	117	174	519	579	566	1.004	1.202	1.757
IT	0	0	43	226	663	2.431	2.174	7.436	2.880	10.093
LT	1	0	63	89	158	171	231	441	453	701
LU	1	1	5	17	8	53	8	34	22	104
RO	16	4	23	18	49	33	63	72	151	127
MT	4	6	6	10	2	2	0	0	12	18
NL	0	5	99	282	284	1.023	226	1.338	609	2.648
AT	6	20	102	296	274	751	198	903	580	1.970
PL	1	0	38	148	357	1.012	2.204	7.021	2.600	8.181
PT	4	2	25	55	89	285	378	1.040	496	1.382
FI	1	2	93	205	261	644	425	1.026	780	1.877
SE	1	2	121	327	507	1.485	1.001	2.984	1.630	4.798
UK	25	65	895	2.220	2.830	7.255	2.820	8.780	6.570	18.320
NO	2	7	90	301	394	801	597	1.692	1.083	2.801
CH	52	109	377	938	529	1.664	325	1.504	1.283	4.215

Notes: Exceptions to the reference year: AT, SE: 2015; HR, MT (Malta College for Arts, Science and Technology): 2017; Data unavailable for: BG, CZ, DK, EE, IE, EL, FR, CY, LV, HU, SI, SK, IS, ME, AL, RS, TR, BA, AM, FO, GE, IL, MK, MD, TN, UA.
Others: Data are in headcounts (HC); Break in time series: ES: 2015; UK: 2014; The same person may be counted in several fields of R&D: BE (French speaking community), SE; Totals adjusted to avoid double-counting: SE; Data rounded to nearest multiple of 5: UK; Data do not include persons of unknown sex: PL; The base reference population is that of ‚Researchers' as defined in the Frascati Manual (OECD, 2015), with the exception of the following countries which used ‚Academic staff' based on the UOE Manual (UNESCO/OECD/Eurostat, 2017): DE, IT, LT, NL, SE.

Source: Women in Science database, DG Research and Innovation.

Annex 6.4 Number of heads of institutions in the Higher Education Sector (HES) by sex, 2017 and 2014

Country	2017					2014				
	Reference year	Women	Men	Total	% Women	Reference year	Women	Men	Total	% Women
EU-28		638	2.303	2.941	22		580	2.286	2.866	20
BE	FL: 2017; FR: 2016/2013	10	37	47	21	FL: 2014; FR: 2014/2013	10	38	48	21
BG	2017	8	46	54	15	2013	17	59	76	22
CZ	2016	9	53	62	15	2014	11	56	67	16
DK	2017	11	30	41	27	2014	18	37	55	33
DE	2017	71	315	386	18	2014	64	323	387	17
EE	2017	7	16	23	30	2014	4	22	26	15
IE	2017	4	20	24	17	2014	5	21	26	19
EL	2017	4	32	36	11	2014	2	34	36	6
ES	2017	4	46	50	8	2015	1	49	50	2
FR	2017	13	94	107	12	2012	13	114	127	10
HR	2017	41	92	133	31	2014	29	108	137	21
IT	2017	127	394	521	24	2014	111	368	479	23
CY	2016	5	43	48	10	2014	5	42	47	11
LV	2017	20	34	54	37	:	:	:	:	:
LT	2017	14	29	43	33	2014	13	35	48	27
LU	2017	0	1	1	0	2014	0	1	1	0
HU	2017	11	53	64	17	2014	11	55	66	17
MT	2017	5	20	25	20	:	:	:	:	:
NL	2017	4	18	22	18	2014	4	18	22	18
AT	2017	25	70	95	26	2014	24	78	102	24
PL	2017	89	401	490	18	2014	79	355	434	18
PT	2016	35	86	121	29	2014	39	92	131	30
RO	2016	15	82	97	15	2014	14	87	101	14
SI	2016	35	73	108	32	2013	32	73	105	30
SK	2017	6	29	35	17	2014	5	31	36	14
FI	2017	5	36	41	12	2014	10	31	41	24
SE	2017	20	28	48	42	2014	24	24	48	50
UK	2016	40	125	165	24	2014	35	135	170	21
IS	2017	3	7	10	30	2014	4	6	10	40
NO	2017	10	22	32	31	2014	19	27	46	41
CH	2017	12	28	40	30	2014	7	33	40	18
TR	2017	15	161	176	9	2014	13	162	175	7
IL	2017	10	35	45	22	2014	7	36	43	16

Notes: Exceptions to the reference year (2017): BE (French speaking community Hautes Écoles): 2013; BE (French speaking community universities), CZ, PT, RO, SI, UK: 2016; CY: Acad. year 2015-2016; Exceptions to the reference year (2014): FR: 2012; BE (French speaking community Hautes Écoles), BG, SI: 2013; ES: 2015; Data unavailable for: ME, MK, AL, RS, BA, AM, FO, GE, MD, TN, UA: 2017; LV, MT, ME, MK, AL, RS, BA, AM, FO, GE, MD, TN, UA: 2014.
Others: Data are in headcounts (HC); Data about heads of scientific organisation are not available: BG; Private colleges and other smaller institutions are not included: IE; Figures rounded to the nearest multiple of 5: UK.

Source: Women in Science database, DG Research and Innovation.

Annex 6.5 Number of heads of universities or assimilated institutions based on capacity to deliver PhDs by sex and proportion (%) of women, 2017 and 2014

Country	2017					2014				
	Reference year	Women	Men	Total	% Women	Reference year	Women	Men	Total	% Women
EU-28		159	952	1.111	14		134	813	947	14
BE	FL: 2017; FR: 2016	1	10	11	9	2014	1	10	11	9
BG	2013	3	38	41	7	:	:	:	:	:
CZ	2017	2	29	31	6	2014	3	28	31	10
DK	2017	3	8	11	27	2014	3	8	11	27
DE	2017	19	101	120	16	2014	18	89	107	17
EE	2017	0	7	7	0	2014	1	6	7	14
EL	2017	3	19	22	14	2014	2	20	22	9
ES	2017	4	46	50	8	2015	1	49	50	2
FR	2017	8	60	68	12	:	:	:	:	:
HR	2017	2	8	10	20	2014	1	8	9	11
IT	2017	8	90	98	8	2014	7	88	95	7
CY	2016	0	8	8	0	2014	0	8	8	0
LV	2017	5	11	16	31	2014	6	15	21	29
LT	2017	6	21	27	22	2014	3	24	27	11
LU	2017	0	1	1	0	2014	0	1	1	0
HU	2017	2	28	30	7	2014	1	26	27	4
MT	2017	0	1	1	0	:	:	:	:	:
NL	2017	2	12	14	14	2014	4	10	14	29
AT	2017	8	21	29	28	2014	7	20	27	26
PL	2017	24	179	203	12	2014	10	107	117	9
PT	2016	10	34	44	23	2014	10	40	50	20
RO	2016	4	51	55	7	2014	5	51	56	9
SI	2016	13	43	56	23	2013	15	41	56	27
SK	2017	5	22	27	19	2014	4	24	28	14
FI	2017	2	13	15	13	2014	6	9	15	40
SE	2017	5	11	16	31	2014	8	8	16	50
UK	2016	20	80	100	20	2014	15	85	100	15
IS	2017	0	3	3	0	2014	1	2	3	33
NO	2017	3	5	8	38	2014	4	4	8	50
CH	2017	4	8	12	33	2014	1	11	12	8
TR	2017	12	147	159	8	2014	13	153	166	8
BA	2017	30	124	154	19	:	:	:	:	:
IL	2017	1	7	8	13	2014	1	7	8	13

Notes: Exceptions to the reference year (2017): BG: 2013; BE (French speaking community), CZ, PT, RO, SI, UK: 2016; CY: Acad. year 2015-2016; Exceptions to the reference year (2014): SI: 2013; ES: 2015; Data unavailable for: IE, ME, MK, AL, RS, AM, FO, GE, MD, TN, UA: 2017; BG, IE, FR, MT, ME, MK, AL, RS, BA, AM, FO, GE, MD, TN, UA.
Others: Data are in headcounts (HC); Figures rounded to the nearest multiple of 5: UK.

Source: Women in Science database, DG Research and Innovation.

7 Research and innovation outputs

Main findings:

- Women are still under-represented in scientific authorship in the EU-28. The ratio of women to men in corresponding authorship for all fields of R&D combined is 0.47 between 2013 and 2017, which is equivalent to 32 % of all publications having a woman as corresponding author.
- The women to men ratio in corresponding authorship is slowly rising, with an annual growth rate of 3.9 % between 2008 and 2017.
- The highest ratio of female to male authorship based on all contributing authors within the EU-28 in the period 2013-2017 was observed in medical sciences and agricultural sciences. For corresponding authors, the ratio within the EU-28 in 2013-2017 was highest in agricultural sciences, social sciences and the humanities and arts
- Female authors seem to have a focus on national collaboration. International collaboration outside the EU-28 or the 44 countries in the scope of this study has the lowest ratio of female to male authorship.
- The impact of scientific publications in female and male authorship seems to be almost equal, with a ratio of 0.90 for EU-28 in 2017. If one focuses only on corresponding authors, the respective ratio is 0.85. This is regardless of the level of seniority of the authors.
- Women were strongly under-represented during 2013-2016 as patent inventors. The highest women to men ratio of inventorships was 0.36 in Latvia.
- Modest growth (+0.4 %) is apparent in the proportion of women inventors for all technology domains combined at the EU-28 level during the 2005-2016 period.
- A strong gender gap in the composition of the inventors' teams is observed in all countries. In the EU-28, the majority of teams are all male (47 %), followed by those with just one male inventor (33 %).
- The difference between women and men team leaders in their research funding success rate was in favour of men in most of the countries examined. At the EU-level, the funding success rate was higher for men than for women by 3.0 percentage points.
- Between 2013 and 2017, 1.79 % of all publications within EU-28 included a sex or gender dimension in its content.

This chapter looks at gender equality not only in terms of gender-balanced participation in research and innovation output, but also at the integration of the gender dimension in the research content. More precisely, this chapter focuses on the contribution of women and men in research and innovation based on comparative measures that evaluate publication output, publication impact, patent output and the difference between women and men researchers in funding success. The ratio of publications with a sex or gender dimension in their research content (SGDRC) is also examined.

In contrast to previous versions of She Figures, the contribution of authors in research is not based simply on corresponding authorship, but on all authorships. Corresponding authorship may often correlate with a leading role within the researcher team, but this is not true in all cases. However, some indicators are presented for both corresponding and all authorships, in order to present a more detailed picture of research output. This chapter comprises of four sections; gender gap in scientific output, gender gap in patent output, funding success rates and sex or gender dimension in research output. More specifically, the indicators that are highlighted in each sector are given below.

Gender gap in scientific output:

- Women to men ratio of scientific authorship (for all and corresponding authors).
- Women to men ratio of scientific authorship in different types of collaboration (i.e. international, inter-European, national) for all authors.

- The ratio of scientific impact, as measured by Field-Weighted Citation Impact, of their respective publications.

Gender gap in patent output:
- Women to men ratio of inventorships.

Funding success rates:
- Funding success rate differences between women and men.

Sex or gender dimension in research content:
- Percentage of scientific publications that include a sex or gender dimension in their research content

The data used to calculate indicators in each section are extracted from different external data sources. Data which describe the indicators in gender gaps in scientific output and SGDRC are extracted from Scopus; patent data are extracted from the European Patent Office (EPO) Worldwide Patent Statistical Database (PATSTAT) while funding data are derived from the Women in Science (WiS) database. Each data source is further described in the corresponding section.

Gender gap in scientific output

Research funding organisations often rely on quantitative measures to evaluate individual and institutional excellence. The dimensions measured are usually the size and impact of scientific production, collaborations and seniority. Therefore, researchers tend to focus on the number and impact of publications they produce in order to secure or increase their funding (European Commission, 2009).

As seen in previous chapters, women researchers have different patterns from men in the factors that are essential for their successful grant competitions; women are less internationally mobile than men in more senior positions (Figure 5.4) and therefore they have fewer opportunities for international collaboration. In addition, women researchers are less likely to have higher positions (Figure 6.6 and Figure 6.8). Consequently, women are often caught in a vicious circle where fewer opportunities to improve their scientific performance result in less funding success and vice versa.

The monitoring of research outputs by gender is therefore essential and it can provide important insights (European Commission, 2012).

To compute the indicators for this section, information on the sex and country of authors must first be obtained. The sex is obtained using the name of authors, while the country is obtained using the affiliation address of authors as indicated in scientific publications. For the sex, researchers require access to the complete name of an author, including his or her full given name (not just the initials) and surname. For the country, researchers require access to a link associating each author of a paper with their corresponding affiliation address.

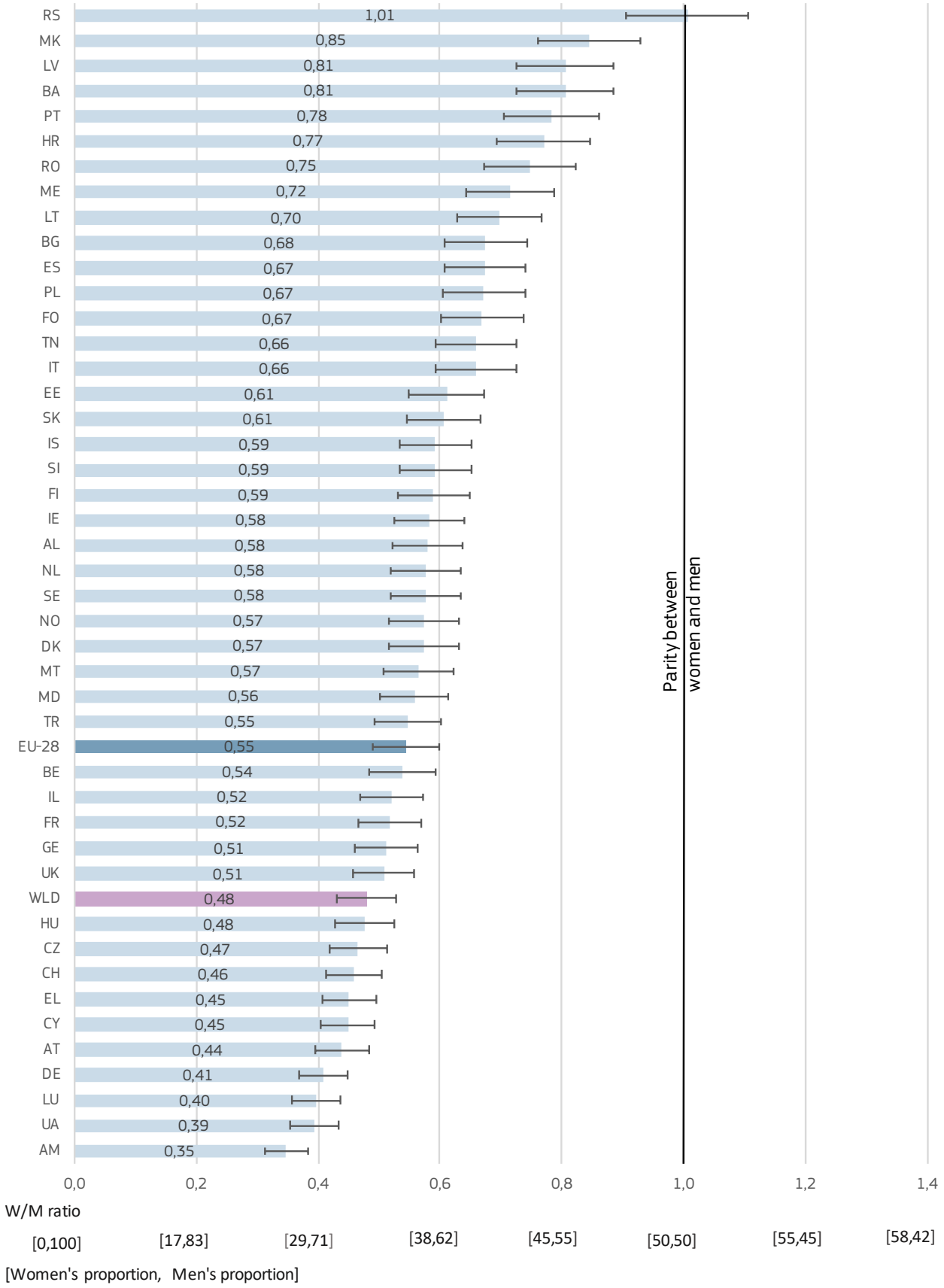
For the calculation of indicators based on the field of Research and Development (FORD) classification, it is important to note that publications are not classified in mutually exclusive fields, instead some will be classified in more than one field. For example, publication P may belong in both mathematics (FORD 1.1) and computer sciences (FORD 1.2). Although publication P will contribute both in the publication count of mathematics and in the publication count of computer sciences, this publication will not be counted twice in the aggregated count of 'all' or 'natural sciences' (FORD 1) publications.

An aggregate representing global values is given in the indicators of this chapter that are based on Scopus data.

Women to men ratio of authorship

This indicator is approached in two ways – by assessing all contributing authors (all authorships) on each publication and by assessing corresponding authors (corresponding authorships) only. When all authors are considered, the indicator represents the sum of the ratios of the total number of women authors in each authorship byline over the corresponding number of men, divided by the total number of publications produced. When corresponding authorship is taken into account, the indicator represents the ratio of the number of publications with a woman as corresponding author over the number of publications with a man as corresponding author. In both cases, a score above 1 means that women produce a larger share of the country's scientific publications than men, whereas a score below 1 indicates the opposite.

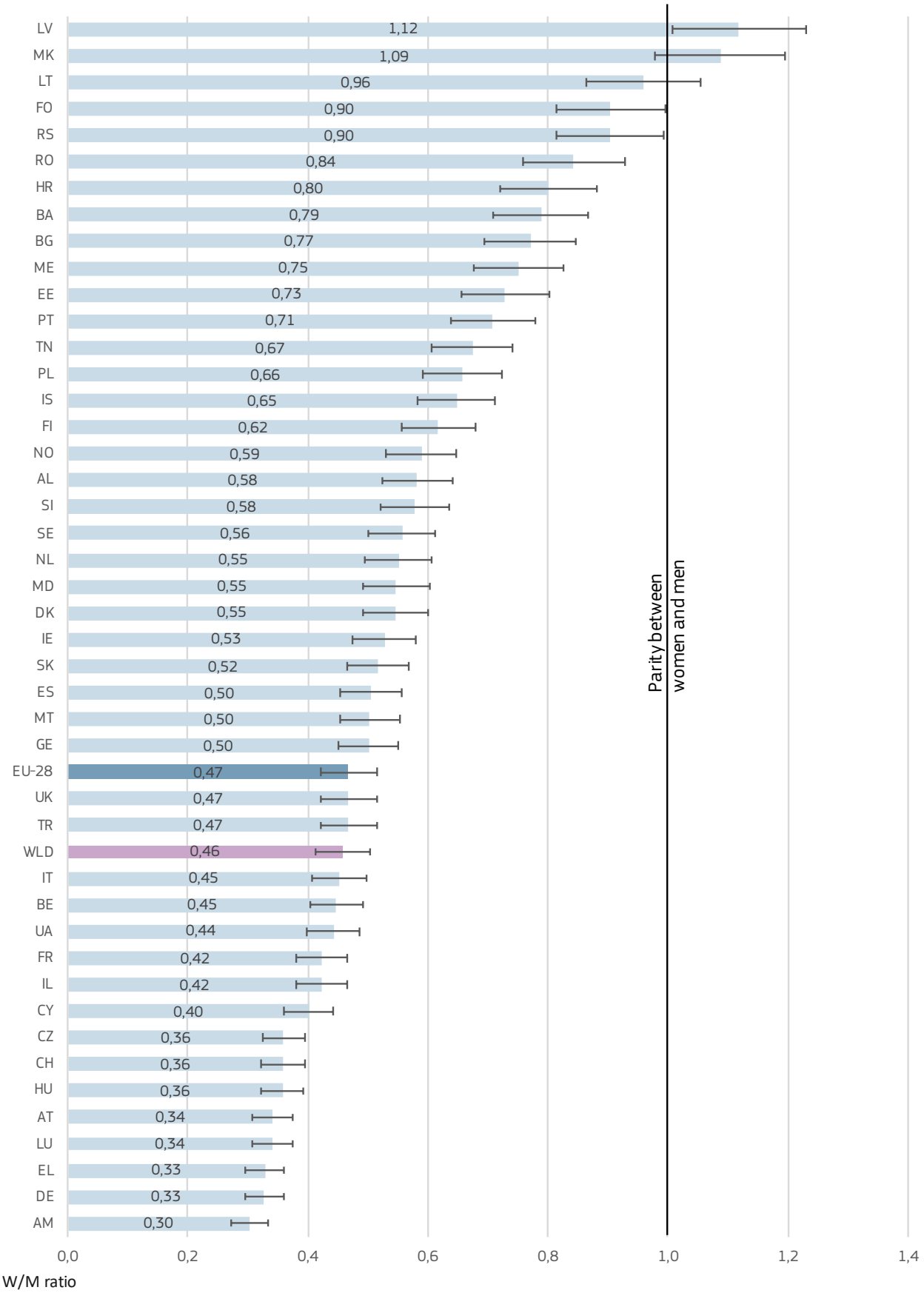
Figure 7.1 Women to men ratio of authorships in all fields of R&D, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; EU-28 and world values are highlighted in the chart. Error bars represent +/- 10 % of value and account for possible biases (unknown sex and/or wrong affiliations in Scopus publications).
The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Figure 7.2 Women to men ratio of corresponding authorships in all fields of R&D, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; EU-28 and world values are highlighted in the chart. Error bars represent +/- 10 % of value and account for possible biases (unknown sex and/or wrong affiliations in Scopus publications).
The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.1 Compound annual growth rate (%) of women to men ratio of authorships, by field of R&D, 2008-2017

Country	All fields		Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	3,0		2,5		3,2		3,1		3,3		4,3		3,6	
EU-28	2,9		2,4		3,1		3,1		3,4		4,1		1,2	
BE	3,7		2,9		2,6		3,8		4,5		5,3		5,0	
BG	2,4		2,1		0,6		3,1		0,7		2,3		14,9	
CZ	1,5		1,3		3,2		1,6		2,8		5,3		-1,1	
DK	3,2		2,6		3,6		2,9		2,4		5,3		5,3	
DE	3,8		3,3		4,2		3,8		4,4		4,8		2,3	
EE	2,4		2,8		3,6		2,4		4,0		4,8		5,1	
IE	4,1		3,0		2,2		3,8		5,4		2,8		2,2	
EL	3,4		3,2		3,4		3,7		5,7		4,5		2,9	
ES	1,9		1,4		1,5		2,3		1,8		3,1		-0,6	
FR	2,1		1,7		1,7		2,0		2,7		3,7		3,3	
HR	1,7		1,8		2,7		2,4		2,7		-0,6		-9,1	
IT	1,8		1,4		2,5		1,9		2,0		3,8		-2,2	
CY	7,3		6,6		6,9		6,3		6,6		8,7		8,9	
LV	3,0		3,1		4,5		1,7		3,5		1,4		12,0	
LT	4,8		5,1		5,0		3,2		6,0		6,1		7,1	
LU	3,3		3,0		3,5		4,5		-0,9		7,5		-6,6	
HU	2,3		1,6		1,3		2,8		1,8		5,6		11,1	
MT	5,8		5,0		3,9		4,5		17,6		9,7		8,9	
NL	4,7		4,1		4,8		4,1		5,6		4,8		3,7	
AT	3,9		3,3		5,6		4,0		3,4		5,5		2,5	
PL	2,4		3,2		4,0		2,2		3,8		5,3		3,6	
PT	2,5		1,7		2,7		1,7		2,3		4,8		1,1	
RO	0,5		-0,2		-0,5		1,7		-2,5		4,4		20,8	
SI	3,5		3,1		3,6		3,0		3,8		2,3		-3,0	
SK	1,9		2,0		2,9		2,8		2,6		5,2		-4,0	
FI	2,2		1,5		2,6		1,8		1,3		4,8		2,2	
SE	2,6		2,0		2,8		2,6		2,2		4,4		1,1	
UK	3,5		2,8		4,0		3,5		4,6		3,8		2,5	
IS	2,5		3,0		9,2		2,6		6,5		5,2		6,3	
NO	3,7		3,2		3,8		3,9		2,6		4,6		3,5	
CH	4,0		3,3		3,9		3,7		3,6		5,0		2,6	
ME	5,0		6,9		7,6		1,2		17,7		-0,9		-9,3	
MK	1,7		1,6		0,2		3,1		4,3		15,5		-	
AL	2,5		1,9		16,5		4,3		-4,0		-4,9		-6,7	
RS	2,0		2,0		2,5		2,0		2,5		2,3		-2,1	
TR	1,8		1,6		1,9		2,5		3,4		3,4		5,2	
BA	2,7		2,4		4,8		3,5		1,3		-0,5		-21,3	
AM	2,9		2,5		7,4		-0,8		-11,9		14,9		-	
FO	3,4		3,4		-		7,6		-5,4		-		-	
GE	5,5		4,4		0,1		1,9		-0,6		3,6		5,0	
IL	2,2		1,6		2,1		2,0		2,9		3,1		2,2	
MD	4,1		4,7		5,5		-2,7		7,1		-17,4		-	
TN	0,8		3,2		2,7		0,1		4,7		2,5		14,9	
UA	5,5		4,6		6,2		4,5		1,0		21,1		-9,3	

Notes: '-' indicates that the value at the beginning or end of the period was unavailable for CAGR calculations either because no value was available for publications authored by men or the value obtained for publications by men was zero; the height of the bars in the trend column indicates relative annual values for women to men ratio of authorships and scaling is not the same across countries. The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.2 Compound annual growth rate (%) of women to men ratio of corresponding authorships, by field of R&D, 2008-2017

Country	All fields		Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	3,2		3,1		2,1		3,0		2,6		3,7		2,4	
EU-28	3,9		3,2		3,7		3,3		2,7		4,2		2,6	
BE	4,4		2,9		1,6		4,6		3,9		6,3		4,0	
BG	1,0		1,7		-0,3		0,4		-2,9		6,5		7,8	
CZ	2,5		2,4		5,1		1,4		2,5		7,2		4,2	
DK	4,0		3,0		3,8		3,1		3,3		3,8		5,8	
DE	5,1		4,5		4,9		4,4		4,4		5,6		2,4	
EE	3,5		3,9		3,4		4,1		0,7		2,8		-1,5	
IE	4,5		3,5		4,1		2,4		3,5		3,5		3,1	
EL	3,2		3,1		2,7		2,6		4,3		2,9		3,7	
ES	2,8		1,9		1,8		2,7		1,0		3,1		1,8	
FR	2,8		2,7		1,9		2,0		2,4		2,9		1,7	
HR	2,5		1,0		2,4		1,2		0,0		4,4		1,1	
IT	4,2		3,7		5,2		3,7		3,2		5,2		1,8	
CY	7,2		7,1		1,4		2,1		-4,8		6,3		5,2	
LV	2,0		0,7		4,4		-2,4		12,4		11,1		29,2	
LT	0,5		2,0		-1,0		-0,9		-2,3		-3,2		4,7	
LU	4,7		2,9		2,2		3,9		-1,8		5,4		-3,0	
HU	2,3		1,9		0,3		1,9		-1,1		4,9		1,4	
MT	2,5		5,3		-0,1		1,8		11,9		3,9		-2,1	
NL	5,5		4,5		5,7		3,8		5,3		5,9		4,7	
AT	5,6		4,9		10,1		4,8		3,4		6,8		3,7	
PL	2,9		3,8		5,1		1,0		2,8		4,7		1,6	
PT	3,2		2,4		3,2		1,0		1,9		5,5		4,3	
RO	-0,6		-1,9		-0,2		-4,2		-8,0		3,9		15,7	
SI	4,0		2,8		2,1		1,7		2,7		2,8		4,2	
SK	2,2		2,4		3,7		1,9		-1,2		2,7		3,1	
FI	3,2		2,2		3,8		0,9		-1,8		4,6		2,7	
SE	2,9		2,1		3,2		2,0		0,5		3,7		2,1	
UK	3,1		3,1		2,2		2,3		3,6		3,5		3,2	
IS	2,4		3,4		1,8		-0,1		10,8		-0,2		-3,9	
NO	4,2		4,1		4,1		3,4		2,1		4,7		3,5	
CH	4,7		4,0		4,9		3,9		5,2		5,8		5,0	
ME	7,1		5,7		9,5		3,6		0,4		25,4		-	
MK	3,0		1,9		1,7		3,5		0,0		12,2		-	
AL	-1,9		-1,4		-9,3		-10,3		7,7		-1,1		-	
RS	1,3		1,3		1,0		0,6		0,5		0,7		6,2	
TR	3,5		3,1		3,0		4,0		3,7		2,5		2,9	
BA	-1,0		0,0		3,0		-1,2		-9,7		2,3		-13,6	
AM	3,4		3,9		7,7		-7,1		-7,4		6,4		-	
FO	1,6		4,9		-		1,5		-10,8		-		-	
GE	1,7		5,2		-8,3		-4,9		-15,8		-0,6		3,6	
IL	4,3		2,6		2,2		4,5		4,4		5,4		3,8	
MD	3,1		4,2		8,2		-2,3		4,0		-		-	
TN	4,2		6,6		5,3		3,1		4,0		1,3		15,8	
UA	5,8		4,4		4,7		6,6		10,5		9,6		12,2	

Notes: '-' indicates that the value at the beginning or end of the period was unavailable for CAGR calculations either because no value was available for publications authored by men or the value obtained for publications by men was zero; the height of the bars in the trend column indicates relative annual values for women to men ratio of authorships and scaling is not the same across countries. The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

While women are under-represented as authors in research publications, they are slowly closing the gap over time.

Figure 7.1 shows that the yearly average ratio of women to men as contributing authors in EU-28 publications was 0.55 during the 2013-2017 period. Therefore, on average, approximately one out of every three authors in the byline of a publication is a woman. This is consistent with our observations of the proportion of women among researchers (Figure 4.1). The average ratio of women to men as contributing authors in publications increased from 2008-2017 at a compound annual growth rate of 2.9 % (Table 7.1).

Figure 7.2 shows that the ratio of women to men as corresponding authors in the EU-28 is 0.47 on average during the 2013-2017 period. Worldwide, this ratio is 0.46 during the same period. This indicates that approximately three out of ten corresponding authors of a publication are women. The EU-28 yearly average ratio for 2013-2017 increased from a yearly average ratio of 0.38 during the period 2008-2012. The compound annual growth rate for this metric over ten years (2008-2017) is 3.9 % (Table 7.2).

Looking at the data disaggregated by country, all countries show a growing trend in the ratio of female to male authorship when assessing all contributing authors. Based on all contributing authors, no country reached parity between female and male authorship during the period analysed with the exception of RS. Among the countries analysed, women represent a higher proportion of the contributing authors across several Eastern and Southern Europe countries. A slightly different picture emerges when looking at corresponding authors. All countries show a growing trend in the ratio of women to men among corresponding authors with the exception of Romania and Bosnia and Herzegovina.

Table 7.1 and Table 7.2 show that both for the ratio of women to men as contributing authors and the ratio of women to men as corresponding author, the greatest growth over the last ten years occurred in the field of social science. This trend is seen both at the aggregate level globally, at the EU-28, and at several of the countries analysed. The lowest growth rate in the ratio of women to men as authors is observed for the humanities and the arts in the EU-28 while globally the lowest growth rate for this metric is seen for the natural sciences. The lowest growth rate in the ratio of women to men as corresponding authors is observed for the humanities and the arts (with agricultural sciences following closely behind) in the EU-28, while globally the lowest growth rate for this metric is seen for engineering and technology.

Women and men's contribution to research differs by research field.

Disaggregating the data according to the six fields of R&D, reveals differences in the ratio of women to men leading or contributing to publications. As shown in Table 7.3, in the EU-28 during the period 2013-2017, the average ratio of women to men as contributing authors of articles was highest in the fields of medical sciences and agricultural sciences. The lowest ratio was observed in the humanities and the arts, and engineering and technology. Among the six fields of R&D, a ratio close to or above parity is observed only in the fields of medical sciences and agricultural sciences with several countries reaching or even exceeding parity.

Data based on corresponding authors (Table 7.4) reveal slightly different trends from the data based on all contributing authors. When simply looking at corresponding authors, the highest ratio of women to men in the EU-28 is observed for the agricultural sciences, the social sciences, and the humanities and arts, respectively. Engineering and technology have the lowest ratio of women to men among corresponding authors.

Table 7.3 Women to men ratio of all authorships, by field of R&D, 2008-2012 and 2013-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17
WLD	0,4	0,4	0,2	0,3	0,6	0,7	0,6	0,7	0,4	0,5	0,2	0,3
EU-28	0,4	0,5	0,3	0,4	0,7	0,8	0,7	0,8	0,4	0,5	0,3	0,3
BE	0,4	0,5	0,3	0,3	0,6	0,7	0,6	0,8	0,5	0,6	0,3	0,4
BG	0,6	0,6	0,6	0,6	0,9	1,0	0,7	0,8	0,6	0,6	0,4	0,5
CZ	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,4	0,5	0,2	0,3
DK	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,8	0,4	0,5	0,3	0,4
DE	0,3	0,4	0,2	0,3	0,5	0,6	0,6	0,7	0,4	0,5	0,3	0,3
EE	0,5	0,6	0,3	0,4	1,0	1,1	0,7	0,9	0,5	0,6	0,4	0,5
IE	0,4	0,5	0,3	0,3	0,7	0,9	0,6	0,8	0,5	0,6	0,4	0,4
EL	0,3	0,4	0,3	0,3	0,6	0,7	0,5	0,7	0,3	0,4	0,3	0,5
ES	0,6	0,6	0,5	0,5	0,9	1,0	0,9	1,0	0,6	0,6	0,4	0,4
FR	0,4	0,5	0,3	0,4	0,7	0,8	0,7	0,8	0,4	0,5	0,3	0,4
HR	0,6	0,7	0,4	0,5	1,1	1,2	1,0	1,1	0,8	0,8	0,8	0,5
IT	0,6	0,6	0,4	0,5	0,9	0,9	0,9	1,0	0,5	0,6	0,4	0,4
CY	0,3	0,4	0,2	0,3	0,6	0,8	0,5	0,6	0,4	0,5	0,3	0,7
LV	0,6	0,8	0,5	0,6	1,3	1,3	0,7	1,0	0,7	0,8	0,5	0,7
LT	0,5	0,6	0,4	0,5	1,0	1,2	0,9	1,2	0,5	0,7	0,3	0,5
LU	0,3	0,4	0,2	0,3	0,6	0,7	0,6	0,7	0,3	0,4	0,4	0,4
HU	0,4	0,4	0,3	0,3	0,7	0,8	0,6	0,7	0,4	0,5	0,2	0,3
MT	0,3	0,5	0,2	0,3	0,6	0,8	0,3	0,6	0,4	0,6	0,2	0,7
NL	0,4	0,5	0,2	0,3	0,7	0,8	0,5	0,7	0,5	0,6	0,4	0,5
AT	0,3	0,4	0,2	0,3	0,5	0,6	0,6	0,7	0,4	0,5	0,3	0,4
PL	0,5	0,6	0,4	0,4	1,0	1,2	0,9	1,1	0,5	0,6	0,2	0,3
PT	0,6	0,7	0,5	0,6	1,1	1,2	1,1	1,2	0,6	0,8	0,5	0,6
RO	0,7	0,8	0,6	0,7	1,3	1,3	1,1	1,1	0,7	0,8	0,2	0,3
SI	0,5	0,6	0,4	0,5	0,8	0,9	0,9	1,0	0,5	0,5	0,3	0,3
SK	0,5	0,6	0,4	0,5	0,9	1,1	0,8	0,9	0,5	0,6	0,2	0,3
FI	0,5	0,5	0,3	0,3	0,9	1,0	0,8	0,9	0,5	0,7	0,4	0,5
SE	0,4	0,5	0,3	0,3	0,8	0,9	0,7	0,8	0,5	0,6	0,4	0,5
UK	0,4	0,4	0,2	0,3	0,6	0,7	0,6	0,7	0,4	0,5	0,3	0,3
IS	0,4	0,5	0,2	0,3	0,8	0,9	0,5	0,8	0,5	0,7	0,4	0,6
NO	0,4	0,5	0,3	0,3	0,7	0,9	0,6	0,7	0,4	0,5	0,3	0,4
CH	0,3	0,4	0,2	0,3	0,5	0,6	0,6	0,7	0,4	0,6	0,3	0,4
ME	0,5	0,6	0,4	0,6	1,1	1,0	0,5	1,0	0,7	0,6	0,3	0,5
MK	0,6	0,7	0,6	0,6	1,1	1,3	0,9	1,1	0,5	0,7	0,2	0,4
AL	0,5	0,6	0,3	0,4	0,7	0,9	0,6	0,7	0,6	0,5	0,6	0,4
RS	0,8	0,9	0,7	0,8	1,3	1,5	1,3	1,6	0,7	0,8	0,5	0,5
TR	0,4	0,5	0,3	0,4	0,7	0,8	0,5	0,6	0,4	0,5	0,2	0,3
BA	0,5	0,6	0,4	0,5	1,0	1,2	1,0	1,0	0,6	0,7	0,8	0,5
AM	0,3	0,3	0,3	0,3	0,8	0,8	0,9	0,7	0,4	0,5	0,1	0,4
FO	0,4	0,6	0,2	0,2	0,5	1,0	0,5	0,6	0,3	0,8	0,3	0,4
GE	0,3	0,4	0,4	0,4	0,9	1,0	0,9	0,9	0,6	0,8	0,4	0,5
IL	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,5	0,6	0,3	0,4
MD	0,4	0,5	0,4	0,4	1,0	1,0	0,8	0,9	0,9	0,6	0,1	0,2
TN	0,5	0,6	0,4	0,5	1,1	1,1	0,7	0,9	0,4	0,5	0,6	0,8
UA	0,3	0,4	0,3	0,3	0,7	0,8	0,6	0,6	0,3	0,5	0,4	0,2

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men; The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

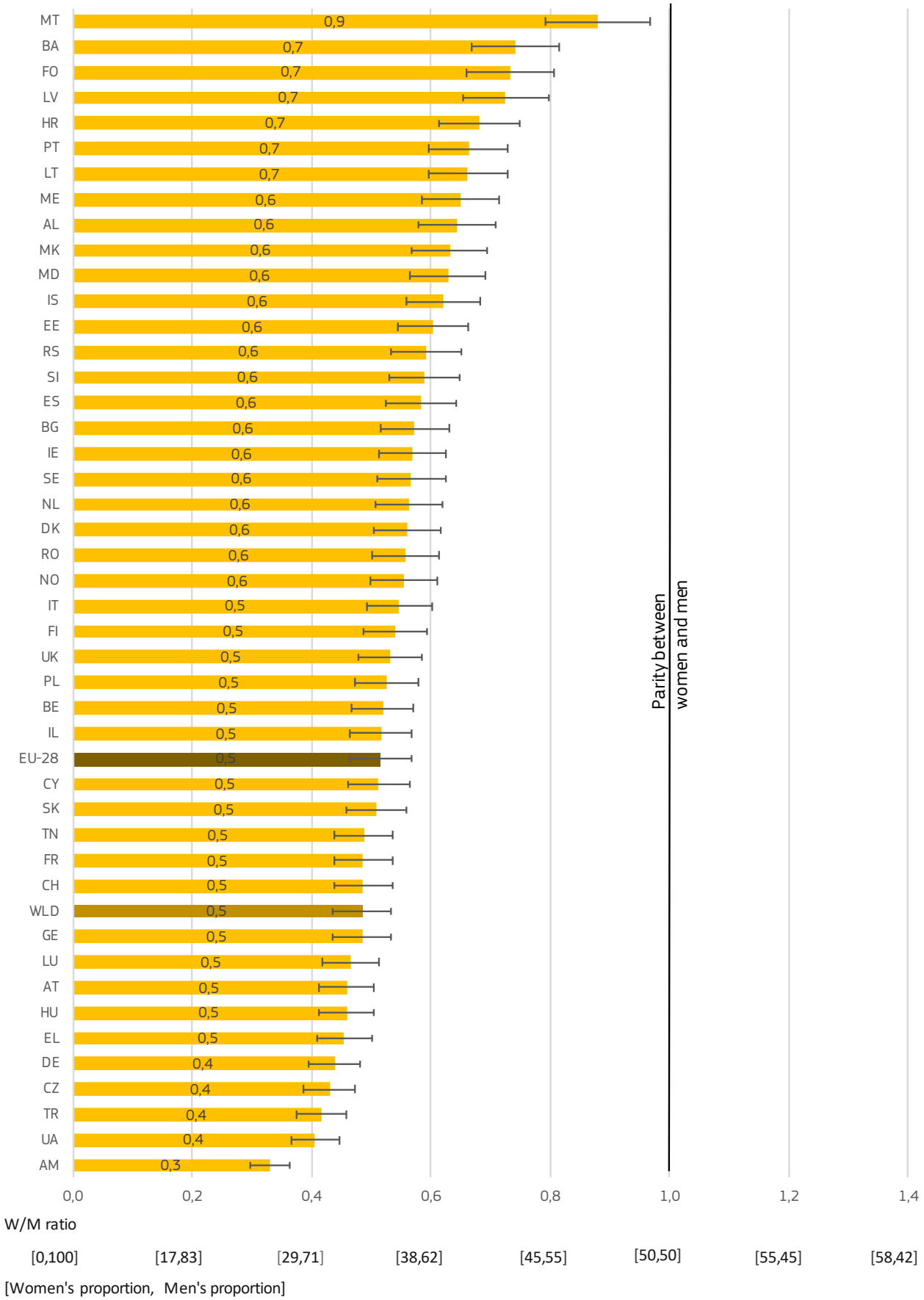
Table 7.4 Women to men ratio of corresponding authorships, by field of R&D, 2008-2012 and 2013-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17
WLD	0,3	0,4	0,3	0,3	0,5	0,6	0,5	0,6	0,6	0,7	0,6	0,7
EU-28	0,3	0,4	0,2	0,3	0,5	0,6	0,6	0,7	0,6	0,7	0,6	0,7
BE	0,3	0,4	0,3	0,3	0,4	0,5	0,5	0,6	0,5	0,7	0,5	0,6
BG	0,7	0,7	0,7	0,7	1,2	1,1	0,9	0,9	1,0	0,8	0,8	0,9
CZ	0,3	0,3	0,2	0,3	0,5	0,5	0,5	0,5	0,4	0,5	0,4	0,5
DK	0,3	0,4	0,2	0,3	0,6	0,7	0,6	0,7	0,5	0,6	0,4	0,6
DE	0,2	0,3	0,2	0,2	0,3	0,4	0,5	0,5	0,4	0,5	0,4	0,5
EE	0,5	0,6	0,3	0,4	1,0	1,0	0,8	0,9	1,2	1,2	1,2	1,3
IE	0,3	0,4	0,2	0,3	0,6	0,7	0,6	0,6	0,7	0,8	0,7	0,7
EL	0,3	0,3	0,2	0,2	0,4	0,4	0,4	0,4	0,4	0,4	0,7	0,7
ES	0,4	0,4	0,3	0,4	0,5	0,6	0,7	0,7	0,6	0,7	0,6	0,7
FR	0,3	0,4	0,3	0,3	0,5	0,5	0,6	0,6	0,5	0,6	0,6	0,6
HR	0,5	0,7	0,4	0,5	0,9	1,0	0,9	1,0	1,0	1,2	0,8	0,8
IT	0,4	0,4	0,3	0,4	0,4	0,5	0,6	0,7	0,5	0,6	0,5	0,6
CY	0,2	0,3	0,2	0,2	0,4	0,5	0,5	0,4	0,5	0,6	0,7	1,0
LV	1,0	1,0	1,1	1,1	1,1	1,0	3,3	1,9	3,6	2,3	2,0	4,2
LT	0,6	0,8	0,6	0,7	1,4	1,2	1,9	1,4	1,8	1,6	1,3	1,3
LU	0,2	0,3	0,2	0,2	0,3	0,5	0,4	0,5	0,4	0,4	0,6	0,6
HU	0,3	0,3	0,2	0,2	0,4	0,5	0,5	0,5	0,4	0,6	0,5	0,6
MT	0,3	0,4	0,3	0,3	0,6	0,7	0,4	0,6	0,4	0,6	0,3	0,5
NL	0,3	0,4	0,2	0,3	0,6	0,7	0,5	0,6	0,6	0,8	0,5	0,7
AT	0,2	0,3	0,1	0,2	0,3	0,4	0,5	0,6	0,4	0,5	0,5	0,6
PL	0,5	0,6	0,4	0,5	1,0	1,0	1,0	1,1	0,7	0,9	0,8	0,9
PT	0,5	0,6	0,4	0,5	0,9	0,9	1,0	1,1	0,7	0,9	0,8	0,9
RO	0,8	0,8	0,7	0,8	1,6	1,1	2,1	1,1	1,0	1,3	0,7	1,2
SI	0,4	0,5	0,3	0,4	0,7	0,7	0,8	0,8	0,8	0,9	0,8	1,0
SK	0,4	0,4	0,3	0,4	0,7	0,8	0,7	0,6	0,6	0,7	0,5	0,7
FI	0,4	0,5	0,3	0,4	0,9	0,9	0,8	0,8	0,7	0,9	0,8	1,0
SE	0,4	0,4	0,3	0,3	0,7	0,8	0,7	0,7	0,6	0,8	0,6	0,7
UK	0,3	0,3	0,2	0,2	0,5	0,6	0,5	0,6	0,6	0,7	0,6	0,7
IS	0,3	0,5	0,2	0,3	0,6	0,9	0,5	0,7	0,8	1,1	0,6	0,8
NO	0,3	0,4	0,2	0,3	0,7	0,9	0,6	0,7	0,5	0,7	0,6	0,7
CH	0,2	0,3	0,2	0,2	0,4	0,4	0,5	0,6	0,4	0,6	0,5	0,6
ME	0,5	0,6	0,5	0,7	0,9	0,8	0,5	0,7	1,1	1,5	0,3	3,1
MK	0,8	0,9	0,7	0,9	1,1	1,5	1,2	1,4	1,3	1,8	0,7	1,6
AL	0,6	0,5	0,4	0,4	0,7	0,5	0,9	0,8	0,9	1,2	0,3	1,2
RS	0,7	0,9	0,6	0,8	1,1	1,1	1,4	1,3	0,8	0,9	0,8	0,9
TR	0,3	0,4	0,3	0,3	0,5	0,6	0,4	0,5	0,6	0,6	0,6	0,7
BA	0,5	0,6	0,4	0,5	1,0	1,0	0,9	0,9	0,7	0,7	0,6	0,6
AM	0,2	0,2	0,2	0,3	0,7	0,6	0,3	0,5	0,5	0,4	0,2	0,7
FO	0,5	0,8	0,4	0,4	0,5	1,4	0,7	0,9	0,2	1,4	0,0	0,3
GE	0,3	0,4	0,5	0,4	1,0	0,7	1,1	0,8	0,5	0,9	0,4	1,2
IL	0,3	0,3	0,2	0,2	0,4	0,5	0,4	0,4	0,7	0,9	0,7	0,7
MD	0,4	0,5	0,3	0,5	0,6	0,7	1,0	1,9	0,5	2,1	0,7	0,7
TN	0,5	0,6	0,4	0,5	0,9	0,9	0,6	0,8	0,6	0,6	1,0	1,0
UA	0,3	0,4	0,3	0,3	0,5	0,7	0,4	0,7	0,5	1,5	0,6	0,9

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men; The percentage of authors to which a gender could be assigned varies. For the EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

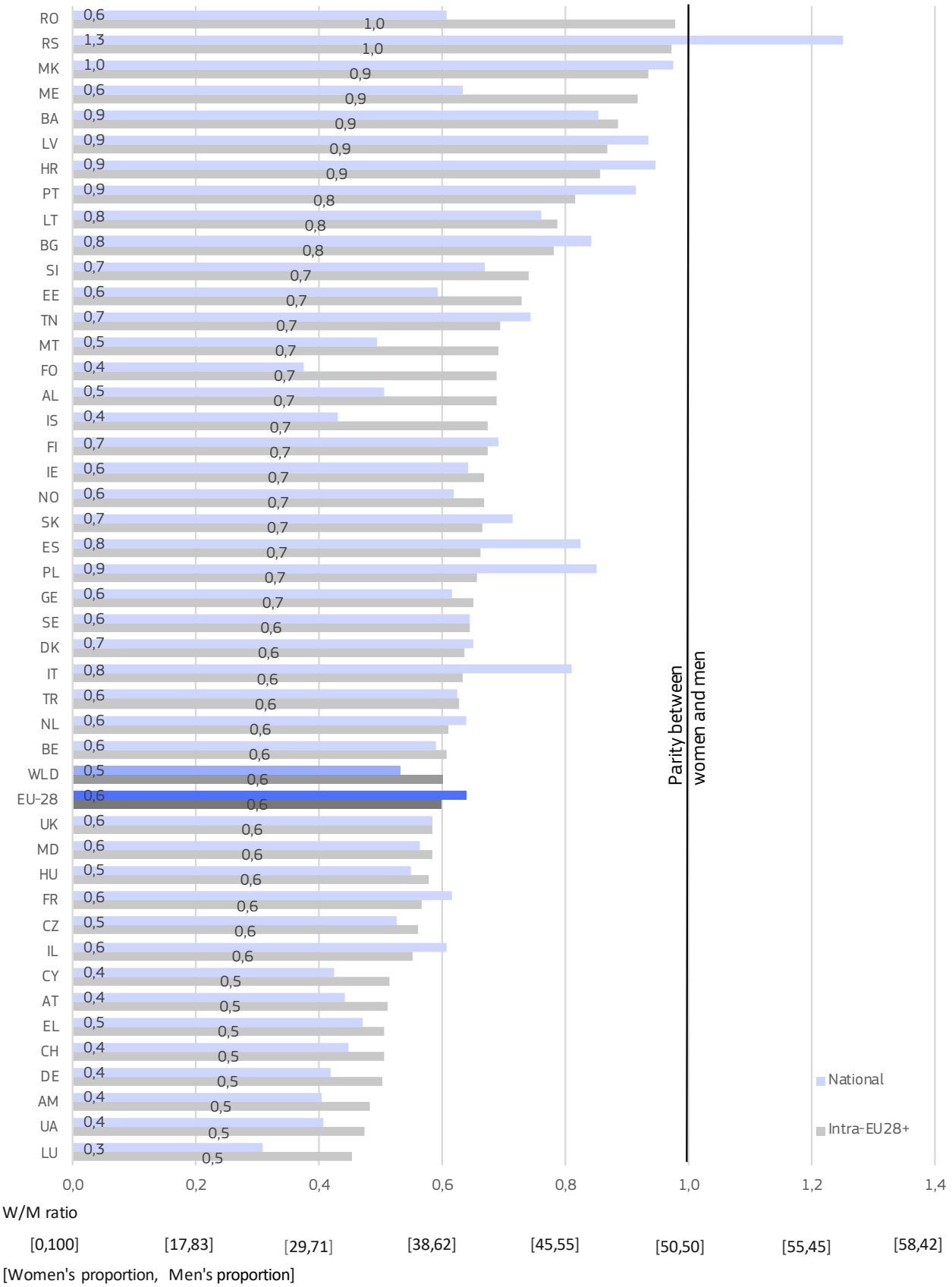
Figure 7.3 Women to men ratio of authorships in all fields of R&D, international collaboration, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; Countries are listed in descending order; Error bars represent +/- 10 % of value; '-' indicates that the value obtained for publications by men was zero; The percentage of authors to which a gender could be assigned varies; For EU-28 the percentage is above 85 %; with the lowest value of 48 % in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

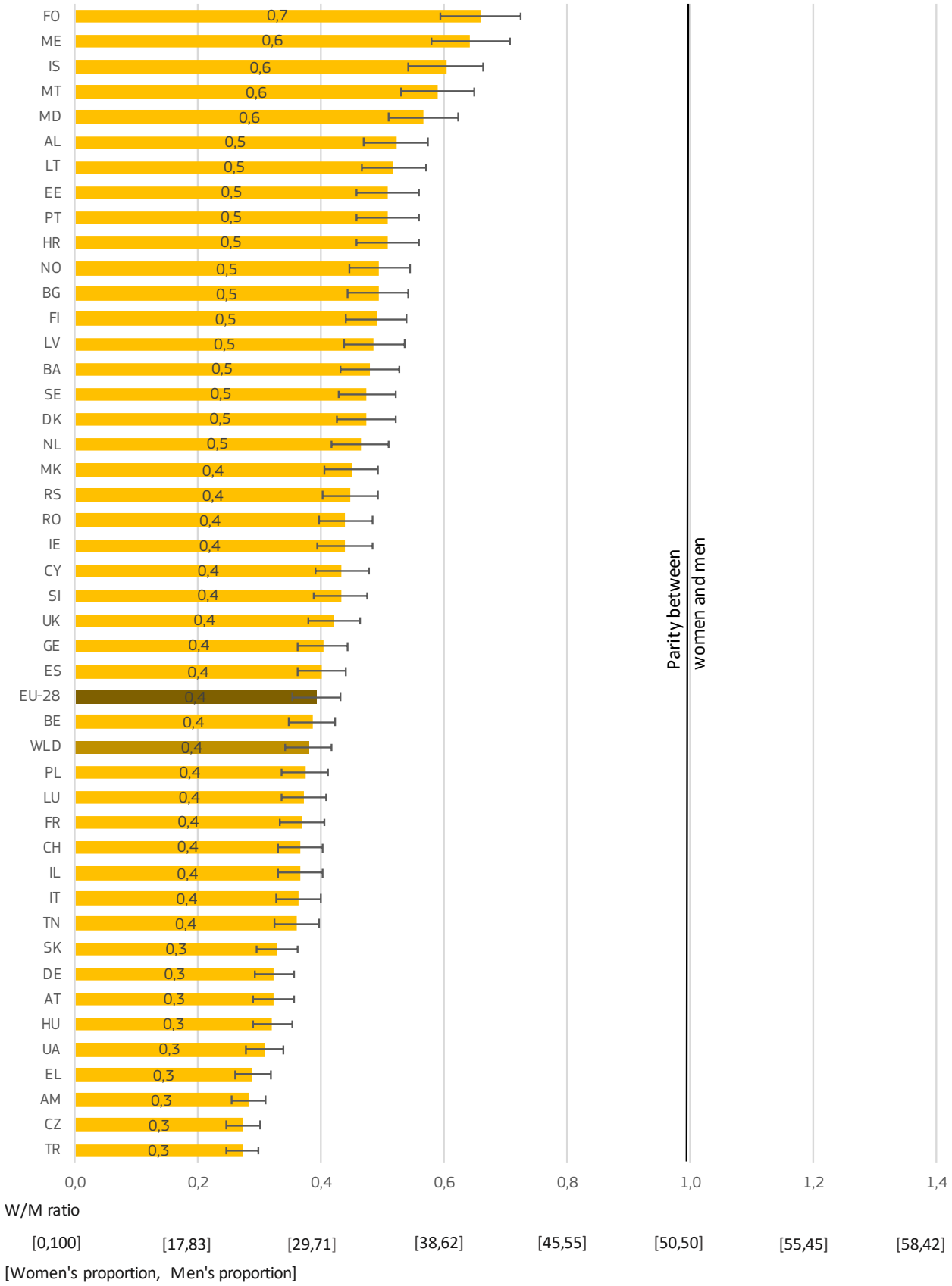
Figure 7.4 Women to men ratio of authorships in all fields of R&D, for national and intra-EU28+ collaboration, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; Countries are listed in descending order based on ratio of women to men in intra-EU28+ collaboration; Error bars removed to increase visibility; '-' indicates that the value obtained for publications by men was zero; The percentage of authors to which a gender could be assigned varies; For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

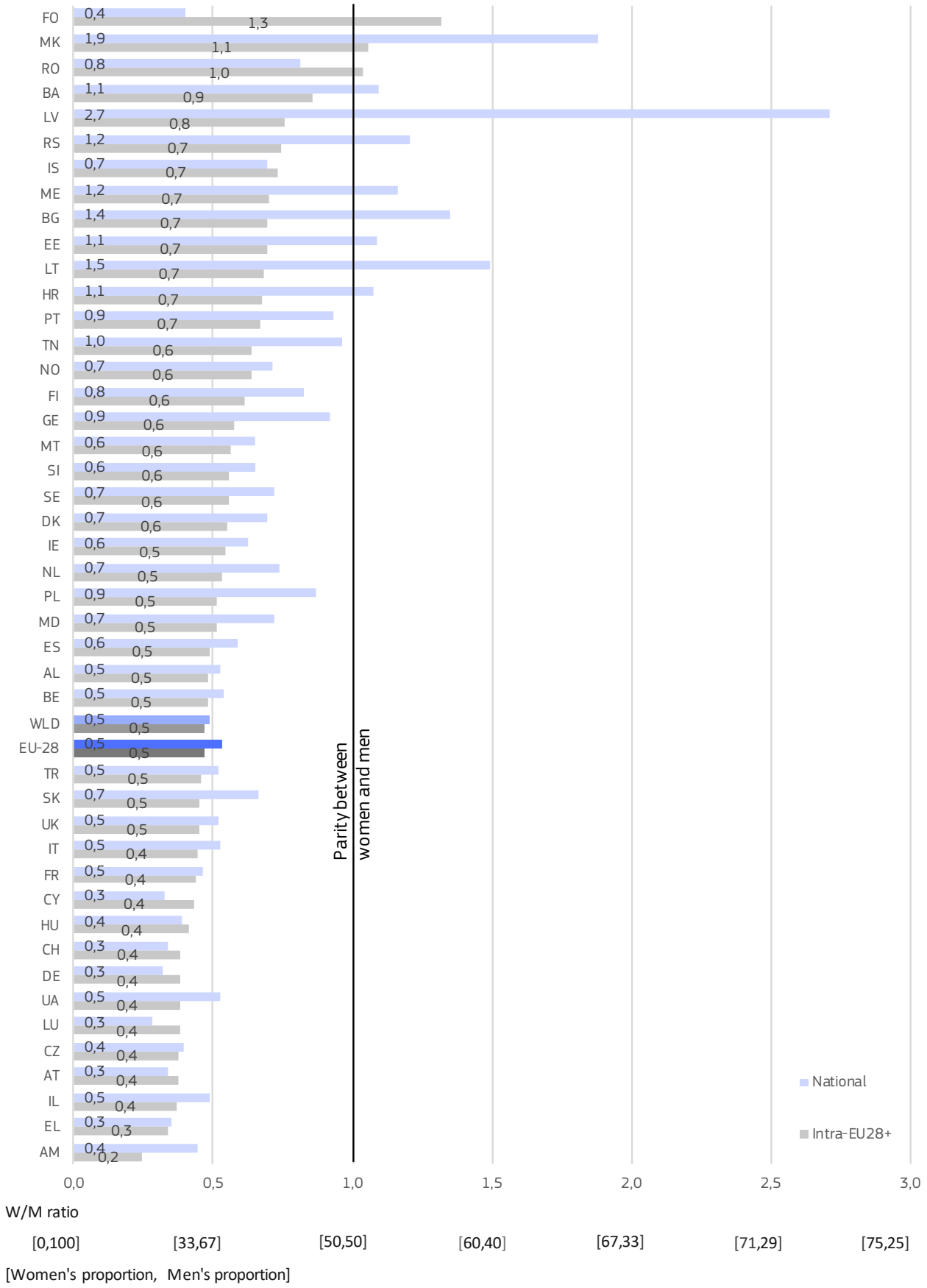
Figure 7.5 Women to men ratio of corresponding authorships in all fields of R&D, international collaboration, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; Countries are listed in descending order; Error bars represent +/- 10 % of value; '-' indicates that the value obtained for publications by men was zero; The percentage of authors to which a gender could be assigned varies; For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Figure 7.6 Women to men ratio of corresponding authorships in all fields of R&D, national and intra-EU28+ collaboration, 2013-2017



Notes: Values represent the average yearly ratio for the period 2013-2017; Countries are listed in order of highest to lowest ratio based on ratio of women to men intra-EU28+ co-publication; Error bars removed for visibility reasons; The percentage of authors to which a gender could be assigned varies. For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Women's contribution to national and intra-EU collaborated research is greater than women's contribution to international research.

Publications can be classified into different types based on the type of collaborations from which they result. In this study, various types of research collaborations are defined based on the affiliation of the contributing and corresponding authors. National collaborations (intra-country) are defined as publications for which all the affiliations listed are from the same country. Intra-EU-28 collaborations are defined as publications for which all the affiliations listed are within the EU-28. Intra-EU-28+ collaborations are defined as publications for which all the affiliations listed are countries within the ERA. Multi-authored research outputs, where at least one author is from an institution inside the country of interest and at least one author is from an institution outside the EU (for EU countries) or outside the country of interest (for Associated countries).

Figures 7.3 to 7.6 show women and men's contributions to each of the above collaboration types. In general, within the ERA participating countries, when assessing all contributing authors, women contribute more to national collaborations than to international collaborations. Similarly, when assessing corresponding authors only, women contribute more to national collaborations and less to international collaborations, with their contributions to intra-EU-28 and intra-EU-28+ collaborations falling in between. In some countries, parity between women and men was reached for corresponding authors conducting national collaborations (assessed as countries for which the error bar crossed the point of parity; EE, HR, PT, BA, GE, TN. Note that error bars are not shown in the figure to facilitate ease of reading). In a few countries, women's contribution based on corresponding authorship surpassed men's contribution in nationally collaborated research (assessed as countries for which the error bar was above the point of parity; BG, LV, LT, ME, MK, RS). Readers should note that error bars are not shown in the Figure, to facilitate ease of reading.

At the EU level, women to men ratio in international collaboration is increasing across all fields of R&D.

Tables 7.5 and 7.6 display the annual growth rate for the women to men ratio of all (Table 7.5) or corresponding (Table 7.6) authorships in international co-publications by fields of R&D. The 'trend' column indicates the absolute annual values to give more insights into changes in the indicator over the period, as the CAGR mathematically only shows the change between the first and the last year. The height of the bars is not scaled across the whole table but only delineates trends for the regions or country. Positive growth is seen both in the EU-28 and globally across all fields of R&D. The growth rate for the EU-28 is equal or higher than the level of growth observed globally, in all fields of R&D, with the only exception being humanities and arts for corresponding authorship.

When assessing all contributing authors, the highest growth in representation of women is observed in the fields of agricultural sciences (with a CAGR for 2008-2017 of 3.7 %) for the EU-28 followed by social sciences (with a CAGR for 2008-2017 of 3.3 %) (Table 7.5). When assessing only corresponding authors, the highest growth in representation is observed in the field of social sciences (the CAGR for 2008-2017 was 4.6 % for the EU-28), followed by engineering and technology (the CAGR for 2008-2017 was 3.5 % for the EU-28) (Table 7.6).

Table 7.5 CAGR (%) of women to men ratio of all authorships in international collaborations, by field of R&D, 2008-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	2,3		3,1		2,3		3,4		3,0		1,3	
EU-28	2,4		3,1		2,5		3,7		3,3		1,6	
BE	2,2		1,7		2,6		4,3		4,1		5,4	
BG	0,8		0,9		-0,5		-2,3		7,2		14,2	
CZ	1,9		1,5		0,9		2,4		2,7		1,0	
DK	2,9		3,3		3,8		3,0		4,4		5,9	
DE	3,1		3,7		3,1		3,7		3,8		3,3	
EE	2,3		-2,2		1,8		9,8		7,1		-3,9	
IE	2,9		0,4		2,8		3,7		0,6		1,6	
EL	3,1		3,1		4,1		4,1		3,8		4,1	
ES	2,4		2,5		1,5		3,5		2,8		2,3	
FR	1,8		2,0		1,4		2,8		4,2		2,8	
HR	2,7		6,2		1,9		0,8		0,1		3,9	
IT	2,1		2,9		1,4		2,9		4,0		-0,8	
CY	8,4		7,1		7,8		-0,7		12,4		14,9	
LV	2,3		4,3		-3,1		-0,3		-4,9		10,6	
LT	2,6		6,4		2,1		0,0		1,0		8,9	
LU	1,8		7,1		3,9		-6,0		2,8		-	
HU	1,8		5,1		1,6		2,8		4,8		9,0	
MT	16,3		15,3		4,3		34,3		4,9		-	
NL	3,6		4,4		3,0		5,7		3,6		0,3	
AT	3,4		4,8		3,2		4,1		3,0		3,4	
PL	2,1		2,7		1,6		2,5		3,1		2,2	
PT	2,0		1,8		1,5		5,2		3,1		1,5	
RO	1,2		6,3		0,4		-2,7		8,0		-	
SI	4,0		3,2		2,1		4,2		4,1		14,1	
SK	3,2		5,2		5,1		6,5		2,3		-8,9	
FI	1,8		2,5		2,1		0,7		5,3		1,3	
SE	2,0		2,2		3,1		3,0		4,4		1,5	
UK	2,6		4,0		2,6		4,3		2,8		2,0	
IS	3,2		9,8		1,7		6,7		5,6		6,1	
NO	2,9		4,6		3,2		2,5		2,6		1,0	
CH	3,0		3,3		3,2		3,4		4,0		1,6	
ME	8,3		11,1		0,6		19,1		-4,3		-	
MK	0,1		-5,0		3,0		3,5		13,1		-	
AL	0,8		14,2		1,4		-4,2		-2,6		-4,1	
RS	2,2		2,7		2,4		4,3		4,2		9,3	
TR	1,3		1,2		1,1		3,8		2,7		3,6	
BA	1,8		2,7		2,0		1,5		-4,7		-11,2	
AM	2,8		7,2		-1,7		-10,6		21,0		-	
FO	2,8		-		7,6		-6,4		-		-	
GE	4,6		-2,7		2,6		-0,7		2,0		1,1	
IL	1,7		2,4		1,7		4,3		3,2		3,5	
MD	3,2		2,5		-4,9		2,7		-15,4		-	
TN	2,6		2,4		0,0		4,7		1,2		-1,2	
UA	3,1		3,9		2,2		0,8		14,5		-5,6	

Notes: '–' indicates that the value at the beginning of the period was zero or missing and CAGR could not be calculated.
Other: Values of CAGR represent the average yearly change of the women to men ratio for the period 2008-2017 while bars in the ‚trend' column shows the annual values of women to men ratio; the scale in the ‚trend' column is not the same across countries and fields of R&D.

Source: Computed by Elsevier using Scopus data.

Table 7.6 CAGR (%) of women to men ratio of corresponding authorships in international collaborations, by field of R&D, 2008-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	2,7		2,4		2,9		2,9		4,0		3,8	
EU-28	3,3		3,5		2,9		3,1		4,6		3,1	
BE	2,1		0,8		3,6		2,9		5,7		13,4	
BG	3,2		5,4		2,7		-8,7		10,1		-	
CZ	3,1		2,4		1,7		6,2		8,7		-0,2	
DK	3,2		4,6		1,6		2,3		4,5		3,3	
DE	4,0		3,9		3,9		2,7		5,7		5,6	
EE	10,0		3,5		7,8		27,8		16,5		-10,3	
IE	5,2		6,7		2,9		2,9		2,9		3,7	
EL	4,8		5,9		3,3		3,0		6,5		5,1	
ES	3,2		2,9		1,2		2,6		3,2		3,6	
FR	3,5		2,6		2,1		3,9		5,3		3,6	
HR	2,9		10,5		0,8		-1,9		1,6		0,4	
IT	4,1		6,0		2,1		4,5		6,1		-2,4	
CY	10,4		-0,3		4,3		-10,8		14,8		-	
LV	5,0		9,2		-8,1		-		-5,4		-	
LT	5,0		9,1		0,3		8,7		1,0		26,0	
LU	-1,5		5,1		-0,1		-10,3		3,5		-	
HU	3,9		6,4		2,4		0,7		10,4		-	
MT	-		-		6,8		-		-		-	
NL	4,0		5,5		2,7		4,6		5,0		1,3	
AT	3,8		9,5		3,5		3,0		4,2		3,4	
PL	3,8		4,4		1,9		3,2		5,1		4,1	
PT	3,1		1,8		0,5		3,2		5,6		12,4	
RO	4,1		7,5		4,0		-		-		-	
SI	3,8		4,4		3,2		-4,3		4,1		17,5	
SK	4,5		2,7		4,7		1,9		3,0		-15,4	
FI	3,4		5,6		1,0		1,8		4,9		-1,2	
SE	2,4		2,5		2,0		0,6		6,4		2,0	
UK	3,5		2,9		2,4		4,4		3,5		3,1	
IS	3,3		3,1		-1,1		11,0		4,6		-5,3	
NO	3,8		5,1		2,3		2,4		2,9		1,1	
CH	3,5		3,9		3,7		4,7		6,0		4,1	
ME	6,9		17,7		3,7		-0,2		-		-	
MK	2,8		8,8		5,2		8,6		2,5		-	
AL	-2,2		-13,0		-17,1		10,7		10,9		-	
RS	1,0		0,2		3,1		2,2		4,3		-	
TR	1,7		0,9		0,9		4,2		1,8		2,2	
BA	-1,2		3,1		-0,4		-11,6		3,2		8,0	
AM	2,5		6,5		-6,7		-		-		-	
FO	3,7		-		1,5		-10,8		-		-	
GE	5,8		-4,7		0,9		-17,2		7,7		10,7	
IL	2,5		3,4		2,9		3,3		5,3		4,0	
MD	2,1		0,7		-13,5		-6,7		-		-	
TN	5,9		3,7		4,3		1,4		0,5		-	
UA	3,2		2,3		2,3		6,4		7,1		11,1	

Notes: '-' indicates that the value at the beginning of the period was zero or missing and CAGR could not be calculated.
Other: Values of CAGR represent the average yearly change of the women to men ratio for the period 2008-2017 while bars the ‚trend' column shows the annual values of women to men ratio; the scale in the ‚trend' column is not the same across countries and fields of R&D.

Source: Computed by Elsevier using Scopus data.

Table 7.7 Women to men ratio of authorships in international collaborations, by field of R&D, 2008-2012 and 2013-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17
WLD	0,4	0,4	0,3	0,3	0,6	0,7	0,5	0,6	0,5	0,6	0,6	0,6
EU-28	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,5	0,6	0,6	0,6
BE	0,4	0,5	0,3	0,3	0,6	0,7	0,5	0,7	0,5	0,6	0,6	0,7
BG	0,5	0,5	0,5	0,5	0,8	0,9	0,8	0,7	0,7	0,9	0,8	0,9
CZ	0,3	0,4	0,3	0,3	0,6	0,7	0,5	0,6	0,5	0,6	0,5	0,5
DK	0,4	0,5	0,3	0,3	0,6	0,8	0,5	0,7	0,5	0,6	0,5	0,7
DE	0,3	0,4	0,2	0,3	0,5	0,6	0,5	0,6	0,5	0,6	0,5	0,6
EE	0,5	0,5	0,4	0,3	0,9	1,0	0,6	0,9	0,8	0,9	0,7	1,1
IE	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,6	0,7	0,7	0,8
EL	0,3	0,4	0,3	0,3	0,6	0,7	0,6	0,6	0,4	0,6	0,5	0,8
ES	0,5	0,5	0,4	0,4	0,7	0,8	0,7	0,8	0,6	0,7	0,6	0,7
FR	0,4	0,5	0,3	0,3	0,7	0,7	0,6	0,7	0,5	0,6	0,6	0,7
HR	0,5	0,6	0,4	0,5	0,9	1,0	0,9	0,9	0,8	1,0	0,8	1,4
IT	0,5	0,5	0,3	0,4	0,7	0,8	0,7	0,8	0,6	0,7	0,7	0,7
CY	0,2	0,4	0,2	0,3	0,6	0,9	0,5	0,6	0,5	0,7	0,8	1,9
LV	0,5	0,7	0,4	0,5	1,1	1,0	0,9	0,9	1,1	1,0	1,0	1,0
LT	0,4	0,6	0,4	0,5	0,9	1,0	0,7	0,9	0,7	0,8	0,9	1,5
LU	0,4	0,4	0,2	0,3	0,6	0,7	0,7	0,7	0,5	0,5	0,2	0,6
HU	0,4	0,4	0,3	0,3	0,6	0,7	0,5	0,6	0,6	0,7	0,5	0,7
MT	0,5	0,7	0,2	0,4	0,8	1,2	0,4	0,7	0,5	0,9	0,2	1,9
NL	0,4	0,5	0,2	0,3	0,6	0,7	0,5	0,6	0,5	0,7	0,6	0,7
AT	0,4	0,4	0,2	0,3	0,5	0,6	0,6	0,6	0,5	0,6	0,5	0,6
PL	0,4	0,5	0,4	0,4	0,8	0,8	0,7	0,8	0,6	0,8	0,7	0,9
PT	0,5	0,6	0,4	0,5	0,9	1,0	0,8	1,0	0,7	0,8	0,6	0,9
RO	0,4	0,5	0,4	0,5	0,8	0,8	0,7	0,7	0,6	0,9	0,4	0,6
SI	0,4	0,5	0,4	0,5	0,8	0,9	0,7	0,9	0,7	0,8	0,7	1,1
SK	0,4	0,5	0,3	0,4	0,7	0,9	0,5	0,6	0,6	0,7	1,0	0,7
FI	0,4	0,5	0,3	0,3	0,8	0,9	0,7	0,7	0,6	0,7	0,7	0,8
SE	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,6	0,7	0,6	0,7
UK	0,4	0,4	0,2	0,3	0,7	0,8	0,5	0,7	0,6	0,6	0,6	0,7
IS	0,4	0,5	0,2	0,3	0,9	1,0	0,5	0,8	0,7	0,8	0,5	0,7
NO	0,4	0,5	0,3	0,3	0,8	0,9	0,6	0,7	0,5	0,7	0,6	0,7
CH	0,4	0,4	0,3	0,3	0,6	0,7	0,6	0,7	0,5	0,6	0,6	0,7
ME	0,5	0,8	0,4	0,7	1,1	1,2	0,5	1,1	1,0	0,8	0,2	1,3
MK	0,7	0,7	0,7	0,6	1,0	1,1	0,9	1,0	0,7	0,8	0,3	1,2
AL	0,5	0,7	0,4	0,5	0,8	1,0	0,7	0,7	0,5	0,7	0,8	0,8
RS	0,6	0,7	0,6	0,7	1,0	1,2	1,0	1,2	0,7	0,8	0,7	1,2
TR	0,4	0,4	0,3	0,3	0,7	0,8	0,5	0,6	0,6	0,6	0,6	0,6
BA	0,6	0,7	0,4	0,5	1,0	1,2	0,9	1,0	0,7	0,8	0,9	1,0
AM	0,3	0,3	0,2	0,3	0,8	0,9	0,8	0,6	0,5	0,6	0,2	0,6
FO	0,4	0,6	0,3	0,2	0,6	1,0	0,5	0,5	0,4	1,0	0,3	0,6
GE	0,3	0,4	0,4	0,4	0,9	1,0	0,8	0,8	0,8	0,9	0,5	0,6
IL	0,4	0,5	0,3	0,3	0,7	0,8	0,6	0,7	0,5	0,7	0,6	0,7
MD	0,4	0,5	0,4	0,4	1,2	1,1	1,0	1,0	1,2	0,8	0,2	0,4
TN	0,5	0,6	0,4	0,5	0,9	0,9	0,8	0,9	0,5	0,5	0,9	0,7
UA	0,4	0,4	0,3	0,4	0,7	0,8	0,7	0,7	0,5	0,8	0,6	0,4

Notes: Values represent the average yearly ratio for the period 2013-2017; Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men.
Other: The percentage of authors to which a gender could be assigned varies. For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.8 Women to men ratio of corresponding authorships in international collaborations, by field of R&D, 2008-2012 and 2013-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17
WLD	0,3	0,3	0,2	0,3	0,4	0,5	0,4	0,5	0,5	0,6	0,6	0,7
EU-28	0,3	0,3	0,2	0,3	0,4	0,5	0,5	0,5	0,5	0,6	0,5	0,7
BE	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,5	0,4	0,6	0,5	0,7
BG	0,4	0,5	0,5	0,5	0,6	0,6	0,6	0,5	0,8	0,8	0,2	0,6
CZ	0,2	0,3	0,2	0,2	0,3	0,3	0,3	0,4	0,3	0,5	0,3	0,3
DK	0,3	0,4	0,2	0,3	0,5	0,6	0,5	0,6	0,5	0,5	0,5	0,6
DE	0,2	0,3	0,2	0,2	0,3	0,4	0,4	0,5	0,4	0,5	0,5	0,6
EE	0,4	0,5	0,4	0,3	0,7	0,7	0,6	0,6	0,6	0,8	0,3	0,8
IE	0,3	0,4	0,2	0,2	0,5	0,6	0,4	0,5	0,5	0,7	0,7	0,8
EL	0,2	0,3	0,2	0,2	0,3	0,3	0,4	0,4	0,3	0,4	0,4	0,5
ES	0,3	0,4	0,3	0,3	0,4	0,5	0,5	0,6	0,5	0,5	0,6	0,6
FR	0,3	0,4	0,2	0,3	0,4	0,4	0,4	0,5	0,4	0,5	0,5	0,6
HR	0,4	0,5	0,3	0,4	0,6	0,6	0,6	0,7	0,8	0,6	0,8	0,7
IT	0,3	0,4	0,2	0,3	0,4	0,4	0,4	0,5	0,4	0,5	0,6	0,5
CY	0,1	0,3	0,1	0,2	0,4	0,6	0,8	0,6	0,4	0,6	0,3	1,1
LV	0,3	0,5	0,2	0,4	0,6	0,5	0,4	1,0	1,0	1,0	0,0	0,5
LT	0,3	0,4	0,3	0,4	0,6	0,7	0,3	0,6	0,5	1,1	0,5	3,3
LU	0,3	0,3	0,2	0,2	0,4	0,5	0,6	0,6	0,3	0,5	0,3	0,5
HU	0,2	0,3	0,2	0,3	0,3	0,4	0,4	0,3	0,4	0,6	0,7	0,6
MT	0,5	0,6	0,0	0,3	0,8	0,7	0,4	0,6	0,2	0,7	0,0	0,6
NL	0,3	0,4	0,2	0,3	0,5	0,5	0,4	0,5	0,5	0,6	0,6	0,7
AT	0,2	0,3	0,2	0,3	0,3	0,4	0,4	0,5	0,4	0,5	0,5	0,5
PL	0,3	0,4	0,3	0,3	0,4	0,4	0,5	0,6	0,5	0,7	0,6	0,7
PT	0,4	0,5	0,3	0,4	0,6	0,6	0,6	0,8	0,5	0,7	0,4	0,9
RO	0,3	0,4	0,3	0,5	0,7	0,6	0,3	0,5	0,6	0,5	0,4	0,4
SI	0,3	0,4	0,4	0,4	0,5	0,5	0,5	0,6	0,5	0,6	1,0	1,0
SK	0,2	0,3	0,2	0,3	0,4	0,6	0,4	0,3	0,3	0,4	0,6	0,3
FI	0,3	0,4	0,2	0,3	0,6	0,7	0,6	0,6	0,6	0,7	0,8	1,0
SE	0,3	0,4	0,2	0,3	0,6	0,6	0,5	0,6	0,5	0,7	0,6	0,8
UK	0,3	0,4	0,2	0,2	0,5	0,5	0,4	0,5	0,5	0,6	0,6	0,7
IS	0,4	0,5	0,2	0,3	0,7	0,9	0,5	0,8	0,7	1,0	0,8	0,8
NO	0,4	0,5	0,2	0,3	0,7	0,8	0,6	0,7	0,5	0,7	0,6	0,7
CH	0,3	0,3	0,2	0,3	0,4	0,4	0,5	0,6	0,4	0,6	0,5	0,7
ME	0,5	0,6	0,5	0,7	0,7	0,9	0,4	0,8	0,5	1,0	0,0	0,1
MK	0,6	0,7	0,7	0,8	0,7	0,9	0,7	1,1	1,0	1,0	0,0	0,3
AL	0,5	0,5	0,5	0,5	1,0	0,6	0,5	0,6	1,0	1,2	0,0	0,4
RS	0,5	0,6	0,6	0,7	0,7	0,7	0,8	0,9	0,5	0,6	0,5	1,0
TR	0,3	0,3	0,2	0,3	0,4	0,4	0,3	0,4	0,5	0,5	0,5	0,6
BA	0,6	0,6	0,4	0,5	0,8	0,9	0,9	0,9	0,7	0,8	0,8	1,3
AM	0,2	0,2	0,2	0,2	0,6	0,5	0,2	0,6	0,4	0,7	0,0	0,4
FO	0,7	0,8	0,4	0,1	0,6	1,5	0,7	0,8	0,5	1,4	0,0	0,0
GE	0,2	0,4	0,5	0,3	0,7	0,7	0,9	0,8	0,4	0,7	0,1	0,4
IL	0,3	0,3	0,2	0,2	0,4	0,5	0,4	0,4	0,5	0,6	0,6	0,7
MD	0,3	0,5	0,3	0,4	0,9	0,7	1,2	1,8	0,9	1,6	0,0	0,0
TN	0,5	0,5	0,4	0,5	0,6	0,6	0,6	0,6	0,4	0,4	0,2	0,3
UA	0,3	0,3	0,3	0,3	0,4	0,5	0,3	0,6	0,5	0,8	0,7	0,5

Notes: Values represent the average yearly ratio for the period 2013-2017; Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men.
Other: The percentage of authors to which a gender could be assigned varies. For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Small increases in the women to men ratio of authorships can be seen between the periods 2008-2012 and 2013-2017 in all fields of R&D.

Besides the annual growth rate disaggregated by fields of R&D depicted in the previous section, international co-publications were shown for two distinct time periods to exemplify the developments in the ratio of women to men's contributions to international co-publications (Table 7.7 and 7.8). With few exceptions the women to men ratio in international collaborations increased from the 2008-2012 period to the 2013-2017 period across all fields of R&D (for all authorships, Table 7.7). Some of the changes were rather small and not visible due to rounding to only one digit, but the general trend is moving towards parity.

In some countries, women's contribution to international publications exceeds that of men when assessing all contributing authors. However, for some countries, the total number of publications is rather small, so that individual publications may have strong effects. This is observed for the humanities and arts publications in Croatia, Cyprus, Latvia, Malta, Montenegro, North Macedonia, and in Serbia, where there are occasional surprisingly high differences between the periods. It is also observed for medical sciences research from Montenegro, North Macedonia, Serbia, and Bosnia and Herzegovina. Observation of parity in this metric is greatly reduced when only assessing corresponding authors (Table 7.8).

In summary, data suggest that the international co-publication rate of women to men is moving towards parity across the board, while no clear pattern of 'fast movers' among fields of R&D can be observed.

The ratio of field-weighted citation impact (FWCI) for publications by women to those by men shows similar performance by women and men authors

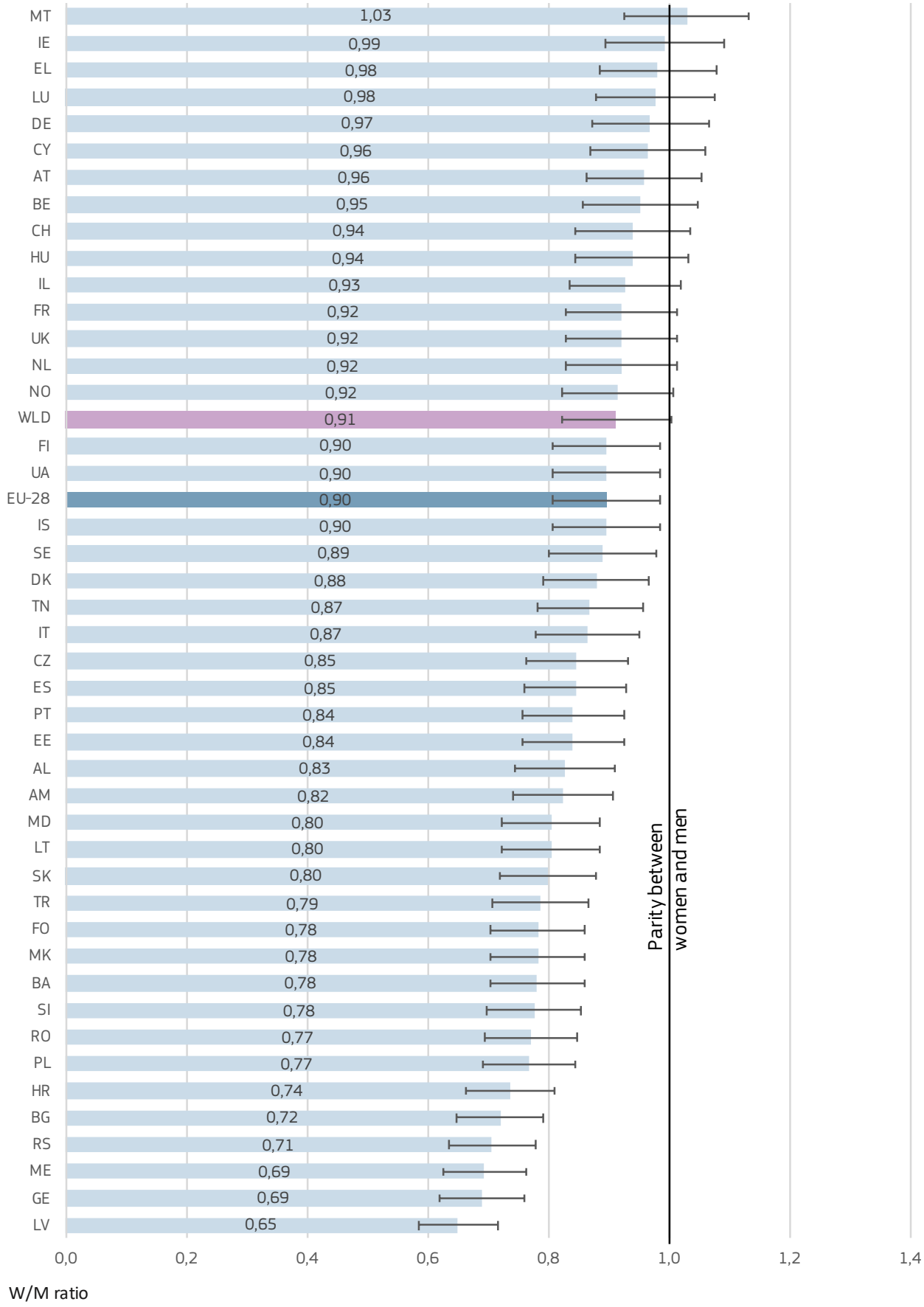
This indicator is the ratio of the average field-weighted citation impact (FWCI) calculated for publications by women compared to those by men when they are contributing authors or corresponding authors. This is calculated based on all contributing authors and attribution of the publication's FWCI is assigned using a fractional approach. A score above 1 indicates that women in each country produced publications that, on average, had a higher impact than men's publications whereas a score below 1 means the opposite.

FWCI is a metric that reflects the citation impact of a publication based on the actual number of citations received by an article compared to the expected number of citations for articles of the same document type (article, review, or conference proceeding paper), the year of publication and the field of R&D. When an article is classified in two or more fields, the harmonic mean of the actual and expected citation rates is used. The indicator is therefore always defined with reference to a global baseline of 1.0 and it intrinsically accounts for differences in citation accrual over time and differences in citation rates for different document types (reviews typically attract more citations than research articles, for example). It also accounts for subject-specific differences in citation frequencies overall and over time and for variations in the types of document.

When assessing based on all contributing authors (Figure 7.7), in 2017, 15 countries surpassed the global ratio of the average FWCI for women to men authorships, while also reaching or surpassing parity (including the error bars). However, it should be noted that small publications sets may result in an average value that is not a good representation of the entire publication set as highly (or very poorly) cited publications may have exceptional effects on the mean. The average FWCI for the EU-28, showing a ratio of 0.90 in 2017, has not yet reached parity.

When assessing based on corresponding authorship (Figure 7.8), in 2017 six countries were observed to be above global value (MT, FO, CY, LU, IS, EL). These countries also reached or surpassed gender parity (including the error bars; not shown for ease of reading). At the EU-28 level, gender parity has not been achieved as the women to men ratio for the average FWCI was 0.85.

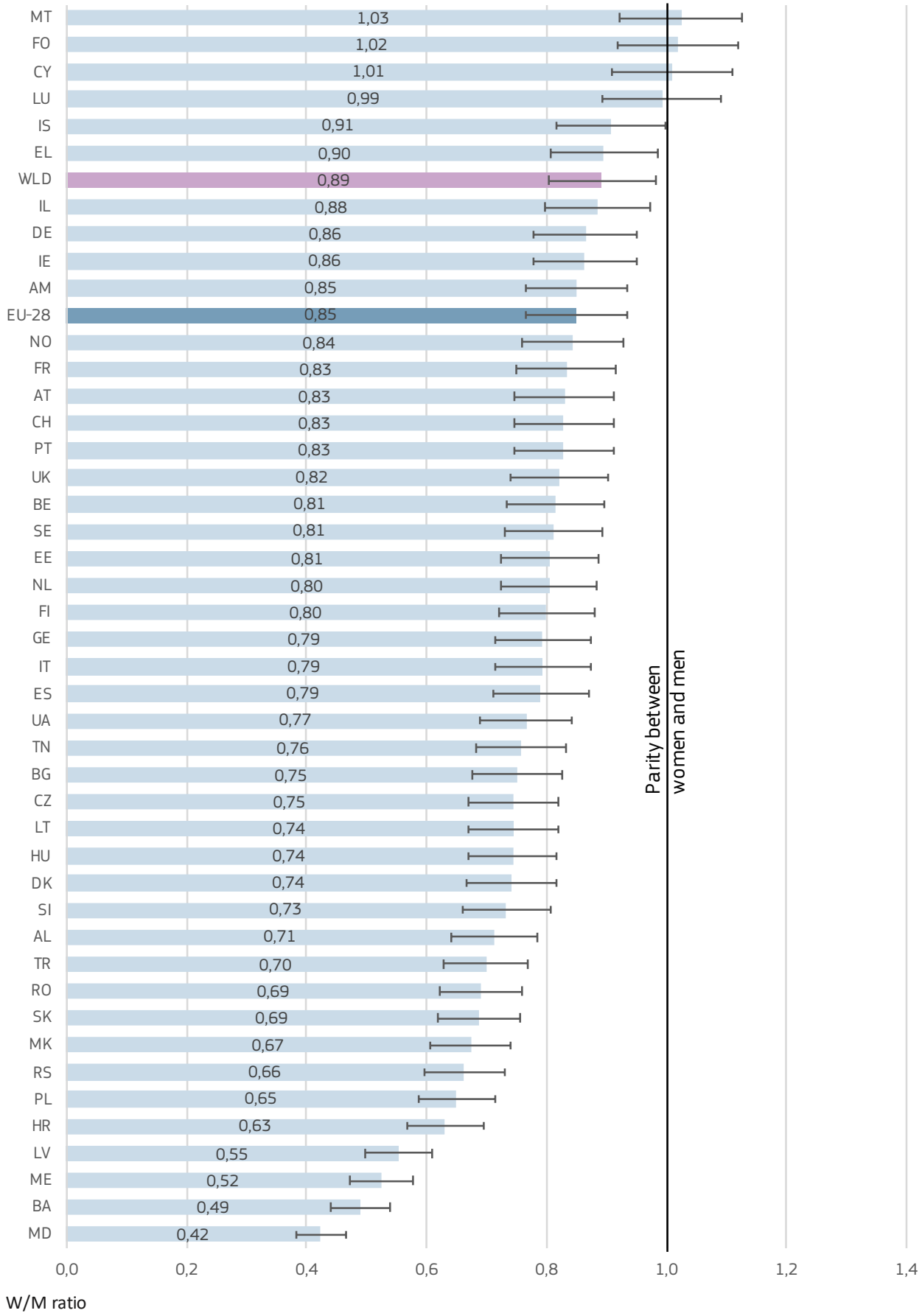
Figure 7.7 Women to men ratio of average FWCI for publications based on all authorships in all fields of R&D, 2017



Notes: Countries are listed descending order; EU-28 and world values are highlighted in the figure; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia for EU-28 countries and 50 % for Albania and the Faroe Islands for non-EU countries; Error bars represent +/- 10 % of the value.
Other: FWCI: Field-Weighted Citation Impact.

Source: Computed by Elsevier using Scopus data.

Figure 7.8 Women to men ratio of average FWCI for publications based on corresponding authorships in all fields of R&D, 2017



Notes: Countries are listed descending order; EU-28 and world values are highlighted in the figure; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia for EU-28 countries and 50 % for Albania and the Faroe Islands for non-EU countries; Error bars represent +/- 10 % of the value.
Other: FWCI: Field-Weighted Citation Impact.

Source: Computed by Elsevier using Scopus data.

Table 7.9 CAGR (%) of women to men ratio of average FWCI for publications (all authorships), by field of R&D, 2008-2017

Country	All fields		Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	0,2		0,2		1,3		0,0		-0,2		-0,9		-0,6	
EU-28	-0,2		-0,1		-0,1		-0,3		-0,4		-0,8		-0,6	
BE	0,1		-0,1		1,0		-0,2		-0,9		1,3		1,4	
BG	-1,0		-1,3		-1,7		-0,6		-1,9		-2,9		2,7	
CZ	-1,0		-0,8		-1,3		-2,1		-1,9		-3,6		-0,7	
DK	-0,3		-0,3		-0,9		0,1		-1,7		-2,0		-4,8	
DE	-0,2		0,0		0,0		-0,8		-0,7		0,8		2,1	
EE	-1,2		-2,0		-0,3		-1,6		0,0		1,0		-1,2	
IE	0,1		0,9		2,3		-0,8		2,5		0,6		1,5	
EL	0,4		0,4		0,0		-0,3		1,7		-0,4		4,3	
ES	-0,7		-0,3		-0,1		-1,2		-0,5		-0,8		-0,3	
FR	0,3		0,1		-0,3		-0,2		-0,8		0,7		0,5	
HR	-1,0		0,0		-1,6		-1,9		-2,9		-2,5		4,2	
IT	-0,5		-0,4		-0,2		-0,6		-0,4		-0,9		-2,3	
CY	2,9		2,8		-1,0		0,0		-4,2		5,9		-8,0	
LV	-0,3		1,4		0,3		-1,4		0,4		-0,1		4,9	
LT	-0,3		-1,0		1,2		0,8		-0,2		-1,6		-2,6	
LU	-0,2		-1,7		2,3		-1,0		3,1		9,3		-0,5	
HU	-0,1		1,1		3,2		-1,8		-0,5		-3,6		-10,3	
MT	0,4		6,2		7,6		-4,2		-1,7		-2,3		14,7	
NL	-0,6		0,0		-0,7		-1,4		-0,8		-0,4		1,4	
AT	0,1		0,6		0,4		-0,5		-0,6		-2,4		0,6	
PL	0,1		-0,1		-0,5		-0,6		-2,5		-0,6		-2,4	
PT	-0,2		0,0		-0,8		-0,6		0,7		-0,5		-1,0	
RO	-0,1		-0,4		-0,8		0,8		-0,5		3,1		36,4	
SI	-2,4		-3,2		-3,9		-1,7		-4,6		-4,2		0,8	
SK	-0,1		0,1		0,1		-1,5		-2,1		1,4		-3,0	
FI	-0,3		0,5		0,8		-0,9		-1,7		-0,5		-3,3	
SE	-0,3		0,4		0,3		-0,7		-1,6		-1,0		0,4	
UK	-0,4		-0,2		0,2		-0,3		-1,1		-1,5		-1,0	
IS	-0,8		-0,1		3,1		-1,8		0,5		1,1		-0,4	
NO	-0,2		0,1		-0,8		-0,8		-0,6		0,1		2,9	
CH	-0,1		0,2		1,2		-0,5		-1,6		-0,6		-1,0	
ME	5,6		7,9		2,7		-5,0		2,2		0,3		-	
MK	0,9		-5,3		-1,7		-0,5		-2,9		2,8		-	
AL	-1,9		-0,2		-14,7		-2,5		-8,8		-13,6		-21,7	
RS	-0,3		0,4		-1,9		-4,0		-6,3		-0,9		10,9	
TR	-1,3		-1,0		-1,5		-1,9		-0,1		-2,3		1,7	
BA	-0,2		-0,8		6,4		0,1		-8,4		-6,1		-31,2	
AM	0,3		0,1		0,3		-1,8		-7,9		-4,8		-	
FO	-3,0		-6,9		-		-0,8		-13,9		-		-	
GE	-0,6		0,2		-1,4		2,5		-1,4		-7,1		-15,6	
IL	-0,4		0,2		0,9		-1,0		-4,1		0,0		0,0	
MD	1,4		2,2		4,4		-15,9		-15,4		-27,8		-	
TN	0,3		-0,4		-2,1		1,3		2,0		4,6		6,3	
UA	1,1		0,4		1,8		-0,7		-4,7		3,1		25,1	

Notes: '-' indicates that the value at the beginning or end of the period was unavailable for CAGR calculations either because no value was available for publications authored by men or the value obtained for publications by men was zero; trend: Shows the trend in the ratio using annual values (the scale is not the same across countries); The percentage of authors to which a gender could be assigned varies. For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.10 CAGR (%) of women to men ratio of average FWCI for publications (corresponding authorships), by field of R&D, 2008-2017

Country	All fields		Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
WLD	0,3		0,2		1,3		-0,2		-0,3		-0,9		-0,5	
EU-28	-0,3		0,1		0,0		-0,9		-0,6		-0,7		-0,3	
BE	0,2		0,9		1,5		-1,1		-1,9		2,2		5,1	
BG	2,5		-0,8		-1,1		8,2		-3,4		-1,1		6,6	
CZ	0,2		0,8		-1,6		-1,0		-0,3		-1,4		-5,4	
DK	-2,0		-0,5		0,3		-3,1		-2,8		-1,9		-5,0	
DE	-0,6		-0,2		-0,4		-1,6		-0,4		0,9		2,8	
EE	-0,6		-2,7		-4,8		3,0		-0,6		4,3		-2,8	
IE	-0,6		1,3		7,3		-0,7		-4,9		-2,0		-4,8	
EL	1,1		1,7		0,1		1,3		-0,8		1,1		8,0	
ES	-0,8		0,2		-0,1		-1,8		-0,6		-1,4		1,6	
FR	0,0		0,8		0,3		-1,3		-0,1		0,8		-1,0	
HR	-0,5		1,6		-2,4		-1,6		-7,2		2,2		8,0	
IT	-1,2		-0,4		0,3		-2,8		-0,1		-0,2		-3,2	
CY	7,7		4,7		5,2		4,2		-12,2		17,0		5,0	
LV	2,1		0,7		-2,0		6,3		-11,5		-11,5		-	
LT	1,5		0,4		0,9		5,6		3,3		-3,2		-7,8	
LU	3,0		2,5		10,4		3,3		-6,5		8,0		-7,1	
HU	-0,6		1,8		7,1		-3,0		-2,9		-0,5		-10,1	
MT	0,2		5,4		6,7		-3,7		10,8		12,6		4,3	
NL	-1,8		0,5		-1,0		-3,1		-1,5		-1,3		3,4	
AT	-0,9		-0,1		2,0		-1,7		-0,8		-3,5		-5,7	
PL	-1,0		-0,5		-2,5		-1,6		-2,9		2,3		-7,0	
PT	0,8		0,9		1,9		1,1		0,8		0,6		2,2	
RO	0,1		-1,5		0,1		12,7		-2,5		-2,0		-	
SI	-2,6		-4,9		-6,9		2,1		-6,0		-5,3		2,2	
SK	2,1		1,8		0,0		1,3		-2,7		0,5		-6,5	
FI	-0,2		0,9		-1,1		-0,9		-4,2		-0,5		-4,2	
SE	-0,2		0,8		0,6		-0,4		-0,3		-2,2		0,2	
UK	-1,0		-0,3		0,2		-1,5		-1,2		-1,9		-1,1	
IS	0,8		-0,6		17,7		2,8		-1,0		1,3		-3,8	
NO	-0,4		0,6		0,4		-1,6		0,0		1,3		0,2	
CH	0,4		0,3		1,3		0,5		-1,3		0,7		-2,3	
ME	8,0		12,8		0,1		-7,2		14,6		-		-	
MK	-3,0		-6,6		-3,1		-4,3		8,9		-7,2		-	
AL	1,2		-6,8		-35,2		22,0		-3,6		10,5		-	
RS	-1,0		0,3		-3,9		-3,9		-6,2		0,4		16,1	
TR	-1,3		-0,4		-1,9		-2,5		2,2		-2,7		0,9	
BA	-5,6		-7,9		4,3		0,2		-6,8		-15,5		-100	
AM	12,3		17,2		19,2		1,2		-		-		-	
FO	-4,9		-16,1		-		5,7		-7,5		-		-	
GE	6,9		2,4		-1,4		11,0		-4,7		8,5		-21,1	
IL	-0,6		0,4		-1,1		-0,7		-1,1		-0,1		-2,1	
MD	-4,6		0,6		-1,1		-39,0		-25,0		-		-	
TN	1,9		-0,8		0,8		3,8		5,4		4,8		0,9	
UA	-1,4		-2,9		0,4		-4,9		-10,6		1,9		29,1	

Notes: '-' indicates that the value at the beginning or end of the period was unavailable for CAGR calculations either because no value was available for publications authored by men or the value obtained for publications by men was zero; trend: Shows the trend in the ratio using annual values (the scale is not the same across countries); The percentage of authors to which a gender could be assigned varies. For EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.11 Women to men ratio of average FWCI for publications (all authorships), by field of R&D, 2012 and 2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
WLD	0,91	0,91	0,86	0,96	0,95	0,92	1,01	0,97	0,93	0,88	0,96	0,95
EU-28	0,92	0,91	0,90	0,93	0,92	0,89	0,97	0,94	0,89	0,85	0,89	0,88
BE	0,97	0,99	0,95	1,00	0,93	0,88	1,00	0,97	0,93	0,92	0,87	0,90
BG	0,62	0,71	0,90	0,78	0,66	0,65	0,84	0,66	0,48	0,66	0,90	1,35
CZ	0,93	0,87	1,05	0,93	0,80	0,74	0,99	0,87	0,75	0,81	0,62	0,70
DK	0,96	0,92	0,93	0,88	0,83	0,82	0,92	0,93	0,98	0,79	0,84	0,74
DE	0,98	0,98	0,94	0,99	0,99	0,93	1,01	0,97	0,95	0,96	1,03	0,98
EE	0,80	0,90	0,97	1,21	0,70	0,72	0,95	0,95	0,72	0,82	0,82	0,70
IE	1,00	1,08	0,99	1,19	0,89	0,88	1,01	1,16	0,92	1,00	1,02	1,19
EL	1,00	0,97	1,03	0,99	0,98	0,97	0,99	1,19	0,96	0,93	0,84	1,07
ES	0,95	0,92	0,93	0,94	0,86	0,78	1,04	0,94	0,87	0,82	0,99	0,87
FR	0,96	0,96	0,94	0,94	0,87	0,83	1,00	0,94	0,77	0,78	0,81	0,97
HR	0,76	0,83	0,84	0,77	0,70	0,69	0,98	0,87	0,78	0,79	0,81	1,62
IT	0,89	0,88	0,87	0,89	0,86	0,84	0,95	0,94	0,89	0,85	0,86	0,81
CY	0,88	0,98	0,92	0,86	1,13	0,99	0,80	1,17	0,91	0,96	1,25	0,45
LV	0,81	0,75	0,90	0,82	0,40	0,45	0,54	0,38	0,53	0,63	0,50	0,31
LT	0,68	0,79	0,93	1,07	0,56	0,68	0,88	0,71	0,64	0,79	0,55	0,63
LU	0,91	0,83	1,27	0,87	1,06	0,89	1,03	1,11	0,78	1,08	0,89	1,43
HU	0,95	1,01	0,80	1,15	0,90	0,75	1,02	0,95	0,90	0,83	0,97	0,61
MT	1,29	1,18	1,30	1,65	1,27	0,91	0,87	1,00	0,95	1,00	1,15	0,58
NL	0,98	0,97	1,01	0,92	0,90	0,84	0,99	0,98	0,93	0,91	0,99	0,99
AT	1,00	0,98	0,98	0,98	0,95	0,92	1,01	0,91	0,88	0,80	0,79	0,75
PL	0,81	0,81	0,83	0,91	0,67	0,62	0,92	0,79	0,73	0,77	0,53	0,74
PT	0,89	0,89	0,88	0,86	0,84	0,75	1,01	1,02	0,77	0,82	0,71	0,82
RO	0,62	0,77	0,86	0,82	0,60	0,55	0,77	0,95	0,78	1,01	1,94	7,44
SI	0,87	0,73	1,02	0,85	0,76	0,85	0,97	0,76	0,70	0,68	0,85	0,81
SK	0,89	0,85	0,97	0,91	0,81	0,60	0,86	0,78	0,89	0,95	0,74	0,84
FI	0,91	0,94	0,75	0,94	0,80	0,79	0,98	0,88	0,98	0,82	0,95	0,65
SE	0,95	0,95	0,90	0,94	0,87	0,80	0,96	0,83	0,87	0,86	0,83	0,80
UK	0,97	0,96	0,95	1,00	0,93	0,86	1,00	0,94	0,93	0,86	0,92	0,90
IS	1,15	0,95	0,92	1,12	0,82	0,74	1,17	0,94	0,84	0,78	0,86	0,79
NO	1,01	0,93	0,95	0,93	0,92	0,82	1,01	0,98	0,91	0,93	0,98	1,21
CH	0,98	0,95	0,98	0,97	1,00	0,93	1,00	0,90	0,80	0,82	0,72	0,85
ME	0,72	0,77	0,39	0,65	0,96	0,57	0,39	0,80	1,05	0,69	10,48	-
MK	0,67	0,61	0,97	0,65	0,55	0,66	0,81	0,62	0,66	1,64	0,19	4,43
AL	1,24	0,76	2,56	0,26	1,21	1,06	0,91	0,67	0,80	0,18	0,37	0,09
RS	0,75	0,73	0,93	0,80	0,73	0,61	1,02	0,67	1,01	0,69	1,07	1,37
TR	0,87	0,80	0,90	0,78	0,98	0,82	1,06	1,12	0,99	0,79	1,04	1,22
BA	1,18	0,75	0,67	0,88	0,85	0,72	1,25	0,73	0,84	0,94	0,76	0,15
AM	0,81	0,83	0,91	1,00	0,75	0,85	1,31	0,91	0,66	0,60	0,52	0,72
FO	1,51	0,61	0,00	0,71	0,75	0,86	1,22	0,31	0,61	2,10	-	3,00
GE	0,70	0,80	0,74	0,73	0,47	0,67	0,87	0,85	0,65	0,73	0,99	0,24
IL	0,93	0,98	0,99	1,02	0,90	0,86	0,95	0,83	0,91	0,96	0,83	1,04
MD	0,61	0,83	0,56	0,69	1,10	0,61	0,64	0,30	0,57	0,47	2,65	0,00
TN	0,91	0,93	1,03	0,77	0,86	0,85	1,08	1,00	1,09	0,90	0,77	0,86
UA	0,81	0,82	0,83	1,02	0,68	0,57	0,80	0,69	0,54	1,23	0,61	5,61

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men; Values with two decimal places have been used to delineate developments; '-' indicates where no value was available for publications authored by men or the value obtained for publications by men was zero; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.12 Women to men ratio of average FWCI for publications (corresponding authorships), by field of R&D, 2012 and 2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017	2012	2017
WLD	0,88	0,88	0,86	0,95	0,89	0,86	0,98	0,95	0,95	0,88	0,97	0,97
EU-28	0,88	0,88	0,89	0,88	0,83	0,81	0,93	0,90	0,90	0,86	0,91	0,94
BE	0,88	0,93	0,89	0,87	0,75	0,72	0,94	0,80	0,86	0,86	0,93	1,14
BG	0,71	0,69	1,04	0,86	0,36	0,74	1,17	0,61	0,28	0,60	0,67	1,48
CZ	0,77	0,84	0,84	0,84	0,58	0,61	0,96	0,76	0,71	0,72	0,62	0,48
DK	0,88	0,82	0,99	0,90	0,64	0,66	1,00	0,78	0,97	0,75	0,84	0,87
DE	0,93	0,92	0,92	0,90	0,84	0,78	0,93	0,95	0,94	0,96	1,01	1,03
EE	0,59	0,87	0,59	1,15	0,42	0,78	0,79	0,89	0,54	0,81	0,97	0,67
IE	0,97	1,01	1,04	1,37	0,72	0,78	0,95	0,78	1,02	0,88	1,18	0,95
EL	0,85	0,96	0,93	0,88	0,67	0,89	0,90	0,92	0,83	1,00	0,73	1,01
ES	0,90	0,91	0,92	0,91	0,71	0,68	1,00	0,92	0,83	0,79	1,05	0,97
FR	0,88	0,93	0,89	0,87	0,72	0,73	0,91	0,93	0,73	0,74	0,91	0,87
HR	0,76	0,78	0,89	0,67	0,54	0,57	1,02	0,58	0,99	0,86	0,93	1,91
IT	0,85	0,82	0,90	0,84	0,74	0,73	0,84	0,92	0,90	0,90	0,86	0,84
CY	0,92	0,83	1,20	1,28	1,28	1,09	1,69	0,82	0,82	1,03	1,40	0,85
LV	0,84	0,72	1,28	0,60	0,19	0,38	0,65	0,19	0,89	0,19	0,57	0,09
LT	0,84	0,76	0,65	0,84	0,23	0,56	0,79	0,68	0,61	0,71	0,50	0,46
LU	0,90	0,95	1,73	1,38	0,71	0,89	1,36	0,64	0,83	1,13	1,13	1,05
HU	0,94	0,91	0,82	1,22	0,77	0,57	0,76	0,68	1,15	0,92	0,96	0,60
MT	0,72	0,93	0,58	1,31	1,19	1,06	0,62	2,18	0,83	2,36	0,65	0,41
NL	0,88	0,93	0,98	0,85	0,70	0,69	0,86	0,90	0,89	0,83	0,98	1,12
AT	0,92	0,91	0,91	0,99	0,84	0,75	1,05	0,84	0,78	0,74	0,65	0,56
PL	0,74	0,75	0,85	0,75	0,49	0,50	0,86	0,71	0,69	0,86	0,70	0,62
PT	0,85	0,91	0,88	0,96	0,74	0,70	0,95	0,95	0,71	0,77	0,78	0,79
RO	0,45	0,61	0,92	0,80	0,46	0,76	0,78	0,74	0,89	0,72	4,71	-
SI	0,87	0,64	1,02	0,77	0,63	0,79	0,98	0,74	0,89	0,67	0,79	0,93
SK	0,72	0,80	0,81	0,79	0,58	0,49	0,82	0,56	1,02	0,71	0,53	0,68
FI	0,81	0,88	0,75	0,80	0,64	0,64	0,92	0,70	0,91	0,81	1,03	0,70
SE	0,90	0,91	0,89	0,97	0,69	0,73	0,99	0,83	0,90	0,80	0,77	0,80
UK	0,90	0,88	0,96	0,90	0,79	0,75	0,91	0,84	0,93	0,81	0,93	0,91
IS	0,88	0,87	1,12	1,58	0,48	0,94	1,42	0,82	1,62	0,80	1,69	0,87
NO	0,90	0,93	0,86	1,12	0,66	0,71	1,01	0,93	0,85	0,96	1,04	1,16
CH	0,95	0,86	1,01	0,91	0,85	0,82	0,83	0,88	0,86	0,79	0,67	0,81
ME	0,74	0,79	0,31	0,58	0,32	0,24	0,38	1,00	1,22	0,51	6,33	-
MK	0,63	0,61	0,76	1,10	0,57	0,54	0,42	0,99	0,86	1,84	0,63	0,00
AL	1,49	0,58	8,02	0,15	1,39	1,00	0,73	0,93	1,57	0,30	0,00	0,68
RS	0,67	0,75	0,91	0,79	0,55	0,62	0,72	0,58	0,76	0,44	1,48	1,02
TR	0,81	0,74	0,82	0,68	0,86	0,66	0,97	1,08	1,00	0,76	0,90	1,23
BA	1,18	0,36	0,43	0,49	0,76	0,66	1,27	0,91	0,80	0,30	0,61	0,00
AM	0,54	1,25	0,72	1,17	0,60	0,71	0,75	20,97	0,23	0,14	0,00	0,00
FO	1,88	0,64	-	1,37	0,27	0,90	2,68	0,44	0,93	0,00	-	-
GE	0,30	0,76	1,12	0,41	0,22	0,80	1,45	0,79	0,82	0,58	1,35	0,11
IL	0,89	0,96	0,88	0,75	0,70	0,89	0,84	0,80	0,90	0,95	0,71	1,01
MD	0,58	0,53	0,53	0,35	0,97	0,25	1,21	0,23	0,13	0,39	1,54	-
TN	0,85	0,75	1,02	0,80	0,58	0,64	1,28	0,95	1,01	1,16	0,42	0,38
UA	0,80	0,65	0,75	0,81	0,35	0,62	0,68	0,61	0,45	0,88	0,48	2,49

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men; Values with two decimal places have been used to delineate developments; '-' indicates where no value was available for publications authored by men or the value obtained for publications by men was zero; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

The citation impact for women and men is similar across fields.

As can be seen in Tables 7.11 and 7.12, regardless of the field, year, or authorship type, the women-to-men ratio of FWCI in the EU-28 is approximately 0.90 (with the exception of agricultural sciences in 2012, which was approximately 1.0). The metric was also stable across the ten-year period in all fields of R&D with very little change in value (Table 7.9 and Table 7.10) for most of the countries, although in a few countries and fields, larger fluctuations are observed. However, this is due to the small number of publications in some countries, which means the metric can be swayed to a greater extent by outlier publications with a very high FWCI.

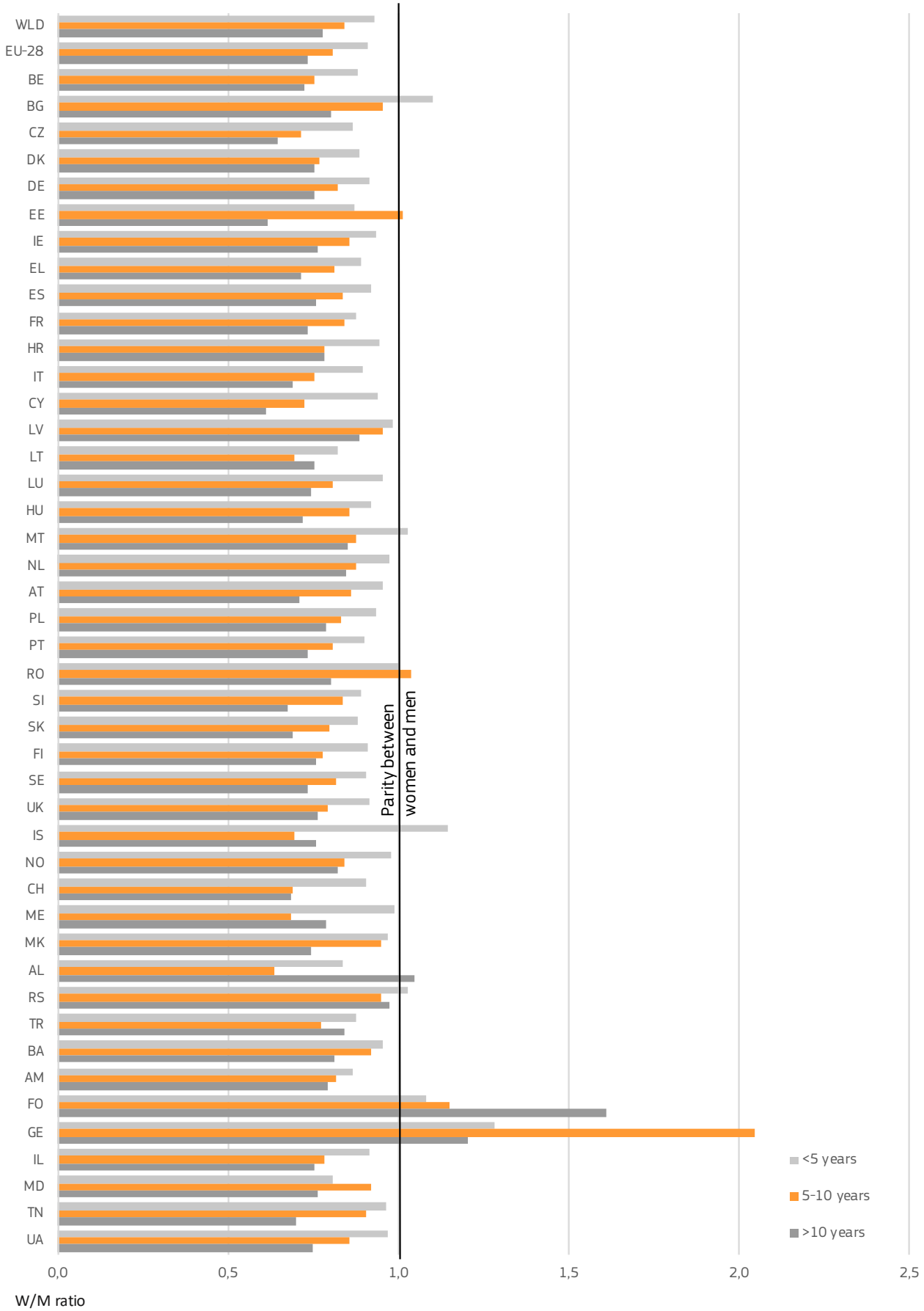
The ratio of average publications is lowest at the highest level of seniority.

Figure 7.9 and Table 7.13 show the women-to-men ratio of the average number of publications per individual at each seniority level, for 2013-2017. In the majority of the EU-28 Member States, the ratio for the most senior category (those authors who have more than 10 years publishing experience) is the lowest. For the middle category and the least senior category, the ratio of average publications is closer to parity, sometimes even surpassing the parity line.

When it is disaggregated by fields of R&D, the picture is similar. Exceptionally, in the social sciences (GE, AM, BA, ME and LV), and in the humanities and the arts (IS, HU, BA, UA and RS), the ratio of average publications is higher for the most senior category, but this may be related to the overall low number of publications in this category resulting in a mean value that is not representative of the overall publication set.

The data indicate that junior women authors publish almost as many publications as men authors, but as seniority increases, men authors widen the gap and become more productive than women authors.

Figure 7.9 Ratio of women to men average number of publications (all authorships) in all fields of R&D, per seniority level, 2013-2017



Notes: Countries are listed in protocol order; EU-28 and world values at the top; error bars were omitted for visibility reasons; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia for EU-28 countries and 50 % for Albania and Faroe Islands for non-EU countries.

Source: Computed by Elsevier using Scopus data.

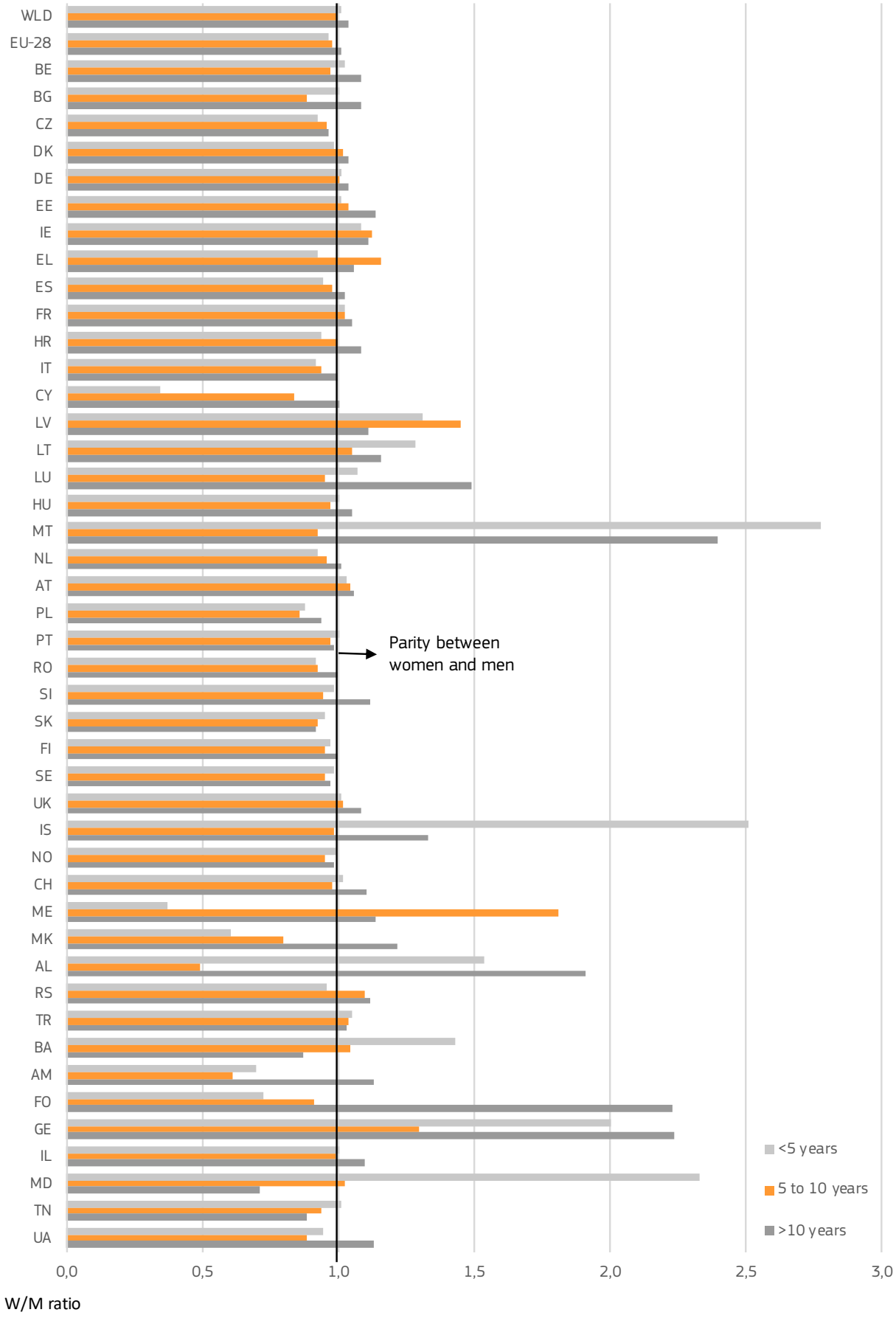
Table 7.13 Ratio of women to men average number of publications (all authorships), by field of R&D and seniority level, 2013-2017

	Natural Sciences			Engineering and technology			Medical sciences			Agricultural sciences			Social sciences			Humanities and arts		
	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years
WLD	0,9	0,8	0,8	1,0	0,9	0,8	0,9	0,8	0,8	0,9	0,9	0,8	1,0	0,9	0,9	1,0	0,9	0,9
EU-28	0,9	0,8	0,7	1,0	0,9	0,8	0,9	0,8	0,7	1,0	0,9	0,8	1,0	0,9	0,9	1,0	0,9	0,9
BE	0,9	0,7	0,7	0,9	0,8	0,8	0,9	0,9	0,7	0,9	0,8	0,7	1,0	0,9	0,8	1,1	0,9	0,9
BG	1,1	0,9	0,8	1,2	0,8	1,0	1,1	1,0	1,0	1,0	0,8	1,0	1,0	0,8	0,7	:	1,0	0,8
CZ	0,9	0,7	0,6	0,9	0,9	0,8	0,9	0,9	0,7	0,9	0,8	0,8	0,9	1,0	0,8	1,0	1,1	0,7
DK	0,9	0,8	0,7	0,9	0,8	0,8	0,9	0,8	0,7	0,9	0,8	0,7	1,0	0,8	0,9	1,0	0,8	0,8
DE	0,9	0,8	0,8	1,0	0,9	0,8	0,9	0,8	0,7	1,0	0,9	0,8	1,0	0,9	0,9	0,9	0,9	0,9
EE	0,8	1,2	0,6	0,9	0,7	0,7	0,8	0,9	0,7	0,9	0,7	1,0	0,8	0,8	0,9	1,0	0,7	0,7
IE	0,9	0,8	0,7	0,9	0,9	0,7	0,9	0,9	0,8	0,9	0,9	0,8	1,0	0,9	0,9	1,0	1,0	0,9
EL	0,9	0,8	0,7	0,9	0,8	0,7	0,9	0,8	0,8	1,0	0,8	0,8	0,9	0,9	0,8	0,9	1,1	0,7
ES	0,9	0,8	0,7	0,9	0,9	0,8	0,9	0,9	0,8	1,0	0,9	0,8	0,9	0,9	0,9	1,0	0,9	0,9
FR	0,9	0,9	0,7	0,9	0,9	0,8	0,9	0,8	0,7	1,0	0,9	0,8	0,8	0,9	0,9	0,9	0,9	0,9
HR	1,0	0,8	0,7	1,0	0,9	0,9	0,9	0,8	0,9	0,9	0,9	1,0	0,9	0,9	1,0	1,1	0,9	1,0
IT	0,9	0,7	0,7	1,0	0,9	0,8	0,9	0,8	0,7	1,0	0,8	0,8	1,0	0,9	0,9	0,9	1,0	1,0
CY	0,9	0,7	0,6	0,9	0,9	0,7	1,1	0,9	0,7	1,0	0,7	0,6	1,0	0,9	0,9	1,2	1,1	0,8
LV	1,0	0,9	0,9	1,0	1,0	0,9	1,1	1,2	1,1	1,0	0,9	0,7	0,9	1,0	1,6	0,5	1,3	0,3
LT	0,8	0,7	0,7	1,0	0,8	0,7	1,0	0,8	0,9	1,2	0,8	0,7	1,0	0,8	1,1	1,3	1,1	0,7
LU	1,0	0,8	0,7	1,2	0,8	0,7	0,9	0,8	0,7	0,7	0,7	0,4	0,7	0,7	0,9	1,0	0,9	0,6
HU	0,9	0,8	0,7	1,0	0,8	0,7	1,0	0,9	0,7	0,9	0,8	0,8	1,1	0,9	1,0	1,0	0,8	1,2
MT	0,9	0,9	0,5	1,1	1,2	0,4	1,1	0,9	1,0	0,8	1,7	0,6	0,6	1,0	1,1	1,6	1,0	0,8
NL	1,0	0,9	0,8	1,0	0,9	0,8	0,9	0,9	0,8	1,0	0,9	0,8	1,0	0,9	0,9	0,9	0,9	0,9
AT	0,9	0,9	0,7	0,9	0,9	0,7	0,9	0,8	0,7	0,9	0,9	0,8	0,9	0,9	0,9	1,1	0,9	0,8
PL	0,9	0,8	0,8	1,0	0,9	0,9	1,0	0,9	0,8	1,0	0,9	0,9	0,9	0,9	0,9	1,0	0,9	0,9
PT	0,9	0,8	0,7	0,9	0,9	0,8	1,0	0,9	0,8	1,0	0,9	0,8	1,0	0,9	0,8	0,9	0,9	1,0
RO	1,0	1,0	0,8	1,0	1,1	0,9	0,9	0,7	0,7	1,0	1,0	0,9	1,0	0,9	0,8	1,5	1,4	0,4
SI	0,9	0,8	0,7	0,8	1,0	0,8	0,9	0,9	0,8	1,1	0,8	0,8	1,0	0,8	0,9	1,0	1,1	0,9
SK	0,9	0,8	0,7	0,9	0,9	0,8	0,9	0,9	0,8	0,9	0,8	0,9	1,0	0,9	0,9	0,9	0,9	0,6
FI	0,9	0,7	0,7	0,9	0,8	0,7	0,9	0,8	0,7	1,0	0,7	0,9	0,9	0,8	1,0	1,0	0,8	0,8
SE	0,9	0,8	0,7	1,0	0,9	0,8	0,9	0,8	0,7	0,9	0,8	0,8	0,9	0,9	0,9	0,9	0,9	1,0
UK	0,9	0,8	0,7	0,9	0,9	0,8	0,9	0,9	0,8	1,0	0,9	0,8	1,0	0,9	0,9	0,9	1,0	0,9
IS	1,0	0,6	0,8	1,2	0,3	0,3	1,2	1,1	0,9	0,9	1,2	1,3	1,1	1,2	1,3	0,4	0,9	1,8
NO	1,0	0,8	0,8	1,2	1,0	0,8	0,9	0,9	0,8	1,0	0,8	0,7	1,0	0,9	0,8	0,9	1,0	0,9
CH	0,9	0,7	0,7	1,1	0,9	0,9	0,9	0,8	0,7	1,0	0,9	0,8	1,0	0,9	0,8	0,9	1,0	0,8
ME	1,2	0,8	0,7	1,2	0,8	0,8	0,8	0,5	1,1	1,2	0,9	0,4	0,9	1,0	2,1	1,0	1,3	:
MK	1,0	0,9	0,9	1,0	0,7	0,9	1,0	1,2	0,6	1,0	1,1	0,9	1,1	1,0	1,1	:	:	:
AL	0,6	0,6	1,3	:	1,1	0,7	1,0	0,8	1,5	0,7	0,7	1,5	1,1	0,5	0,4	1,4	:	:
RS	1,0	1,0	1,0	1,2	1,0	1,1	1,0	1,0	1,1	1,0	1,0	1,1	0,9	0,9	0,9	0,9	0,9	1,3
TR	0,9	0,9	0,8	0,9	0,8	0,8	0,8	0,7	0,8	0,9	0,8	0,9	0,9	0,8	0,9	0,9	0,8	0,9
BA	1,0	0,9	0,8	1,3	0,8	1,0	0,9	0,9	0,8	0,7	0,8	0,5	1,1	0,9	1,9	0,8	0,9	2,3
AM	0,9	0,8	0,8	1,1	1,1	0,5	0,9	0,9	0,8	:	1,0	0,9	:	0,9	1,4	1,5	:	:
FO	1,1	1,2	1,5	:	:	:	:	1,5	1,1	1,0	:	1,0	:	:	:	:	:	:
GE	1,3	2,5	1,2	1,0	0,7	0,7	1,2	1,2	1,1	1,2	1,3	0,3	1,0	1,1	1,6	1,1	:	0,4
IL	0,9	0,8	0,7	0,9	0,8	0,8	0,9	0,8	0,8	1,0	0,9	0,8	1,0	0,9	1,0	1,0	0,9	1,1
GE	0,9	0,8	0,7	0,8	1,0	0,8	0,8	2,0	0,9	0,8	0,6	:	1,3	:	:	1,1	:	:
TN	0,9	0,9	0,6	0,9	0,9	0,6	1,0	0,9	0,8	1,0	1,0	0,6	0,9	0,8	1,0	0,6	1,2	0,8
UA	1,0	0,9	0,7	1,0	0,9	0,8	0,9	0,9	0,8	0,9	1,2	0,9	1,0	1,1	1,1	0,8	0,8	1,2

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men.
Other: ':' indicates that no men nor women were identified in that category; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Figure 7.10 Ratio of women to men average FWCI of publications (corresponding authorships) in all fields of R&D, per seniority level, 2013-2017



Notes: Countries are listed in protocol order; EU-28 and world values at the top; error bars were omitted for visibility reasons; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia for EU-28 countries and 50 % for Albania and Faroe Islands for non-EU countries.

Source: Computed by Elsevier using Scopus data.

Table 7.14 Ratio of women to men average FWCI of publications (all authorships), by field of R&D and seniority level, 2013-2017

	Natural Sciences			Engineering and technology			Medical sciences			Agricultural sciences			Social sciences			Humanities and arts		
	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years	<5 years	5-10 years	>10 years
WLD	1,0	1,0	1,0	0,9	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1
EU-28	1,0	1,0	1,0	0,9	0,9	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1
BE	1,1	1,0	1,1	0,9	0,9	1,1	1,0	1,0	1,1	1,0	1,0	1,0	1,1	0,9	1,0	1,2	0,9	1,2
BG	0,9	0,8	1,0	1,2	1,1	1,1	0,9	0,8	1,2	1,1	0,7	1,2	1,7	0,7	1,4	:	0,7	1,5
CZ	1,0	1,0	1,0	0,9	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,1	1,0	0,8	1,1	0,9	0,7	0,7
DK	0,9	1,0	1,1	1,0	1,0	0,9	1,0	1,0	1,0	0,7	0,9	1,0	1,0	0,8	1,0	0,8	0,9	0,9
DE	1,0	1,0	1,1	1,0	1,0	1,0	1,0	1,0	1,0	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0	1,1
EE	1,2	1,1	1,1	1,1	0,9	1,2	1,1	0,9	1,0	1,7	1,2	1,0	0,4	0,7	1,3	0,5	0,7	1,1
IE	1,2	1,2	1,2	0,9	1,0	1,0	1,0	1,2	1,1	1,1	1,1	1,1	0,9	0,9	1,1	1,0	1,6	1,0
EL	1,0	1,1	1,0	1,0	1,0	1,0	0,9	1,3	1,0	1,1	1,2	1,2	0,7	1,0	1,2	0,6	1,0	1,3
ES	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,0	1,0	1,0	0,9	0,9	1,0
FR	1,1	1,0	1,1	1,0	1,0	1,0	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,1	1,0	0,9	1,0	1,1
HR	0,8	1,0	1,0	0,8	1,1	1,0	1,2	1,2	1,2	1,0	1,1	1,2	0,9	1,0	1,1	1,4	1,4	0,8
IT	0,9	0,9	1,0	0,9	0,9	0,9	0,9	1,0	1,0	1,1	1,1	1,0	1,0	1,0	1,0	1,0	1,2	1,2
CY	0,8	1,2	1,0	0,8	0,9	1,0	0,1	0,5	0,9	0,9	0,9	0,9	0,8	1,2	1,0	0,9	1,7	0,7
LV	1,0	1,3	1,1	1,0	1,2	0,9	3,0	2,2	1,6	1,1	1,0	0,8	2,2	1,4	1,4	0,7	0,2	1,1
LT	1,3	1,0	1,1	1,1	1,1	0,9	1,3	1,1	1,3	1,0	0,6	0,7	1,1	1,0	0,9	3,8	1,5	1,4
LU	1,0	1,0	1,7	1,1	1,0	0,7	1,0	0,9	1,8	1,2	1,1	0,9	1,0	1,1	1,2	2,0	1,0	1,8
HU	0,9	1,0	1,1	1,1	1,2	1,0	1,0	1,0	1,0	1,1	1,3	1,1	1,6	1,2	1,0	2,1	1,1	1,5
MT	1,4	1,1	4,4	1,1	1,0	1,5	4,8	0,9	2,9	4,9	2,5	0,3	1,1	1,4	1,0	0,5	3,3	1,2
NL	1,0	1,0	1,0	1,0	1,0	1,0	0,9	0,9	1,0	0,9	0,9	0,9	1,0	1,0	1,0	1,3	1,1	1,1
AT	1,0	1,1	1,1	1,0	1,0	1,0	1,0	1,1	1,0	0,9	0,9	1,0	1,0	0,9	1,0	0,8	0,9	1,3
PL	0,9	0,9	0,9	0,9	0,9	0,9	1,0	0,9	0,9	1,0	1,0	1,0	1,0	0,9	0,9	1,0	1,0	1,2
PT	1,0	1,0	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,1	1,1	1,1	0,8	1,0	1,0	0,7	1,0	1,2
RO	1,0	0,9	0,9	1,1	1,0	1,0	0,7	0,7	1,1	0,8	1,2	1,0	1,0	0,8	1,3	0,3	1,1	4,2
SI	0,9	1,0	1,1	1,0	1,0	1,3	1,1	1,0	1,4	0,7	1,1	1,0	0,7	0,9	0,9	0,4	0,7	1,4
SK	1,0	0,9	0,9	1,0	1,1	0,9	1,0	0,9	0,9	1,1	0,9	1,0	1,2	0,9	0,7	1,1	1,6	1,0
FI	1,1	1,0	1,0	1,0	1,0	0,9	0,9	0,9	1,0	1,1	1,0	1,2	1,2	0,9	1,0	2,0	0,8	1,2
SE	1,0	1,0	1,0	1,0	1,0	1,0	0,9	0,9	0,9	1,2	1,0	0,9	1,1	0,9	1,0	0,9	0,9	0,9
UK	1,1	1,0	1,1	1,0	1,0	1,1	1,0	1,0	1,0	1,0	1,1	1,0	1,0	1,0	1,0	0,9	1,1	1,1
IS	1,0	1,1	1,2	1,0	0,9	1,3	4,5	0,9	1,3	1,3	1,1	1,5	0,6	0,5	1,7	1,1	1,0	1,2
NO	1,0	1,0	1,0	1,0	0,9	1,0	0,9	0,9	1,0	0,9	1,1	1,0	0,9	0,9	1,0	0,8	0,8	1,1
CH	1,1	1,0	1,1	1,1	0,9	0,9	0,9	0,9	1,1	0,9	1,0	1,1	1,0	1,0	0,9	1,1	1,4	0,6
ME	0,5	2,1	1,0	0,2	2,6	1,1	2,0	1,9	0,8	0,4	2,8	0,9	0,2	0,1	2,2	0,2	1,6	:
MK	0,6	0,8	1,3	0,6	1,3	1,2	1,3	0,5	1,0	0,4	0,7	1,8	0,6	1,2	1,7	:	:	:
AL	1,4	0,4	1,8	:	0,9	0,9	2,3	0,4	3,9	0,3	0,9	0,6	0,6	0,8	0,0	1,3	:	:
RS	1,1	1,1	1,1	1,0	1,1	1,1	0,9	1,2	1,2	1,1	1,2	1,2	0,8	1,1	0,9	1,1	0,8	2,1
TR	1,0	0,9	1,0	1,0	0,9	0,9	1,2	1,2	1,1	1,2	1,0	1,1	0,9	0,9	1,1	0,9	1,7	0,8
BA	1,6	1,0	0,6	3,1	0,8	0,6	1,6	1,5	0,9	3,0	1,1	0,5	1,1	1,7	0,4	0,2	0,4	3,7
AM	0,8	0,7	1,1	1,8	0,7	0,9	0,9	0,6	0,9	:	0,7	1,3	:	0,4	0,5	-	:	:
FO	0,7	1,0	1,9	:	:	:	:	2,8	2,3	0,6	:	2,7	:	:	:	:	:	:
GE	1,0	1,3	1,4	1,8	1,8	1,5	1,3	1,3	1,7	0,3	0,3	0,8	-	2,9	0,6	-	:	0,4
IL	1,0	1,0	1,2	1,0	0,9	1,1	1,0	1,0	1,0	0,8	1,0	1,1	0,9	1,0	1,0	1,1	0,9	1,2
GE	2,3	1,0	0,7	0,7	1,1	0,8	6,9	1,0	0,6	33,2	0,2	:	0,1	:	:	0,1	:	:
TN	1,0	1,0	0,9	1,0	1,0	0,9	0,9	1,0	0,9	1,2	1,2	0,9	1,4	0,8	0,7	186,6	0,6	2,5
UA	0,9	0,9	0,9	0,9	0,9	1,0	1,0	0,5	1,4	0,8	0,8	1,1	0,9	0,8	1,3	4,5	2,0	1,2

Notes: Cells are colour coded relative to parity (defined mathematically as 50 %-50 %). Blue = More men than women; White = Parity; Orange = More women than men.
Other: ':' indicates that no men nor women were identified in that category; the percentage of authors to which a gender could be assigned varies; for EU-28 the percentage is above 85 %; with the lowest value of 48 % for Latvia in the EU-28 countries, and 50 % for Albania and the Faroe Islands in the non-EU countries.

Source: Computed by Elsevier using Scopus data.

Women authors with higher seniority have a similar FWCI to men authors.

For the average FWCI of publications disaggregated by seniority level (Figure 7.10 and Table 7.14), the pattern is similar to that observed when assessing authorship regardless of seniority (Figures 7.9 and 7.10). Women authors at the most senior level have a similar level of average FWCI to men authors in most countries and the ratio of average FWCI is higher at the highest seniority level.

In the EU-28, women authors at the highest seniority level reach parity in the average FWCI ratio. In general, the ratio of average FWCI is closer to parity than the average number of publications for all seniority levels. Overall, while junior women authors have a similar productivity to men authors (the ratio of the average number of publications) with a slightly lower impact, senior women authors publish less than men authors but have similar impact.

Table 7.14 displays the ratio of average FWCI per field of R&D. The picture is rather fragmented as several countries (especially the ones with rather low overall publication numbers) show very high numbers in some fields at all seniority levels. Readers should note that the metrics calculated for countries with smaller publication output and lower fidelity of gender assignment should be interpreted with caution. As already mentioned in the context of previous analyses, these extraordinarily high FWCI's may be the result of participation in highly impactful publications. It is easier for women authors to participate in these highly impactful publications, rather than playing a leading role as a corresponding author. This is especially likely given the results in Table 7.14 and Figure 7.10 which show that for all authorship, the effects of participation in impactful publications may be more pronounced than the impact of corresponding authorship.

Women to men ratio in inventorships

This indicator is the ratio between the number of inventions produced by women (women inventorships) over the corresponding number of men (men inventorships), or equivalently, the ratio of the proportion of women inventorships (in total inventorships) over the corresponding proportion for men. The absolute number of inventorships used in computing this indicator is based on fractionalised counts of patent applications between their corresponding inventors: for example, if a patent application involves 10 inventors, each inventor is attributed an equal fraction of the inventorship (i.e. 1/10 of the invention). A score above 1 indicates that women in a given country produced a larger share of the country's inventions than men, whereas a score below 1 means the opposite.

A wide gender gap persists in patent output.

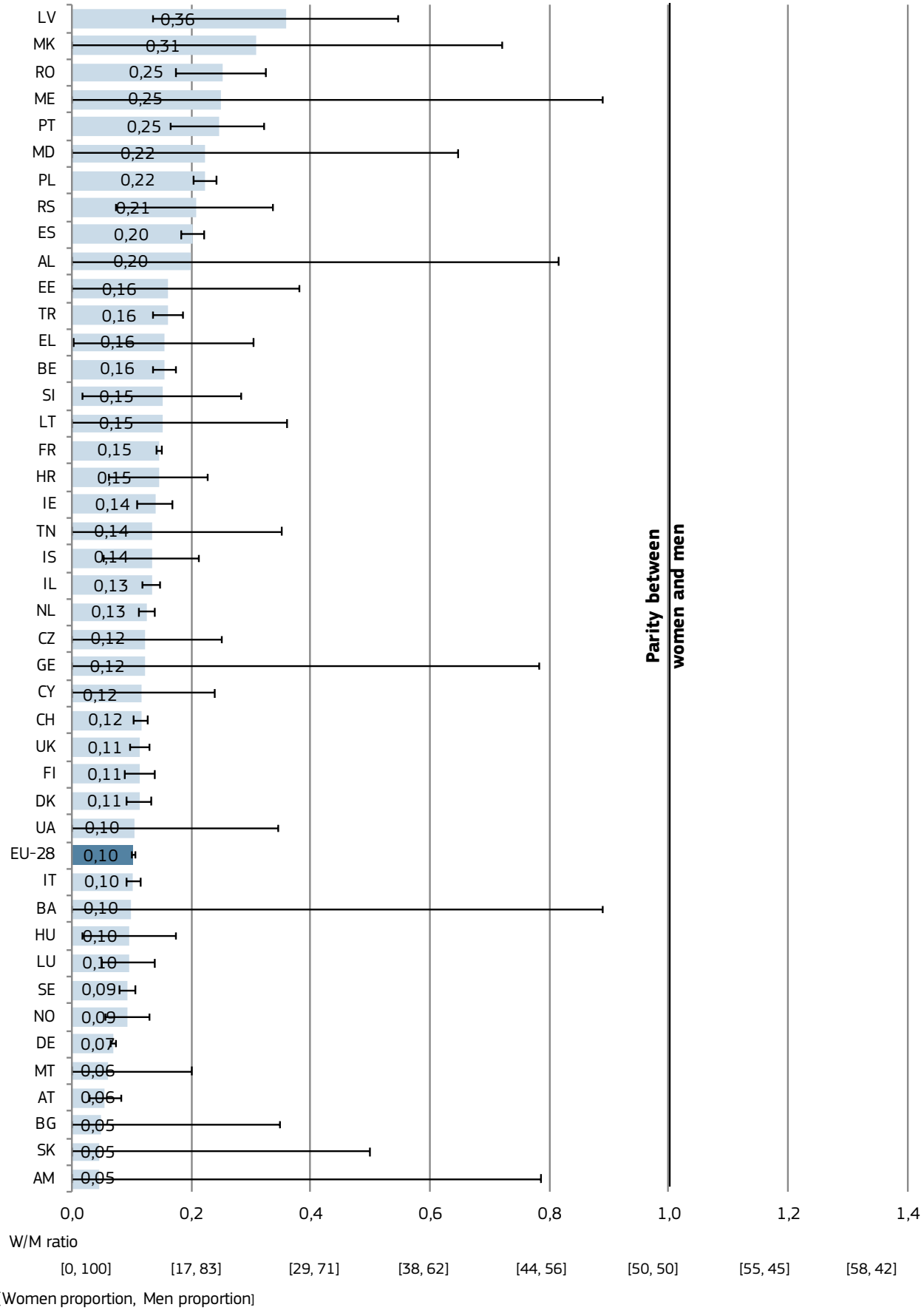
Women are under-represented as inventors in both the EU-28 and worldwide. Several previous works already showed this gender gap. Sugimoto (Sugimoto et al., 2015) verified that women contributed less than 8 % of all inventorships for the entire period (1976–2013), but with an increasing trend (10.8 % in 2013).

A similar growth rate is also observed by a study from WIPO (WIPO, 2016); progress is observed in all indicators related to gender balance in the PCT system between 1995 and 2015. Overall, the authors noted that women increased their participation from 17 % to 29 %. This kind of progress is observed in most countries, in all technical fields and in both academic institutions and companies, although at different rates.

For the UK-IPO (UK-IPO, 2016), the overall proportion of patents involving a female inventor (either working alone or as part of a team) increased by more than 500 % between 1975 and 2015. However, for the authors, the number of all female teams remains very low with only 0.3 % of patents coming from all-female teams over the last 10 years. They concluded that the world of patenting remains male-dominated and even in 2014 there is a clear gender disparity with 73 % of all worldwide patent applications coming from all-male inventors, rising to almost 96 % when mixed teams are considered (i.e. 96 % of all patent applications worldwide in 2014 had at least one male inventor).

In the light of known gender disparities in patenting, it is relevant to monitor this gap and the related trend by using patent-based indicators, taking into account the production of inventions by country, year and technological field (i.e. the section of the International Patent Classification, IPC, used to classify a patent). For this purpose, several patent-based indicators were computed by using raw bibliographic data derived from the European Patent Office (EPO) Worldwide Patent Statistical Database (PATSTAT). A standard strategy was used to determine the sex of each inventor, based on specific dictionaries of name-gender attribution that collected information covering countries worldwide. Using this method, it was possible to assign a sex to more than 97 % of the inventors.

Figure 7.11 Women to men ratio of inventorships, all International Patent Classification (IPC) sections, 2013–2016



Notes: Data not applicable for FO.
Other: Error bars represent the 90 % confidence intervals, accounting for potential biases due to the inability to infer the sex of inventors on some patent applications. It assumes that the attribution of a sex to an inventor's name is 100 % accurate (i.e. that the gender attributed to a given inventor name is always the correct one; in other words, that there are no misattributions).

Source: Computed by using European patent applications (kind codes A1 and A2) in PATSTAT.

Women are still strongly under-represented as patent inventors.

Figure 7.11 considers all the International Patent Classification (IPC) sections in the period 2013–2016, and it highlights a strong under-representation of women as inventors, observed at the aggregate EU-28 level and for all individual countries considered. It is interesting to link this result with the technological fields represented in table 7.15 by their IPC codes, checking also the values of the indicators for the years 2005-2008 and 2013-2016.

Again, for both periods 2005-2008 and 2013-2016, women inventors are under-represented across all countries and time periods, pertaining to all the IPC sections, despite being partially limited in the fields of 'human necessities' and in 'chemistry and metallurgy'. An exception can be seen in Romania during the 2013-2016 period in the 'textiles and paper' section, where the women to men ratio is in favour of women. In Portugal (still in 'textiles and paper'), the ratio was close to parity in the period 2005-2008, but the value decreased during the 2013-2016 period. However, for these countries, as well as for the Associated Countries, the confidence interval has a range of values that could be equal to +/-0.1 (Portugal and Romania), reaching to +/- 0.7 for Armenia. Confidence intervals account for potential biases due to the inability to infer the sex of inventors on some patent applications.

Although the comparison of these low figures across two periods suggests that little change has occurred, the analysis of the compound annual growth rate (CAGR) of the proportion of women inventorships is more revealing in this respect as shown in Table 7.16.

The proportion of women among inventors grew slowly at EU level.

Table 7.16 presents the compound annual growth rate of the proportion of women inventorships, representing the average yearly percentage of increases and decreases in the proportion. To obtain more robust estimates, this indicator is built using a four-year moving period, e.g. 2012–2015, 2013–2016, and so on.

Modest growth is apparent in the proportion of women inventorships for all technology domains (combined) at the EU-28 level (0.4 %). The highest increase can be found in domains such as 'mechanical engineering, lighting, heating, weapons and blasting', in which women remain considerably under-represented. More variations become apparent when considering growth figures at the level of individual countries. On the one hand, the proportion of women inventors grew on average the most during 2005-2016 in Serbia (17.5 %), in North Macedonia (12.7 %) and in Romania (9.7 %). On the other hand, the largest annual decrease during the same period in the proportion of women inventorships can be seen in Armenia (-14.3 %), Montenegro (-10.8 %) and Bulgaria (-9.5 %). However, it should be noted that the decrease observed in Bulgaria is in spite of the high growth of women inventorships in the 'performing operations and transporting' section.

Overall, the observations about gender differences in patent inventions reveal that women are heavily under-represented as inventors, and that growth figures in this respect are modest. This under-representation of women in research and innovation activities and outputs is therefore more severe in 'innovation' (patent inventions) than in 'research' (scientific publications). What is interesting is to measure also the propensity of the two sexes in to work together; this could be derived by means of the sex composition in inventors' teams.

Table 7.15 Women to men ratio of inventorships, by IPC section, 2005–2008 and 2013–2016

Country	A		B		C		D		E		F		G		H	
	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16	2005–08	2013–16
EU-28	0,2	0,2	0,1	0,1	0,2	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1
BE	0,3	0,2	0,1	0,1	0,2	0,3	0,1	0,1	0,0	0,0	0,1	0,1	0,1	0,1	0,1	0,1
BG	0,3	0,0	0,0	0,0	0,3	0,1	z	0,8	z	0,1	0,1	0,0	0,1	0,0	0,1	0,0
CZ	0,2	0,3	0,0	0,0	0,1	0,2	0,2	0,1	0,0	0,0	z	0,0	0,0	0,1	0,0	0,0
DK	0,2	0,2	0,0	0,1	0,3	0,3	0,2	0,2	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0
DE	0,2	0,2	0,0	0,0	0,1	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0
EE	0,3	0,2	0,1	0,1	0,3	0,4	0,4	0,1	z	0,1	0,0	0,1	0,3	0,1	0,2	0,1
IE	0,2	0,2	0,1	0,1	0,3	0,2	0,1	0,2	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,1
EL	0,3	0,3	0,1	0,1	0,4	0,3	0,1	z	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,0
ES	0,3	0,3	0,2	0,1	0,4	0,5	0,2	0,1	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,1
FR	0,3	0,3	0,1	0,1	0,3	0,3	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
HR	0,4	0,3	0,1	0,1	0,5	0,5	z	z	0,1	0,1	0,0	z	0,3	0,1	0,1	0,1
IT	0,2	0,2	0,0	0,1	0,3	0,3	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1
CY	0,2	0,2	0,0	0,0	0,1	0,2	z	z	0,0	0,1	0,0	0,1	0,1	0,1	0,0	0,1
LV	0,3	0,6	0,7	0,2	0,3	0,5	z	0,7	z	0,1	z	0,1	0,0	0,1	0,0	0,0
LT	0,2	0,3	0,0	0,1	0,5	0,3	z	z	z	z	z	0,1	0,1	0,1	0,0	0,0
LU	0,2	0,2	0,1	0,1	0,1	0,2	0,1	0,1	0,1	0,1	0,0	0,0	0,1	0,1	0,1	0,1
HU	0,2	0,2	0,0	0,0	0,3	0,2	0,4	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1
MT	0,0	0,1	0,1	0,0	0,1	0,2	z	z	z	0,0	0,1	z	z	0,0	0,0	0,1
NL	0,2	0,2	0,1	0,1	0,2	0,2	0,2	0,1	0,1	0,1	0,0	0,1	0,1	0,1	0,1	0,1
AT	0,1	0,1	0,0	0,0	0,2	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PL	0,3	0,4	0,1	0,1	0,4	0,6	0,3	0,5	0,0	0,1	0,0	0,0	0,1	0,1	0,1	0,1
PT	0,3	0,4	0,1	0,1	0,4	0,6	0,9	0,6	0,1	0,1	0,0	0,1	0,2	0,1	0,2	0,2
RO	0,3	0,4	0,1	0,2	0,1	0,6	0,5	2,3	0,1	0,1	0,0	0,1	0,1	0,2	0,1	0,1
SI	0,4	0,3	0,1	0,0	0,4	0,4	0,0	0,2	0,0	0,1	0,0	0,0	0,1	0,2	0,1	0,0
SK	0,3	0,1	0,1	0,1	0,4	0,1	0,1	z	z	0,0	z	z	0,0	0,0	0,0	0,1
FI	0,2	0,2	0,1	0,1	0,3	0,2	0,1	0,2	0,0	0,0	0,0	0,1	0,1	0,1	0,1	0,1
SE	0,2	0,2	0,1	0,1	0,2	0,2	0,1	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1	0,1
UK	0,2	0,2	0,1	0,1	0,2	0,2	0,1	0,1	0,0	0,0	0,0	0,0	0,1	0,1	0,1	0,1
IS	0,2	0,2	0,1	0,1	0,2	0,1	0,3	0,0	z	0,3	z	0,0	0,2	0,0	0,1	0,2
NO	0,2	0,2	0,1	0,1	0,2	0,3	0,1	0,2	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,1
CH	0,2	0,2	0,0	0,1	0,2	0,2	0,0	0,1	0,0	0,0	0,0	0,1	0,1	0,1	0,0	0,1
ME	z	z	z	z	z	z	z	z	z	z	z	z	z	z	z	1,0
MK	1,0	1,1	z	z	z	1,0	z	z	z	z	z	z	z	z	z	z
AL	z	z	z	0,5	z	z	z	z	z	z	z	z	z	z	z	z
RS	0,1	0,4	z	0,1	0,3	0,6	z	z	z	0,1	0,0	0,0	0,0	0,2	z	0,1
TR	0,1	0,3	0,1	0,1	0,2	0,3	0,1	0,2	0,1	0,1	0,1	0,1	0,1	0,1	0,1	0,1
BA	0,3	z	0,1	z	z	z	z	z	z	z	0,3	z	0,4	1,0	z	z
AM	1,0	0,0	z	0,5	0,7	z	z	z	z	z	z	z	z	0,1	0,1	z
FO	0,1	z	z	z	z	z	z	z	z	z	z	z	0,3	z	z	z
GE	0,4	0,1	0,1	z	0,3	0,2	z	z	0,2	0,1	0,1	z	z	0,3	0,3	0,1
IL	0,2	0,2	0,1	0,1	0,4	0,4	0,2	0,2	0,1	0,0	0,1	0,0	0,1	0,1	0,1	0,1
MD	0,1	0,3	z	0,3	0,6	0,4	z	z	z	0,0	0,3	0,1	0,1	0,1	z	0,1
TN	0,1	0,3	0,1	0,1	0,2	0,1	z	z	z	0,0	z	0,1	0,0	0,0	z	z
UA	0,2	0,3	0,1	0,1	0,1	0,2	0,2	1,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0

Other: IPC sections: A = Human necessities; B = Performing operations & transporting; C = Chemistry & metallurgy; D = Textiles & paper; E = Fixed constructions; F = Mechanical engineering, lighting, heating, weapons & blasting; G = Physics; H = Electricity;
Colouring of cells is relative to parity (defined mathematically at 50 %–50 %): Blue = Fewer women than men; White = Parity; Orange = More women than men; Grey (z) = Not applicable (due to small population size).

Source: Computed by using European patent applications (kind codes A1 and A2) in PATSTAT.

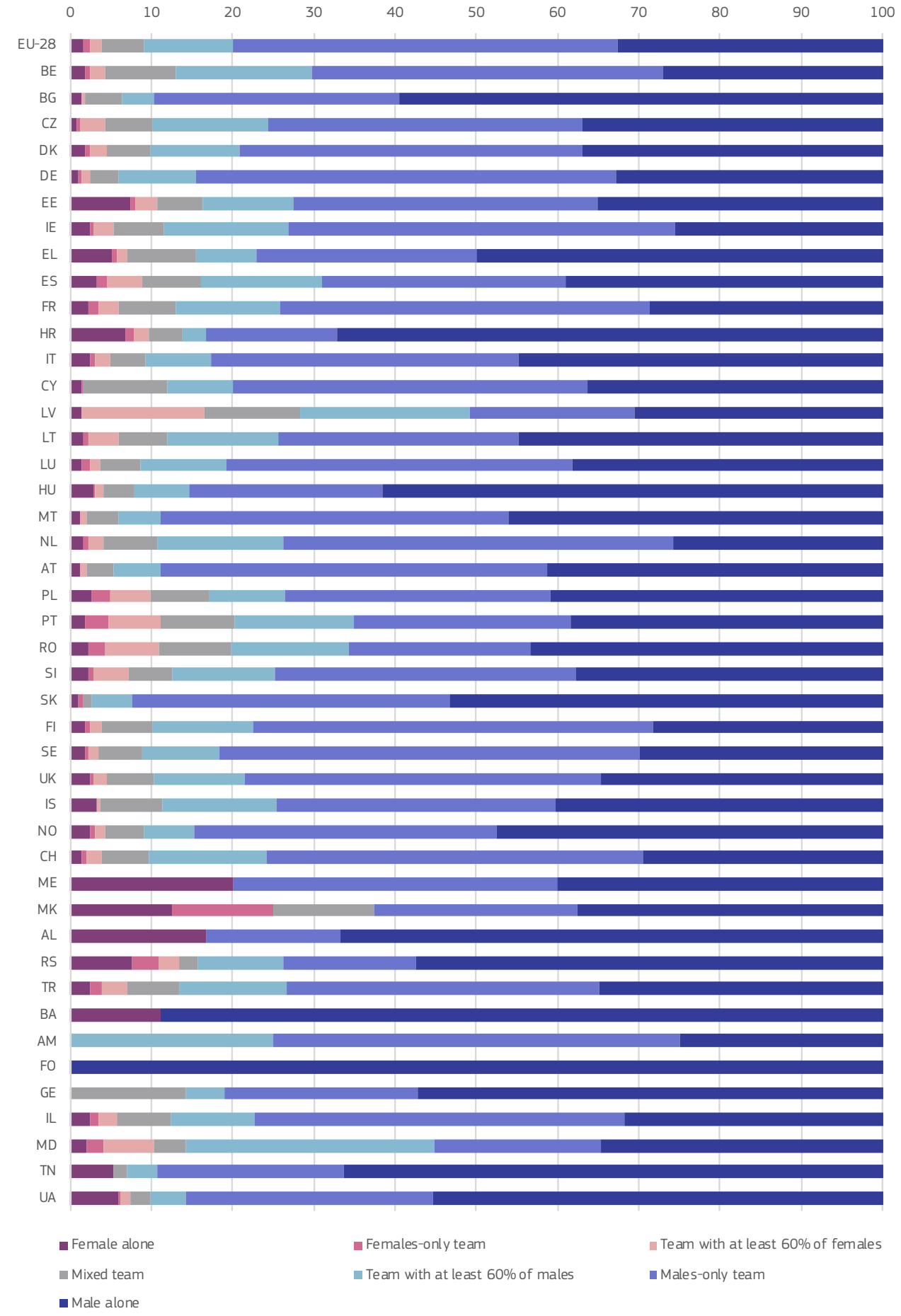
Table 7.16 Compound annual growth rate (%) of the four-year proportion of women inventorships, by IPC section, 2005–2016

Country	All IPC sections		A		B		C		D		E		F		G		H	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
EU-28	0,4		-0,1		2,5		1,6		3,8		1,2		4,6		2,2		2,8	
BE	-0,9		-2,1		0,0		1,2		1,3		-0,9		0,4		0,2		6,8	
BG	-9,5		-19,5		15,7		-15,9		z		z		-12,1		-7,0		-16,2	
CZ	5,8		4,8		10,3		5,2		-2,9		0,5		z		4,2		1,6	
DK	-2,3		-2,4		2,8		0,1		-3,8		0,3		3,1		-2,1		3,8	
DE	1,1		0,3		3,6		2,5		5,9		3,0		5,3		3,2		4,3	
EE	-4,8		-2,4		3,4		1,3		-15,0		z		19,8		-7,3		-9,4	
IE	-0,1		2,2		-6,3		-1,6		17,3		-1,1		3,4		-0,6		1,1	
EL	-0,1		0,9		4,1		-4,6		z		4,8		-1,4		1,2		-11,8	
ES	-1,5		-0,3		-2,4		1,6		-5,9		-7,3		-3,2		-0,7		-4,6	
FR	0,3		0,3		2,3		0,8		3,1		2,6		3,9		1,6		0,2	
HR	-5,5		-2,1		-2,1		-1,0		z		-10,7		z		-7,5		-7,9	
IT	-1,1		-1,8		3,1		-0,1		2,9		-0,1		3,7		-0,9		0,3	
CY	5,1		0,4		-17,1		8,0		z		11,0		14,2		5,7		19,6	
LV	4,5		5,9		-10,3		4,7		z		z		z		20,3		7,6	
LT	-1,4		3,5		19,5		-5,8		z		z		z		-0,6		-9,7	
LU	0,9		2,0		0,9		3,4		-0,5		0,4		-2,2		1,6		-3,5	
HU	-4,0		-4,0		0,7		-4,0		-9,2		-1,0		-9,6		-3,6		15,4	
MT	1,3		10,5		-13,2		5,8		z		z		z		z		11,3	
NL	1,8		-0,2		2,2		1,0		-2,6		-0,8		5,2		4,3		5,1	
AT	-0,5		-4,1		2,9		-0,5		-1,3		9,5		14,4		-0,9		6,5	
PL	3,9		3,9		4,9		2,9		3,9		5,5		10,0		4,1		5,9	
PT	1,0		2,7		0,3		4,4		-2,4		3,8		6,0		-2,0		-0,3	
RO	9,7		4,1		4,9		27,1		9,6		-5,6		10,7		9,8		5,0	
SI	-4,7		-1,7		-6,6		-0,3		16,1		2,9		0,8		9,1		-12,7	
SK	-9,0		-16,4		-0,3		-15,2		z		z		z		-9,8		17,1	
FI	0,6		-2,2		-0,5		-0,4		6,6		11,5		8,3		1,6		2,0	
SE	-1,4		-2,7		-0,6		-2,2		-2,1		7,0		5,8		0,3		6,8	
UK	0,4		-0,1		3,2		0,9		-0,2		-0,7		7,9		2,9		5,0	
IS	-1,4		1,1		1,7		-2,9		-17,4		z		z		-14,6		3,4	
NO	0,1		0,5		-0,7		1,5		9,3		6,2		-8,2		2,5		10,6	
CH	-0,7		-0,4		4,6		0,5		7,3		7,9		4,4		-0,6		8,0	
ME	-10,8		z		z		z		z		z		z		z		z	
MK	12,7		0,6		z		z		z		z		z		z		z	
RS	17,5		15,8		z		6,5		z		z		-0,6		46,9		z	
TR	5,4		7,8		3,4		7,7		4,6		0,6		-1,5		3,7		1,4	
BA	-6,8		z		z		z		z		z		z		8,2		z	
AM	-14,3		-32,2		z		z		z		z		z		z		z	
GE	-4,5		-18,5		z		-5,1		z		-10,8		z		z		-5,7	
IL	-2,4		-3,2		-0,3		-0,8		-4,7		-8,8		-3,9		-1,8		2,9	
MD	7,7		11,4		z		-2,6		z		z		-16,4		4,1		z	
TN	3,7		10,3		3,7		-4,4		z		z		z		3,3		z	
UA	1,6		1,8		1,5		8,8		14,7		-0,4		2,5		-6,8		-4,8	

Notes: Data systematically not applicable for: AL, FO.
Others: IPC sections: A = Human necessities; B = Performing operations & transporting; C = Chemistry & metallurgy; D = Textiles & paper; E = Fixed constructions; F = Mechanical engineering, lighting, heating, weapons & blasting; G = Physics; H = Electricity;
CAGR: The compound annual growth rate of the proportion of women inventorships computed on four-year moving periods (e.g. 2005–2008, 2006–2009, 2007–2010, and so on);
Trend: Shows the trend in the proportion of women inventorships using four-year moving periods (the scale is not the same across countries);
z = Not applicable (due to small population size).

Source: Computed by using European patent applications (kind codes A1 and A2) in PATSTAT.

Figure 7.12 Distribution of patent application by sex composition of the inventors' team (%), 2013–2016



Source: Computed by using European patent applications (kind codes A1 and A2) in PATSTAT.

A strong gender gap in the composition of the inventors' teams is observed in all countries.

Each patent application can have one named inventor (a lone individual/inventor) or multiple inventors (working collaboratively as part of a team). The determination of the sex of each named inventor permits to identify mutually exclusive sets of applications, i.e. those referring to a female (or male) working alone, those developed by teams of the same sex and those referred by mixed sex teams. This last group can be further divided by considering the prevalence of one sex (more than 60 % of inventors are women or men) or balanced. In other words, these indicators shed light on the propensity of the two sexes to work alone, in same-sex teams or in mixed-sex teams, as well as on how such collaboration patterns vary between countries (figure 7.12) and evolve over time (table 7.17).

Also, in this case the results show a strong gender-gap; in the EU-28 (2013-2016), the majority of teams are those were all members are males (47 %), followed by those with just one male inventor (33 %). This phenomenon is almost stable when considering the compound annual growth rate from 2005 (-0.016 the CAGR for the all-male teams and -0.044 % for teams with just one male inventor). The proportion of mixed gender teams was 5 % for the 2013-2016 period, while teams composed mainly or totally of women accounted for 1.6 % and 0.7 % respectively. Female-only teams had the highest average annual growth from 2005 (2 %).

At country level, the highest proportion of mixed teams with gender balance was in Georgia (14.3 %) and in North Macedonia (12.5 %) for the period 2013-2016. The highest proportion of mixed teams composed mainly of women is found in Latvia (14.9 %), while that of mixed teams composed mainly of men in Moldova (30.6 %) during the same time period. The average annual growth of mixed teams with gender balance (2005-2016) was highest in Georgia (25.1 %) and Cyprus (11.9 %). The proportion of mainly female mixed teams increased the most (on average) in Romania (22.5 %) during the period 2005-2016. The corresponding highest growth for mixed teams composed mainly of males was found in Moldova (34.5 %).

Table 7.17 CAGR (%) of the four-year proportions of patent applications by sex composition of the inventors' team, 2005–2016

Country	Female alone		Females-only team		Team with at least 60% of females		Mixed team		Team with at least 60% of males		Males-only team		Male alone	
	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend	CAGR	Trend
EU-28	0,0		2,0		0,7		0,7		-0,3		0,0		0,0	
AT	4,1		-5,1		-3,0		0,8		-1,8		0,4		-0,3	
BE	-4,5		-0,2		-2,2		1,2		-1,4		-0,2		1,5	
BG	-8,8		z	z	-19,0		6,0		-14,4		-1,9		4,2	
CY	-8,0		z	z	z	z	11,9		19,6		4,6		-5,9	
CZ	0,4		7,9		9,7		8,0		2,0		-2,0		0,1	
DE	1,9		6,0		2,2		1,7		-0,5		-0,3		0,3	
DK	-1,1		-6,0		2,4		-3,3		-3,4		0,7		1,0	
EE	z	z	-17,4		-9,9		-10,8		-4,3		0,3		4,5	
EL	6,7		-6,6		-5,9		4,5		-1,4		-1,9		0,5	
ES	-6,6		0,1		0,7		-1,0		-0,1		0,9		0,2	
FI	1,5		-6,8		-2,7		1,7		3,1		0,0		-1,2	
FR	-0,9		2,4		0,8		0,3		0,6		0,7		-1,4	
HR	-3,8		-3,8		-7,5		-2,2		-12,8		2,5		1,6	
HU	1,0		-7,3		-3,8		-6,8		-8,6		-1,7		3,2	
IE	0,8		-1,9		1,4		-0,6		-0,3		0,6		-0,8	
IT	3,2		3,5		-3,7		-0,8		-2,6		0,4		0,3	
LT	z	z	z	z	-6,4		-7,4		-1,0		-2,5		4,5	
LU	-5,7		8,6		0,8		3,3		3,3		-0,1		-0,9	
LV	-10,6		z	z	z	z	-7,0		4,1		-2,7		-1,4	
MT	-8,2		z	z	z	z	-2,1		3,5		-1,5		1,5	
NL	-1,8		2,4		1,5		2,6		2,7		-0,7		-0,8	
PL	5,3		7,2		0,6		2,2		-0,6		-1,0		0,0	
PT	-2,1		8,9		1,6		-1,2		-1,1		-2,3		2,1	
RO	-7,3		z	z	22,5		7,2		2,3		-6,7		1,4	
SE	-0,6		-6,0		-1,8		0,8		-0,7		1,1		-1,4	
SI	5,3		-13,5		-6,3		-6,7		-5,8		2,1		3,7	
SK	-4,1		z	z	z	z	-18,7		-7,4		0,6		2,2	
UK	2,5		0,9		1,6		0,5		-0,6		0,1		-0,2	
AL	z	z	z	z	z	z	z		z	z	-12,8		3,7	
AM	z	z	z	z	z	z	z	z	z	z	0,4		-5,3	
BA	-2,1		z	z	z	z	z	z	z	z	z	z	2,8	
CH	-0,3		0,2		0,0		-0,6		-0,5		-0,1		0,5	
FO	z	z	z	z	z	z	z	z	z	z	z	z	2,8	
GE	z	z	z	z	z	z	25,1		-15,9		-2,3		3,7	
IL	-0,7		-3,4		-3,7		-1,7		-2,5		0,2		1,6	
IS	6,4		z	z	-16,9		-2,8		-4,7		-2,3		6,5	
MD	-4,1		z	z	z	z	-8,9		34,5		-14,1		9,2	
ME	-10,8		z	z	z	z	z	z	z	z	-2,8		z	
MK	4,1		z		z	z	z	z	z	z	z	z	-10,5	
NO	-0,8		9,5		0,8		1,0		-2,9		-1,3		1,4	
RS	13,3		z	z	z	z	-3,1		13,8		-4,4		-2,0	
TN	7,5		z	z	z	z	-14,1		-11,0		-1,2		2,0	
TR	-5,5		6,9		17,6		8,5		8,9		1,9		-4,7	
UA	20,7		-22,2		-1,3		-8,4		-4,9		-4,9		4,6	

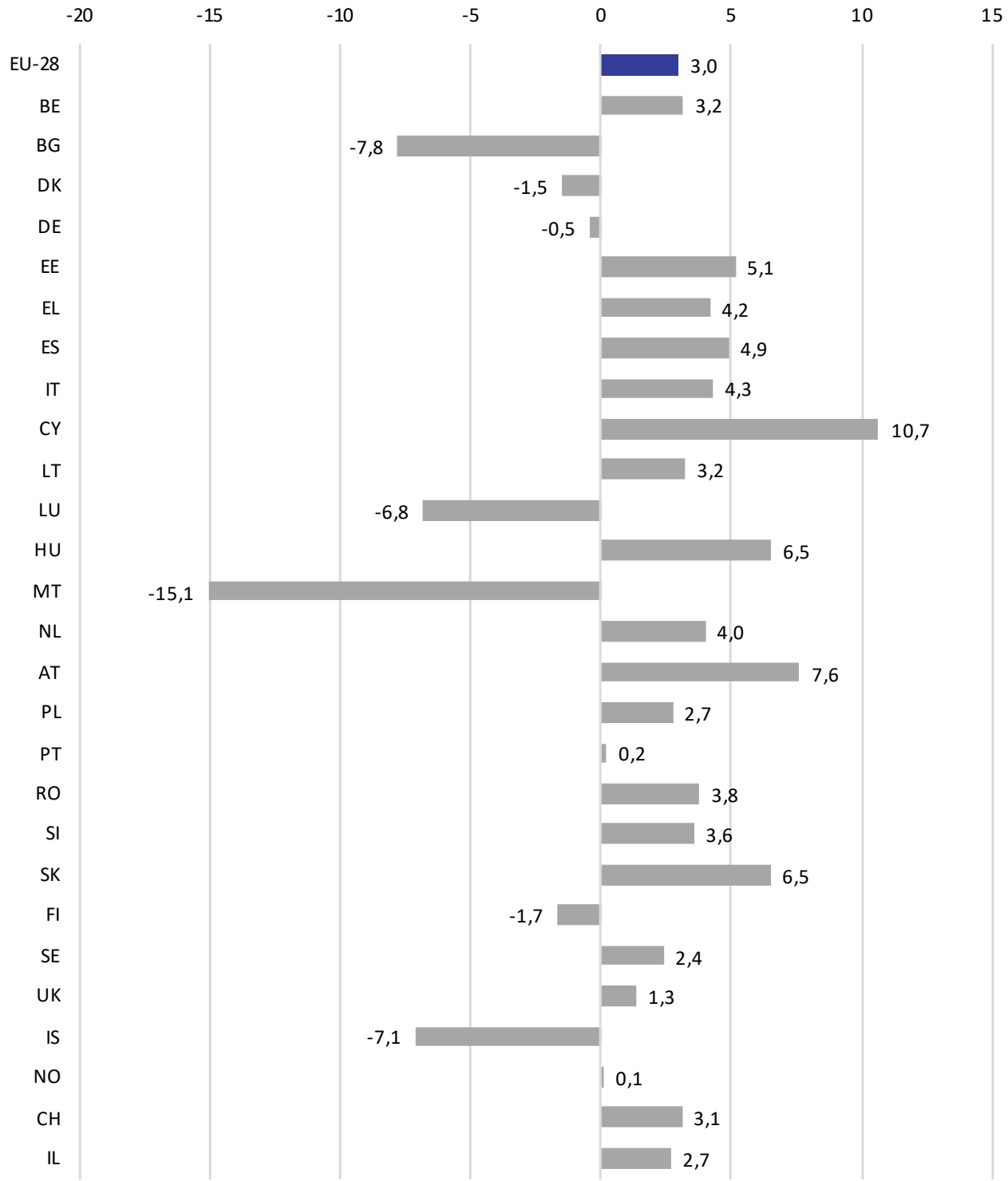
Notes: 'z' represents that data are not applicable; CAGR: The compound annual growth rate of the proportion of type of team-working computed on four-year moving periods (e.g. 2005–2008, 2006–2009, 2007–2010, and so on); Trend: Shows the trend in the proportion of team-working types using four-year moving periods (the scale is not the same across countries).

Source: Computed by using European patent applications (kind codes A1 and A2) in PATSTAT.

Funding success rate differences

This indicator presents the gender gap in success for receiving national, publicly managed research funding. The gender gap is given as the difference in the success rate of men team leaders minus the same rate for women team leaders. A positive difference means that men have a higher success rate, whereas a negative difference means that women have a higher success rate

Figure 7.13 Research funding success rate differences between women and men, 2017



Notes: EU-28 aggregate was calculated without CZ, IE, FR and LV; Exceptions to reference year: LT, PT: 2007; EL: 2009; HR: 2010; BG: 2012; BE(FR): 2013; SI: 2015; FI, IS, IT; LU, ES, UK, BE(FL): 2016; In IL, institutes do not differentiate between team leaders and team members; Data unavailable for: CZ, IE, HR, FR, LV, TR, AL, BA, ME, MK, RS, AM, FO, GE, MD, TN, UA.
Other: Values were calculated from headcounts and only from the institutes that provided both applicants and beneficiaries; positive values represent that success rate is higher for men while negative values that success rate is higher for women.

Source: WiS (Women in Science), DG Research and Innovation.

Men have a higher success rate than women when applying for research funding as team leaders.

Figure 7.13 displays the difference between women and men team leaders in their research funding success rates in 2017, with the funding success rate calculated as the number of beneficiaries of a research grant over the number of applicants.

At the EU-level, the funding success rate was higher for men than for women by 3.0 percentage points. This funding success difference was in favour of men in most of the countries examined with the highest value to be found in Cyprus with 10.7 percentage points. However, for six countries, the funding success rate was higher for women, with Malta having the highest difference of 15.1 percentage points, while the gap was ranging close to parity (from -0.5 to 0.5 percentage points) for Portugal (0.2), Norway (0.1) and Germany (-0.5).

To further analyse this trend, Table 7.18 presents the difference in research funding success between women and men across the different fields of research and development. In all fields of R&D, women are less likely to benefit when applying for research funds. In the field of medical sciences, the difference in funding success rate was in favour of women in only six countries (BG, DK, DE, EL, PT and IS). This number increased to seven countries in the fields of natural sciences (BG, DK, LU, MT, FI, UK, NO) and engineering and technology (BG, IT, FI, SE, IS, NO, CH); to eight in the field of agricultural sciences (DK, LT, HU, AT, FI, SE, NO, IL); to nine in the field of humanities (DK, LT, HU, NL, PT, FI, SE, NO, IL) and to ten in the field of social sciences (BG, DK, DE, EE, PT, RO, SI, UK, IS, NO).

Table 7.18 Research funding success rate differences between women and men, by field of R&D, 2017

	Difference in success rate						
Country	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities and arts	Multi - disciplinary
BG	-18,0	-7,7	-9,5	1,7	-0,4	:	:
DK	-0,1	7,2	-1,7	-9,9	-0,8	-8,3	3,2
DE	2,3	3,3	-5,1	:	-0,2	:	:
EE	1,8	18,7	13,9	20,0	-0,8	4,2	:
EL	13,7	7,7	-44,3	25,2	12,5	5,8	:
ES	5,1	4,0	8,5	3,4	4,3	0,1	:
IT	0,6	-4,8	5,7	25,0	18,5	6,3	:
CY	1,7	14,7	8,3	0,0	18,7	6,8	:
LT	5,4	23,7	7,1	-100,0	1,8	-4,6	:
LU	-22,1	7,6	:	:	1,3	12,2	:
HU	8,0	23,9	12,6	-5,1	9,3	-3,0	:
MT	-17,5	:	:	:	:	:	-66,7
NL	2,3	8,0	:	:	0,9	-21,7	:
AT	4,2	6,5	3,8	-9,3	6,6	4,3	:
PL	2,9	1,1	2,3	0,6	1,6	4,0	-4,8
PT	0,8	0,4	-0,9	8,0	-1,3	-1,0	:
RO	:	4,5	12,0	:	-17,0	:	:
SI	7,3	1,1	8,0	8,3	-18,6	17,1	1,4
SK	7,6	10,4	5,4	5,5	1,2	10,4	:
FI	-4,9	-4,9	3,8	-15,9	1,0	-5,0	:
SE	0,2	-1,3	1,7	-7,6	0,6	-2,4	:
UK	-0,1	:	:	:	-5,1	:	:
IS	13,8	-7,2	-4,0	12,1	-7,3	1,7	-3,2
NO	-6,4	-10,2	1,6	-9,1	-3,6	-1,7	:
CH	3,7	-1,3	4,4	7,1	1,8	3,4	-6,1
IL	2,1	4,2	1,7	-13,3	3,1	-3,3	-18,7

Notes: Exceptions to reference year: LT, PT: 2007; EL: 2009; HR: 2010; BG: 2012; BE(FR): 2013; SI: 2015; FI, IS, IT; LU, ES, UK: 2016; In IL, institutes do not differentiate between team leaders and team members; Data unavailable for: CZ, IE, HR, FR, LV, TR, AL, BA, ME, MK, RS, AM, FO, GE, MD, TN, UA; Data unavailable by field of R&D: BE.
Other: ':' represents that data are unavailable in the specific field of R&D; values were calculated only from the institutes that provided both applicants and beneficiaries; positive values represent that success rate is higher for men while negative values that success rate is higher for women.

Source: WiS (Women in Science), DG Research and Innovation.

The sex and gender dimension (SGDRC) is not yet satisfactorily integrated in research content.

The European Commission seeks to promote the integration of the methods of sex/gender analysis into research design and process as a way of preventing bias in research, promoting a better quality of outcomes in science and technology, and achieving cross-cutting benefits. The indicator presented here reveals the changes over time in the quantity of research that:

- Addresses gender issues
- Addresses women and female issues
- Addresses men and male issues
- Reflects, in some way, a consideration of both sexes as a proxy for gender dimension.

The above categories are by no means meant to be mutually exclusive. This assessment also includes studies on non-human species, as these studies can be models for providing a better understanding of human conditions.

A query-based approach was used to identify the body of research that addresses the 'gender dimension.' The term 'gender dimension' was developed within the European Commission and means integrating sex and/or gender analysis into research. According to Gendered Innovations (European Commission, 2013b), 'sex' refers to the basic biological characteristics of females and males and 'gender' refers to cultural attitudes and behaviours that shape 'feminine' and 'masculine' behaviours, products, technologies, environments and knowledge.

Percentage of a country's scientific publications integrating a sex or gender dimension in their research output

This indicator shows the number of a country's publications that have a sex or gender dimension in their research content, divided by the total number of publications from this country and then converted to a percentage. Sex and gender related content is thereby identified through a search query using the title and the abstract of the scientific publications.

Table 7.19 Percentage of a country's publications with a sex or gender dimension in their research content, 2013-2017 and compound annual growth rate (%) and trend of the four-year percentage, 2007-2017

Country	SGDRC 2013-2017	CAGR (%) 2007-2017	Trend 2007-2017
WLD	1,66	0,13	
EU-28	1,79	0,05	
BE	1,75	1,04	
BG	1,73	-2,48	
CZ	1,77	-0,99	
DK	2,49	-1,06	
DE	1,41	0,87	
EE	2,54	1,80	
IE	1,87	2,33	
EL	2,04	-0,86	
ES	2,08	1,98	
FR	1,25	1,16	
HR	2,94	-0,40	
IT	1,47	0,06	
CY	2,22	10,86	
LV	1,22	2,54	
LT	2,21	-2,20	
LU	1,31	10,10	
HU	1,88	1,30	
MT	3,23	9,58	
NL	2,10	-0,73	
AT	1,86	1,03	
PL	2,07	-3,01	
PT	1,84	5,86	
RO	0,54	-6,18	
SI	1,74	7,63	
SK	1,75	0,82	
FI	2,67	0,19	
SE	3,33	0,07	
UK	1,91	0,19	
IS	4,51	1,09	
NO	3,14	-1,42	
CH	1,75	0,93	
ME	3,04	17,97	
MK	2,54	-2,28	
AL	3,35	-0,01	
RS	2,15	2,88	
TR	4,03	-1,54	
BA	4,18	-3,47	
AM	0,62	18,41	
FO	4,35	-5,79	
GE	2,41	2,98	
IL	2,03	-0,01	
MD	0,44	2,09	
TN	1,58	-6,95	
UA	0,59	12,44	

Notes: trend: Shows the trend in the annual values (the scale is not the same across countries);

Source: Computed by Elsevier using Scopus data.

Studies that integrate a sex or gender dimension in their research content (SGDRC) account for approximately 1.8 % of all research studies in the EU-28.

Table 7.19 shows the percentage of SGDRC for the 2013-2017 period and the overall annual growth rates and trend bars for 2007-2017.

In the 2013-2017 period, 1.79 % of all research in the EU-28 included a sex or gender dimension in its research content. This value is slightly over the percentage observed for research at the global level, which is 1.66 %. However, both values show only moderate annual growth rates across the full 2007-2017 period and the trend bars do not display a clear trend, but rather an inconsistent trend over time.

When assessing the numbers for the individual countries, the data show a diverse picture with the percentage of SGDRC ranging from 4.51 % for Iceland to 0.44 % for Moldova. The highest annual growth rates can be observed in countries with a relatively small overall output, namely Armenia and Montenegro, while some countries show a declining percentage, with the highest negative trend being in Tunisia and Romania.

Table 7.20 Percentage of a country's publications with a sex or gender dimension in their research content, by field of R&D, 2008-2012 and 2013-2017

Country	Natural Sciences		Engineering and technology		Medical sciences		Agricultural sciences		Social sciences		Humanities and arts	
	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17	2008-12	2013-17
WLD	0,69	0,73	0,13	0,14	3,61	3,59	2,37	2,41	2,92	2,99	2,19	2,26
EU-28	0,76	0,80	0,14	0,15	3,79	3,69	2,41	2,46	3,02	2,97	2,31	2,18
BE	0,75	0,91	0,08	0,13	2,80	3,21	2,01	2,32	2,30	2,67	1,68	1,79
BG	0,70	0,88	0,14	0,14	4,67	4,86	1,98	2,17	1,79	2,24	2,55	2,90
CZ	0,88	0,89	0,09	0,11	5,11	4,91	2,37	2,69	3,15	2,89	2,51	2,48
DK	1,22	1,19	0,14	0,23	5,11	4,66	2,33	2,58	2,91	2,53	2,41	1,88
DE	0,59	0,65	0,12	0,12	3,03	3,01	2,56	2,66	2,51	2,73	1,58	1,74
EE	0,70	1,23	0,15	0,18	6,53	7,58	1,22	3,15	3,75	3,43	3,61	2,31
IE	0,59	0,74	0,20	0,28	3,24	3,49	1,39	1,80	2,61	3,04	2,09	3,10
EL	0,84	0,84	0,26	0,21	4,89	4,65	1,62	2,02	2,85	2,66	2,93	2,62
ES	0,75	0,83	0,08	0,13	4,10	4,06	1,95	2,09	3,89	4,10	2,46	2,30
FR	0,60	0,61	0,09	0,11	2,94	2,98	2,25	2,19	2,14	2,12	1,64	1,32
HR	1,04	1,02	0,11	0,27	6,60	5,88	2,74	2,54	7,94	5,38	8,72	3,98
IT	0,69	0,68	0,12	0,12	3,12	3,05	1,82	1,97	2,16	2,29	1,41	1,33
CY	0,31	0,88	0,32	0,27	6,43	5,87	1,28	2,58	3,39	3,38	1,75	3,14
LV	0,40	0,40	0,17	0,13	3,74	4,92	1,17	1,32	0,43	2,41	1,41	2,07
LT	0,41	0,93	0,21	0,24	7,53	7,52	1,56	2,73	1,54	2,73	1,25	1,68
LU	0,29	0,30	0,05	0,00	3,86	4,34	0,00	0,88	2,08	2,46	0,82	2,99
HU	0,78	0,88	0,13	0,13	4,17	4,30	2,20	2,90	2,99	3,00	1,08	1,28
MT	2,45	1,27	0,00	0,39	3,87	6,44	5,00	3,80	2,75	1,66	3,85	0,00
NL	0,98	1,09	0,13	0,20	3,71	3,40	2,71	2,67	3,12	2,96	2,45	2,78
AT	0,83	0,96	0,21	0,18	4,06	3,94	3,50	3,40	3,63	3,02	3,00	2,54
PL	0,84	0,87	0,13	0,12	6,43	5,88	2,27	2,12	3,51	3,83	1,88	2,60
PT	0,62	0,79	0,09	0,15	4,05	4,19	2,12	2,04	3,29	3,84	2,96	2,81
RO	0,25	0,21	0,09	0,09	3,79	2,72	0,93	0,34	0,94	1,05	0,42	1,94
SI	0,73	0,79	0,08	0,16	4,53	4,27	2,92	2,07	2,79	2,58	2,37	2,56
SK	0,82	0,74	0,14	0,15	5,18	6,38	2,31	1,64	2,70	2,39	1,61	1,52
FI	1,34	1,20	0,19	0,17	7,52	6,54	3,86	3,63	4,68	3,84	3,78	3,45
SE	1,34	1,40	0,26	0,29	6,89	6,47	2,98	3,76	5,54	5,00	4,73	4,79
UK	0,95	0,97	0,16	0,16	3,46	3,36	3,34	3,25	2,98	2,78	2,55	2,47
IS	2,29	1,78	0,13	0,41	10,12	9,43	2,59	2,93	4,55	6,77	2,07	4,27
NO	1,22	1,32	0,15	0,19	7,09	6,63	3,23	3,24	4,55	4,53	3,11	3,17
CH	0,80	0,84	0,17	0,12	3,27	3,22	3,03	2,93	2,59	3,06	1,87	2,12
ME	1,15	1,55	0,00	0,17	6,35	10,36	5,22	2,92	3,23	2,31	0,00	3,91
MK	0,62	0,57	0,00	0,18	7,49	6,55	1,48	1,83	1,56	2,24	2,50	0,88
AL	0,47	1,33	0,00	0,80	9,89	7,40	0,76	2,37	2,55	3,35	3,90	2,85
RS	0,70	0,86	0,19	0,14	5,50	5,41	1,69	2,23	2,51	3,23	2,86	2,21
TR	1,27	1,35	0,38	0,28	7,36	7,48	3,12	2,91	5,20	5,07	3,34	3,74
BA	0,65	1,02	0,24	0,56	11,36	8,79	2,33	1,35	3,15	5,14	9,46	3,88
AM	0,22	0,10	0,00	0,00	3,94	3,36	0,84	1,21	4,83	2,36	4,23	1,77
FO	0,00	4,35	0,00	0,00	1,75	6,03	0,00	2,78	0,00	0,00	0,00	0,00
GE	0,32	0,60	0,00	0,13	6,27	6,90	2,70	2,04	3,66	4,41	1,01	1,28
IL	0,73	0,72	0,28	0,20	3,82	3,75	2,15	2,26	4,16	4,00	1,92	2,71
MD	0,13	0,00	0,00	0,10	2,44	2,13	1,67	0,00	1,39	0,69	0,00	0,00
TN	0,80	0,60	0,08	0,10	6,92	5,17	2,15	2,97	1,26	1,55	9,94	3,68
UA	0,15	0,29	0,02	0,02	2,01	3,87	2,15	2,84	0,74	0,54	0,66	0,75

Source: Computed by Elsevier using Scopus data.

Medical sciences include the highest percentage of SGDRC in their research output.

Table 7.20 provides the data for percentage of SGDRC, disaggregated by field of research and development and period. The highest percentage of SGDRC was observed in medical sciences, with values around 3.7 % for the EU-28. At the global and at the EU-28 level, social sciences show the second highest percentage of SGDRC, followed by agricultural sciences. These findings contrast with those presented in She Figures 2015, most likely as a result of the inclusion of non-human studies in this analysis (and exclusion in 2015), resulting in a large body of biological and veterinary research in the agricultural sciences being included in this analysis.

The lowest percentage of SGDRC can be observed in engineering and technology, with only 0.15 % in 2013-2017 for EU-28.

For most countries, the trends remain similar to global and EU-28 trends, with medical sciences having the highest percentage of SGDRC and engineering and technology the lowest, albeit with some variation in various fields of R&D.

Annex 7.1 Number of applicants and beneficiaries of research funding, by sex, 2017

Country	Applicants		Beneficiaries	
	Females	Males	Females	Males
EU-28	32481	59903	10475	21099
BE	1393	1876	377	567
BG	355	560	159	207
DK	842	1766	174	338
DE	2924	9617	1132	3679
EE	127	231	27	61
EL	131	475	29	125
ES	6844	9157	2206	3399
IT	125	256	21	54
CY	134	410	22	111
LT	172	292	51	96
LU	66	227	24	67
HU	434	1053	132	389
MT	4	63	2	22
NL	1792	3274	478	1004
AT	2346	7732	1098	4209
PL	4076	4782	1056	1370
PT	1629	1322	1586	1290
RO	305	398	95	139
SI	312	519	55	110
SK	993	2412	208	662
FI	1222	1906	204	286
SE	2790	3475	374	549
UK	3465	8100	965	2365
IS	455	837	213	332
NO	2230	3852	657	1139
CH	1481	2949	589	1264
IL	2078	5960	506	1611

Notes: Exceptions to reference year: LT, PT: 2007; EL: 2009; HR: 2010; BG: 2012; BE(FR): 2013; SI: 2015; FI, IS, IT; LU, ES, UK, BE(FL): 2016; In IL, institutes do not differentiate between team leaders and team members; Data unavailable for: CZ, IE, HR, FR, LV, TR, AL, BA, ME, MK, RS, AM, FO, GE, MD, TN, UA.
Other: Values are in headcount (HC); values are presented only from the institutes that provided both applicants and beneficiaries.

Source: WiS (Women in Science), DG Research and Innovation.

Annex 7.2 Number of women applicants and beneficiaries of research funding, by field of R&D, 2017

Country	Status	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities and arts	Multi-disciplinary	Unknown
BE	Applicants	:	:	:	:	:	:	:	1393
	Beneficiaries	:	:	:	:	:	:	:	377
BG	Applicants	34	41	66	36	178	0	:	0
	Beneficiaries	16	17	23	17	86	0	:	0
DK	Applicants	208	80	222	29	161	88	43	11
	Beneficiaries	30	18	51	7	42	22	2	2
DE	Applicants	471	275	1226	:	952	:	:	:
	Beneficiaries	174	105	494	:	359	:	:	:
EE	Applicants	47	14	19	1	17	29	:	:
	Beneficiaries	11	1	6	0	4	5	:	:
EL	Applicants	26	53	14	16	8	14	:	0
	Beneficiaries	5	8	9	5	1	1	:	0
ES	Applicants	1919	1459	1144	521	1007	773	0	21
	Beneficiaries	634	490	308	159	336	279	0	0
IT	Applicants	59	9	14	2	15	26	:	:
	Beneficiaries	11	3	2	0	2	3	:	:
CY	Applicants	34	22	36	5	24	13	:	:
	Beneficiaries	7	4	6	1	2	2	:	:
LT	Applicants	31	11	89	2	20	19	:	0
	Beneficiaries	8	1	25	2	7	8	:	0
LU	Applicants	25	3	0	0	25	13	0	0
	Beneficiaries	12	1	0	0	8	3	0	0
HU	Applicants	181	11	63	52	73	54	:	:
	Beneficiaries	58	1	14	17	21	21	:	:
MT	Applicants	3	0	0	0	0	0	1	0
	Beneficiaries	1	0	0	0	0	0	1	0
NL	Applicants	377	111	:	:	1049	72	:	183
	Beneficiaries	129	28	:	:	187	29	:	105
AT	Applicants	434	35	189	19	180	220	0	1269
	Beneficiaries	115	5	36	4	32	76	0	830
PL	Applicants	1334	330	759	281	758	548	27	39
	Beneficiaries	409	85	194	78	173	105	4	8
PT	Applicants	434	211	247	75	311	351	:	0
	Beneficiaries	416	207	238	69	308	348	:	0
RO	Applicants	0	255	32	0	18	0	0	0
	Beneficiaries	0	82	6	0	7	0	0	0
SI	Applicants	43	27	42	42	42	40	76	:
	Beneficiaries	7	6	9	7	15	4	7	:
SK	Applicants	233	199	160	145	188	68	:	:
	Beneficiaries	58	31	34	29	43	13	:	:
FI	Applicants	331	92	200	29	352	179	0	39
	Beneficiaries	65	18	31	6	48	31	0	5
SE	Applicants	305	73	549	17	1623	223	0	0
	Beneficiaries	59	14	112	2	159	28	0	0
UK	Applicants	395	:	:	:	575	:	:	2495
	Beneficiaries	120	:	:	:	155	:	:	690
IS	Applicants	54	26	91	35	72	48	129	0
	Beneficiaries	24	9	56	15	50	28	31	0
NO	Applicants	496	311	559	161	561	90	:	52
	Beneficiaries	265	85	77	51	119	31	:	29
CH	Applicants	375	78	254	7	453	278	36	:
	Beneficiaries	167	32	88	3	175	114	10	:
IL	Applicants	117	34	271	10	323	87	45	1191
	Beneficiaries	38	5	73	3	73	35	12	267

Notes: Exceptions to reference year: LT, PT: 2007; EL: 2009; HR: 2010; BG: 2012; 2013; SI: 2015; FI, IS, IT; LU, ES, UK: 2016; In IL, institutes do not differentiate between team leaders and team members; Data unavailable for: CZ, IE, HR, FR, LV, TR, AL, BA, ME, MK, RS, AM, FO, GE, MD, TN, UA.
Other: ':' represents that data are unavailable; Values are in headcount (HC).

Source: WiS (Women in Science), DG Research and Innovation.

Annex 7.3 Number of men applicants and beneficiaries of research funding, by field of R&D, 2017

Country	Status	Natural sciences	Engineering and technology	Medical sciences	Agricultural sciences	Social sciences	Humanities and arts	Multi-disciplinary	Unknown
BE	Applicants	:	:	:	:	:	:	:	1876
	Beneficiaries	:	:	:	:	:	:	:	567
BG	Applicants	124	139	83	45	169	0	:	0
	Beneficiaries	36	47	21	22	81	0	:	0
DK	Applicants	622	276	371	35	194	132	115	21
	Beneficiaries	89	82	79	5	49	22	9	3
DE	Applicants	2449	2439	2990	:	1739	:	:	:
	Beneficiaries	962	1011	1053	:	653	:	:	:
EE	Applicants	123	31	22	5	22	28	:	:
	Beneficiaries	31	8	10	1	5	6	:	:
EL	Applicants	91	197	105	39	12	31	:	0
	Beneficiaries	30	45	21	22	3	4	:	0
ES	Applicants	3082	2734	875	522	1100	814	0	30
	Beneficiaries	1176	1027	310	177	414	295	0	0
IT	Applicants	161	21	20	4	22	28	:	:
	Beneficiaries	31	6	4	1	7	5	:	:
CY	Applicants	112	146	96	10	37	9	:	:
	Beneficiaries	25	48	24	2	10	2	:	:
LT	Applicants	93	58	108	6	19	8	:	0
	Beneficiaries	29	19	38	0	7	3	:	0
LU	Applicants	143	22	0	0	45	17	0	0
	Beneficiaries	37	9	0	0	15	6	0	0
HU	Applicants	500	100	158	87	105	103	:	:
	Beneficiaries	200	33	55	24	40	37	:	:
MT	Applicants	19	32	8	1	0	0	3	0
	Beneficiaries	3	15	2	1	0	0	1	0
NL	Applicants	1086	488	:	:	1337	113	:	250
	Beneficiaries	397	162	:	:	251	21	:	173
AT	Applicants	980	154	293	17	193	229	0	5866
	Beneficiaries	301	32	67	2	47	89	0	3671
PL	Applicants	1830	644	514	166	814	708	30	76
	Beneficiaries	615	173	143	47	199	164	3	26
PT	Applicants	389	392	111	35	179	216	:	0
	Beneficiaries	376	386	106	35	175	212	:	0
RO	Applicants	0	327	39	0	32	0	0	0
	Beneficiaries	0	120	12	0	7	0	0	0
SI	Applicants	89	137	51	40	41	48	113	:
	Beneficiaries	21	32	15	10	7	13	12	:
SK	Applicants	569	925	180	298	308	132	:	:
	Beneficiaries	185	240	48	76	74	39	:	:
FI	Applicants	644	362	197	42	286	171	0	204
	Beneficiaries	95	53	38	2	42	21	0	35
SE	Applicants	1009	325	630	24	1242	245	0	0
	Beneficiaries	197	58	139	1	129	25	0	0
UK	Applicants	975	:	:	:	685	:	:	6440
	Beneficiaries	295	:	:	:	150	:	:	1920
IS	Applicants	139	73	99	40	66	60	360	0
	Beneficiaries	81	20	57	22	41	36	75	0
NO	Applicants	1486	754	671	239	608	55	:	39
	Beneficiaries	699	129	103	54	107	18	:	29
CH	Applicants	1126	355	540	4	485	333	106	:
	Beneficiaries	543	141	211	2	196	148	23	:
IL	Applicants	674	217	555	30	373	168	50	3893
	Beneficiaries	233	41	159	5	96	62	4	1011

Notes: Exceptions to reference year: LT, PT: 2007; EL: 2009; HR: 2010; BG: 2012; 2013; SI: 2015; FI, IS, IT; LU, ES, UK: 2016; In IL, institutes do not differentiate between team leaders and team members; Data unavailable for: CZ, IE, HR, FR, LV, TR, AL, BA, ME, MK, RS, AM, FO, GE, MD, TN, UA.
Other: ':' represents that data are unavailable; Values are in headcount (HC).

Source: WiS (Women in Science), DG Research and Innovation.

Appendix 1.

Correspondence table between different editions of the She Figures

Name of indicator	SF2018 label	SF2015 label	SF2012 label
Proportion of women among doctoral graduates, 2016	Figure 2.1	Figure 2.2	Figure 2.1
Proportion (%) of women among doctoral graduates, 2007 and 2016	Table 2.1	Table 2.1	n/a
Compound annual growth rate of doctoral graduates, by sex, 2007-2016	Figure 2.2	Figure 2.3 (ISCED 6 graduates according to ISCED-97)	Figure 2.2
Proportion of women among doctoral graduates, by broad field of study, 2016 (%)	Table 2.2	Table 2.3	Table 2.1
Distribution of doctoral graduates across broad fields of study, by sex, 2016	Figure 2.3	Figure 2.4 (ISCED 6 graduates according to ISCED-97)	Figure 2.3
Proportion of women among doctoral graduates, by narrow field of study in natural sciences, ICT and engineering, 2013 and 2016 (%)	Table 2.3	Table 2.5	Table 2.3
Compound annual growth rate (CAGR, %) and trend of doctoral graduates (number), by sex and narrow field of study in natural sciences, ICT and engineering, 2013-2016	Table 2.4	Table 2.6 (ISCED 6 graduates according to ISCED-97)	Table 2.2
Ratio of bachelor graduates to bachelor entrants, by sex and broad field of study, 2016	Table 2.5	n/a	n/a
Ratio of doctoral entrants to master graduates, by sex and broad field of study, 2016	Table 2.6	n/a	n/a
Ratio of doctoral entrants to master graduates, by sex and narrow field of study in natural sciences, ICT and engineering, 2016	Table 2.7	n/a	n/a
Ratio of doctoral graduates to doctoral entrants, by sex and broad field of study, 2016	Table 2.8	n/a	n/a
Number of doctoral (ISCED 8) graduates, by sex, 2012 - 2016	Annex 2.1	Annex 2.2	Annex 2.1
Number of doctoral (ISCED 8) graduates by sex and broad field of study, 2016	Annex 2.2	Annex 2.4	Annex 2.2
Number of doctoral (ISCED 8) graduates by sex and narrow field of study in natural science and engineering (fields EF4, EF5 and EF6), 2016	Annex 2.3	Annex 2.6	Annex 2.3
Proportion of women in the EU-28 among total employment, the population of tertiary educated professionals and technicians (HRSTC) and the population of scientists and engineers (S&E), 2017 and compound annual growth rate (CAGR) and trends of the numbers of women and men in the EU-28 in the same populations, 2013-2017	Figure 3.1	Figure 3.1	Figure 1.1
Tertiary educated and employed as professionals or technicians (HRSTC), as a percentage of tertiary educated (HRSTE) population, by sex, 2017	Figure 3.2	Figure 3.2	Figure 1.2
Proportions of male and female scientists and engineers among the total labour force, by sex, 2017	Figure 3.3	Figure 3.3	Figure 1.3
Employment in knowledge intensive activities (KIA), as percentage of total employment, 2017	Figure 3.4	Figure 3.4	Figure 1.4
Employment in knowledge intensive activities – business industries (KIABI), 2017	Figure 3.5	Figure 3.5	Figure 1.5
Unemployment rate of tertiary educated persons, 2017	Figure 3.6	n/a	n/a
Distribution of R&D personnel across occupations in all sectors (HES, GOV, BES), 2015	Figure 3.7	Figure 3.6	Figure 3.9
Distribution of R&D personnel in the higher education sector (HES) across occupations, by sex, 2015	Figure 3.8	Figure 3.7	Figure 3.10
Distribution of R&D personnel in the government sector (GOV) across occupations, by sex, 2015	Figure 3.9	Figure 3.8	Figure 3.11
Distribution of R&D personnel in the business enterprise sector (BES) across occupations, by sex, 2015	Figure 3.10	Figure 3.9	Figure 3.12
Distribution of researchers in the business enterprise sector across economic activities (NACE Rev. 2), by sex, 2015	Figure 3.11	Figure 3.10	Figure 2.6
Proportion of women among researchers in the business enterprise sector (BES), by selected economic activities (NACE Rev. 2), 2015 (%)	Table 3.1	Table 3.1	Table 2.8
R&D personnel in the higher education sector (HES), by sex and occupation, 2015 (headcount)	Annex 3.1	Annex 3.1	Annex 3.4
R&D personnel in the government sector (GOV), by sex and occupation, 2015 (headcount)	Annex 3.2	Annex 3.2	Annex 3.5
R&D personnel in the business enterprise sector (BES), by sex and occupation, 2015 (headcount)	Annex 3.3	Annex 3.3	Annex 3.6

Name of indicator	SF2018 label	SF2015 label	SF2012 label
Researchers in the business enterprise sector (BES), by sex and selected economic activities (NACE Rev. 2), 2015 (headcount)	Annex 3.4	Annex 3.4	Annex 2.6
Proportion of women among researchers, 2015	Figure 4.1	Figure 4.1	Figure 1.6
Compound annual growth rate (%) for researchers, by sex, 2008–2015	Figure 4.2	Figure 4.2	Figure 1.7
Proportion of researchers per thousand labour force, by sex, 2015	Figure 4.3	Figure 4.3	Figure 1.8
Distribution of researchers across sectors, by sex, 2015	Figure 4.4	Figure 4.4	Figure 1.10
Proportion of women among researchers in the higher education sector, 2015	Figure 4.5	Figure 4.5	Figure 1.9
Proportion of women among researchers in the government sector, 2015	Figure 4.6	Figure 4.6	Figure 1.9
Proportion of women among researchers in the business enterprise sector, 2015	Figure 4.7	Figure 4.7	Figure 1.9
Compound annual growth rate for researchers in the higher education sector, by sex, 2008–2015	Figure 4.8	Figure 4.8	Figure 1.11
Compound annual growth rate for researchers in the government sector, by sex, 2008–2015	Figure 4.9	Figure 4.9	Figure 1.12
Compound annual growth rate for researchers in the business enterprise sector, by sex, 2008–2015	Figure 4.10	Figure 4.10	Figure 1.13
Distribution of researchers in the higher education sector across age group, by sex, 2015	Figure 4.11	Figure 4.11	Figure 1.14
Distribution of researchers in the government sector across age group, by sex, 2015	Figure 4.12	Figure 4.12	Figure 1.15
Dissimilarity index for researchers in the higher education sector and government sector, 2015	Table 4.1	Table 4.1	Table 2.10
Evolution of the proportion (%) of women among researchers in the higher education sector, by field of R&D, 2008–2015	Table 4.2	Table 4.2	Table 2.5
Compound annual growth rates (%) of women researchers in the higher education sector, by field of R&D, 2008-2015	Table 4.3	Table 4.3	Table 2.4
Distribution of researchers in the higher education sector across fields of R&D, by sex, 2015	Figure 4.13	Figure 4.13	Figure 2.4
Evolution of the proportion (%) of women among researchers in the government sector, by field of R&D, 2008–2015	Table 4.4	Table 4.4	Table 2.7
Compound annual growth rates (%) of women researchers in the government sector, by field of R&D, 2008-2015	Table 4.5	Table 4.5	Table 2.6
Distribution of researchers in the government sector across fields of R&D, by sex, 2015	Figure 4.14	Figure 4.14	Figure 2.5
Evolution in the proportion (%) of women researchers in the business enterprise sector, by field of R&D, 2007-2014	Table 4.6	Table 4.6	Table 2.9
Number of researchers, by sex, 2011-2015	Annex 4.1	Annex 4.1	Annex 1.1
Number of researchers in the higher education sector, by sex, 2011-2015	Annex 4.2	Annex 4.2	Annex 1.2
Number of researchers in the government sector, by sex, 2011-2015	Annex 4.3	Annex 4.3	Annex 1.3
Number of researchers in the business enterprise sector, by sex, 2011-2015	Annex 4.4	Annex 4.4	Annex 1.4
Number of researchers in the higher education sector, by field of R&D and sex, 2015	Annex 4.5	Annex 4.5	Annex 2.4
Number of researchers in the government sector, by Field of R&D and sex, 2015	Annex 4.6	Annex 4.6	Annex 2.5
Number of researchers in the business enterprise sector, by field of R&D and sex, 2015	Annex 4.7	Annex 4.7	n/a
Part-time employment of researchers in higher education sector out of total researcher population, by sex, 2016	Figure 5.1	Figure 5.1	n/a
Proportion of researchers in the higher education sector working under 'precarious' working contracts, by sex, 2016	Figure 5.2	Figure 5.2	n/a
Sex differences in the international mobility of researchers during their PhD, 2016	Figure 5.3	Figure 5.3	n/a, although see (non-comparable) Figure 1.16 for reference
Sex differences in the international mobility in the post-PhD stages, 2016	Figure 5.4	Figure 5.4	n/a, although see (non-comparable) Figure 1.16 for reference
Gender pay gap (%) in the economic activity 'Scientific research & development' and in the total economy, 2014	Table 5.1	Table 5.1	n/a, although see She Figures 2009
Gender pay gap (%) in the economic activity 'Scientific research & development' and in the total economy, by age group, 2014	Table 5.2	Table 5.2	n/a, although see She Figures 2009

Name of indicator	SF2018 label	SF2015 label	SF2012 label
Proportion of women researchers in FTE and R&D expenditure in purchasing power standards (PPS) per researcher, 2015	Figure 5.5	Figure 5.5	Figure 4.4
R&D expenditure in purchasing power standards (PPS) per researcher in FTE, by sector, 2015	Figure 5.6	Figure 5.6	Figure 4.5
Proportion of RPOs that adopted gender equality plans, 2016	Figure 5.7	Figure 5.7	n/a
Proportion of research staff working in RPOs that adopted gender equality plans, 2016	Figure 5.8	Figure 5.8	n/a
International mobility rates of HES researchers during PhD, by sex, 2016	Annex 5.1	Annex 5.4	n/a
International mobility rates of HES researchers in post-PhD careers, by sex, 2016	Annex 5.2	Annex 5.5	n/a
Total intramural R&D expenditure for the business enterprise, government and higher education sectors in million PPS, 2015	Annex 5.3	Annex 5.3	Annex 4.4
Proportion of men and women in a typical academic career, students and academic staff, EU-28, 2013-2016	Figure 6.1	Figure 6.1	Figure 3.1
Proportion of men and women in a typical academic career in science and engineering, students and academic staff, EU-28, 2007-2013	Figure 6.2	Figure 6.2	Figure 3.2
Proportion (%) of women among academic staff by grade and total, 2016	Table 6.1	Table 6.1	Table 3.1
Evolution of the proportion (%) of women among Grade A positions, 2013 vs. 2016	Figure 6.3	Figure 6.3	Figure 3.3
Percentage of grade A staff among all academic staff, by sex, 2016	Figure 6.4	Figure 6.4	Figure 3.4
Proportion (%) of women among grade A staff by main field of R&D, 2016	Table 6.2	Table 6.2	Table 3.2
Distribution of grade A staff across fields of R&D, by sex, 2016	Figure 6.5	Figure 6.5	Figure 3.5
Glass Ceiling Index, 2013-2016	Figure 6.6	Figure 6.6	Figure 3.6
Proportion (%) of women among grade A staff, by age group, 2013	Table 6.3	Table 6.3	Table 3.3
Distribution of grade A staff across age groups, by sex, 2016	Figure 6.7	Figure 6.7	Figure 3.7
Proportion of women among heads of institutions in the Higher Education Sector, 2017	Figure 6.8	Figure 6.8	Figure 4.1
Proportion of women among heads of universities or assimilated institutions based on capacity to deliver PhDs, 2017	Table 6.4	Table 6.4	Table 4.1
Proportion of women on boards, members and leaders, 2017	Figure 6.9	Figure 6.9	Figure 4.2
Number of academic staff, by grade and sex, 2016	Annex 6.1	Annex 6.1	Annex 3.1
Number of senior academic staff (grade A), by field of R&D and sex, 2016	Annex 6.2	Annex 6.2	Annex 3.2
Number of academic staff (grade A), by age group and sex, 2016	Annex 6.3	Annex 6.3	Annex 3.3
Women to men ratio of authorships in all fields of R&D, 2013-2017	Figure 7.1	n/a	n/a
Women to men ratio of corresponding authorships in all fields of R&D, 2013-2017	Figure 7.2	Figure 7.1	n/a
Compound annual growth rate (%) of women to men ratio of authorships, by field of R&D, 2008-2017	Table 7.1	n/a	n/a
Compound annual growth rate (%) of women to men ratio of corresponding authorships, by field of R&D, 2008-2017	Table 7.2	n/a, although see (part-comparable) Table 7.2	n/a
Women to men ratio of all authorships, by field of R&D, 2008-2012 and 2013-2017	Table 7.3	n/a	n/a
Women to men ratio of corresponding authorships, by field of R&D, 2008-2012 and 2013-2017	Table 7.4	Table 7.1	n/a
Women to men ratio of authorships in all fields of R&D, for international collaboration, 2013-2017	Figure 7.3	n/a	n/a
Women to men ratio of authorships in all fields of R&D, for intra-country and intra-EU28+ collaboration, 2013-2017	Figure 7.4	n/a	n/a
Women to men ratio of corresponding authorships in all fields of R&D, for international collaboration, 2013-2017	Figure 7.5	n/a, although see (part-comparable) Figure 7.2	n/a
Women to men ratio of corresponding authorships in all fields of R&D, for intra-country and intra-EU28+ collaboration, 2013-2017	Figure 7.6	n/a, although see (part-comparable) Figure 7.2	n/a
CAGR (%) of women to men ratio of all authorships in international co-publications, by field of R&D, 2008-2017	Table 7.5	n/a	n/a
CAGR (%) of women to men ratio of corresponding authorships in international co-publications, by field of R&D, 2008-2017	Table 7.6	Table 7.4	n/a
Women to men ratio of authorships in international co-publications, by field of R&D, 2008-2012 and 2013-2017	Table 7.7	n/a	n/a
Women to men ratio of corresponding authorships in international co-publications, by field of R&D, 2008-2012 and 2013-2017	Table 7.8	Table 7.3	n/a
Women to men ratio of average FWCI for publications based on all authorships in all fields of R&D, 2017	Figure 7.7	n/a	n/a

Name of indicator	SF2018 label	SF2015 label	SF2012 label
Women to men ratio of average FWCI for publications based on corresponding authorships in all fields of R&D, 2017	Figure 7.8	n/a, although see (non-comparable) Figure 7.3	n/a
CAGR (%) of women to men ratio of average FWCI for publications (all authorships), by field of R&D, 2008-2017	Table 7.9	n/a	n/a
CAGR (%) of women to men ratio of average FWCI for publications (corresponding authorships), by field of R&D, 2008-2017	Table 7.10	n/a, although see (non-comparable) Table 7.6	n/a
Women to men ratio of average FWCI for publications (all authors), by field of R&D, 2012 and 2017	Table 7.11	n/a	n/a
Women to men ratio of average FWCI for publications (corresponding authors), by field of R&D, 2012 and 2017	Table 7.12	n/a, although see (non-comparable) Table 7.5	n/a
Ratio of women to men average number of publications (all authors) in all fields of R&D, per seniority level, 2013-2017	Figure 7.9	n/a	n/a
Ratio of women to men average number of publications (all authors), by field of R&D and seniority level, 2013-2017	Table 7.13	n/a	n/a
Ratio of women to men average FWCI of publications (corresponding authors) in all fields of R&D, per seniority level, 2013-2017	Figure 7.10	n/a	n/a
Ratio of women to men average FWCI of publications (all authors), by field of R&D and seniority level, 2013-2017	Table 7.14	n/a	n/a
Women to men ratio of inventorships, all International Patent Classification (IPC) sections, 2013–2016	Figure 7.11	Figure 7.4	n/a
Women to men ratio of inventorships, by IPC section, 2005–2008 and 2013–2016	Table 7.15	Table 7.7	n/a
Compound annual growth rate (%) of the four-year proportion of women inventorships, by IPC section, 2005–2016	Table 7.16	Table 7.8	n/a
Distribution of patent application by sex composition of the inventors' team (%), 2013–2016	Figure 7.12	n/a	n/a
Compound annual growth rate (%) of the four-year proportions of patent applications by sex composition of the inventors' team, 2005-2016	Table 7.17	n/a	n/a
Research funding success rate differences between women and men, 2017	Figure 7.13	Figure 7.5	Figure 4.3
Research funding success rate differences between women and men, by field of R&D, 2017	Table 7.18	Table 7.9	Table 4.2
Percentage of a country's publications with a sex or gender dimension in their research content, 2013 - 2017 and compound annual growth rate (%) and trend of the four-year percentage, 2007-2017	Table 7.19	n/a	n/a
Percentage of a country's publications with a sex or gender dimension in their research content, by field of R&D, 2008-2012 and 2013-2017	Table 7.20	n/a, although see (non-comparable) Table 7.10	n/a
Number of applicants and beneficiaries of research funding, by sex, 2017	Annex 7.1	Annex 7.1	Annex 4.2
Number of women applicants and beneficiaries of research funding, by field of R&D, 2017	Annex 7.2	Annex 7.2 (part)	Annex 4.3 (part)
Number of men applicants and beneficiaries of research funding, by field of R&D, 2017	Annex 7.3	Annex 7.2 (part)	Annex 4.3 (part)

Name of indicator	SF2018 label	SF2015 label	SF2012 label
Proportion of women among researchers, 2015	Figure 4.1	Figure 4.1	Figure 1.6
Compound annual growth rate for researchers, by sex, 2008–2015	Figure 4.2	Figure 4.2	Figure 1.7
Researchers per thousand labour force, by sex, 2015	Figure 4.3	Figure 4.3	Figure 1.8
Distribution of researchers across sectors by sex, 2015	Figure 4.4	Figure 4.4	Figure 1.10
Proportion of women researchers in the higher education sector, 2015	Figure 4.5	Figure 4.5	Figure 1.9
Proportion of women researchers in the government sector, 2015	Figure 4.6	Figure 4.6	Figure 1.9
Proportion of women researchers in the business enterprise sector, 2015	Figure 4.7	Figure 4.7	Figure 1.9
Compound annual growth rate for researchers in the higher education sector, by sex, 2008–2015	Figure 4.8	Figure 4.8	Figure 1.11
Compound annual growth rate for researchers in the government sector (GOV) by sex, 2008-2015	Figure 4.9	Figure 4.9	Figure 1.12
Compound annual growth rate for researchers in the business enterprise sector, 2008-2015	Figure 4.10	Figure 4.10	Figure 1.13
Distribution of researchers in the higher education sector, by sex and age group, 2015	Figure 4.11	Figure 4.11	Figure 1.14
Distribution of researchers in the government sector, by sex and age group, 2015	Figure 4.12	Figure 4.12	Figure 1.15
Dissimilarity Index HES	Table 4.1	Table 4.1	Table 2.10
Evolution of the proportion (%) of women researchers in the higher education sector, by field of science, 2008–2015	Table 4.2	Table 4.2	Table 2.5
Compound annual growth rates (%) of women researchers in the higher education sector, by field of science, 2008-2015	Table 4.3	Table 4.3	Table 2.4
Distribution of researchers in the higher education sector (HES), across fields of science, 2015	Figure 4.13	Figure 4.13	Figure 2.4
Evolution of the proportion (%) of women researchers in the government sector, by field of science, 2008–2015	Table 4.4	Table 4.4	Table 2.7
Compound annual growth rates (%) of women researchers in the government sector, by field of science, 2008-2015	Table 4.5	Table 4.5	Table 2.6
Distribution of researchers in the government sector (GOV), across fields of science, 2015	Figure 4.14	Figure 4.14	Figure 2.5
Evolution in the proportion (%) of women researchers in the business enterprise sector, by field of science, 2007-2014	Table 4.6	Table 4.6	Table 2.9
Number of researchers, by sex, 2011–2015	Annex 4.1	Annex 4.1	Annex 1.1
Number of researchers in the higher education sector, by sex, 2011–2015	Annex 4.2	Annex 4.2	Annex 1.2
Number of researchers in the government sector, by sex, 2011–2015	Annex 4.3	Annex 4.3	Annex 1.3
Number of researchers in the business enterprise sector sector, by sex, 2011–2015	Annex 4.4	Annex 4.4	Annex 1.4
Number of researchers in the higher education sector, by field of science and sex, 2015	Annex 4.5	Annex 4.5	Annex 2.4
Number of researchers in the government sector, by field of science and sex, 2015	Annex 4.6	Annex 4.6	Annex 2.5
Number of researchers in the business enterprise sector, by field of science	Annex 4.7	Annex 4.7	n/a
Part-time employment of researchers in higher education sector out of total researcher population, by sex, 2016	Figure 5.1	Figure 5.1	n/a
'Precarious' working contracts of researchers in higher education sector out of total researcher population, by sex, 2016	Figure 5.2	Figure 5.2	n/a
Sex differences in the international mobility of researchers during their PhD, 2016	Figure 5.3	Figure 5.3	n/a, although see (non-comparable) Figure 1.16 for reference
Sex differences in the international mobility in the post-PhD careers, 2016	Figure 5.4	Figure 5.4	n/a, although see (non-comparable) Figure 1.16 for reference
Gender pay gap (%) in the economic activity 'Scientific research & development' and in the total economy, 2014	Table 5.1	Table 5.1	n/a, although see She Figures 2009
Gender pay gap (%) in the economic activity 'Scientific research & development' and in the total economy, by age group, 2014	Table 5.2	Table 5.2	n/a, although see She Figures 2009
Proportion of women researchers in FTE and R&D expenditure in purchasing power standards (PPS) per capita researchers, 2015	Figure 5.5	Figure 5.5	Figure 4.4
R&D expenditure in purchasing power standards (PPS) per capita researcher in FTE, by sector, 2015	Figure 5.6	Figure 5.6	Figure 4.5
International mobility rates of HES researchers during PhD, by sex, 2016	Annex 5.1	Annex 5.4	n/a
International mobility rates of HES researchers in post-PhD careers, by sex, 2016	Annex 5.2	Annex 5.5	n/a
Total intramural R&D expenditure for the BES, GOV and HES sectors in million PPS, 2015	Annex 5.3	Annex 5.3	Annex 4.4

Appendix 2.
Methodological notes

These notes are intended to provide the reader with a brief reference guide about the coverage, identification and definition of groups, units and concepts presented and used in this publication.

For more detailed methodological notes on the data presented in She Figures 2018 please access the She Figures 2018 Handbook, available at:
http://ec.europa.eu/research/swafs/index.cfm?pg=library&lib=gender_equality

Data sources

The majority of the She Figures data comes from Eurostat (the statistical office of the European Union) and is publicly available. This includes the indicators on ISCED 2011 level 8 graduates, knowledge intensive activities, research and experimental development (R&D) expenditure and most indicators on researchers and R&D personnel. In particular, the publication draws upon Eurostat's databases on:

- Education and Training: https://ec.europa.eu/eurostat/web/education-and-training/data/database
- Science, Technology and Innovation: https://ec.europa.eu/eurostat/web/science-technology-innovation/data/database
- Labour Market (earnings): https://ec.europa.eu/eurostat/web/labour-market/earnings/database

Data on education and on R&D for countries that are not EU MS nor EFTA countries were also collected from:

- UNESCO Institute of Statistics: http://data.uis.unesco.org/ (Subjects: a) Science, Technology and Innovation and b) Education)
- OECD: https://stats.oecd.org/ (Education and Training)

Data on population, labour force, unemployment and labour under-utilisation for countries that are not EU MS nor EFTA countries were also collected from the International Labour Organization (ILO): https://www.ilo.org/ilostat/ (subjects: a) population and labour force and b) unemployment and labour under-utilisation).

National Statistical Correspondents report data by sex on researchers and academic staff (see Seniority grades/Academic staff below), on the applicants and beneficiaries of research funding, on boards of research organisations and on heads of institutions in the Higher Education Sector (HES), and in universities or assimilated institutions to the Women in Science (WiS) database on a goodwill basis. A complete list of the research funds and of the boards can be found at the end of this Appendix.

Statistics on inventorships were produced using data from the EPO Worldwide Patent Statistical Database (PATSTAT). Statistics on authorships, scientific quality/impact and the sex/gender dimension in research content were produced using data from Elsevier's Scopus database.

Data concerning the mobility and employment status (part time/precarious employment) of researchers come from the Mobility Patterns and Career Paths of the EU Researchers (MORE3) Survey (European Commission, 2016). The results and the methodological notes are available online at https://www.more3.eu/.

Data concerning the gender equality actions of Research Performing Organisations (RPOs) come from the Monitoring the evolution and benefits of Responsible Research and Innovation (MoRRI) project, 2016.

Throughout She Figures 2018, the data source for each indicator is presented below the corresponding figure/table.

Statistical terms and classifications

Students and Graduates

The International Standard Classification of Education (ISCED) is the UN framework for classifying educational programmes at different levels. Data presented in the She Figures 2018 have been collected in line with the ISCED 2011 classification (UNESCO, 2011).

Tertiary (or Higher) Education is comprised of four levels: short-cycle tertiary education (level 5), Bachelor's or equivalent (level 6), Master's or equivalent (level 7) and doctoral or equivalent (level 8).

Entry into the ISCED level 5 programmes requires the successful completion of ISCED level 3 or 4 with access to tertiary education. ISCED level 8 programmes are designed primarily to lead to an advanced research qualification. Programmes at this ISCED level are devoted to advanced study and original research and are typically offered only by research-oriented tertiary educational institutions such as universities.

Data referring to the reference year 2012 or earlier have been collected in line with the ISCED 1997 classification (UNESCO, 1997). The equivalents to ISCED 2011 levels 6-7 and 8 are the ISCED-97 levels 5A and 6 respectively used in previous publications.

The number of graduates refers to those graduating in the reference year and not to the number of graduates in the population. The number of graduates also refers to non national students graduating in the country, but does not include national students graduating abroad.

Science and Technology (S&T) fields of education and training

The ISCED-F 2013 classification (UNESCO Institute of Statistics, 2014) distinguishes 29 narrow fields of education and training organised in 10 broad groups: education; humanities and arts; social sciences, journalism and information; business administration and law; natural sciences, mathematics and statistics; information and communication technology; engineering, manufacturing and construction; agriculture, forestry, fisheries and veterinary; health and welfare; and services. In other words, the student and graduate population analysed in this publication covers all fields.

International Standard Classification of Occupations (ISCO)

The International Standard Classification of Occupations (ISCO) is the International Labour Organization classification structure for organising information on labour and jobs. ISCO is a tool for organising jobs into a clearly defined set of groups according to the tasks and duties undertaken in the job. The first version of ISCO, adopted in 1957 and named ISCO-58, was followed by ISCO-68 and ISCO-88. Many current national occupational classifications are based on one of these three ISCO versions. ISCO was updated in 2007 to take into account developments in the world of work since 1988 and to make improvements in the light of experience gained in using ISCO-88. The update did not change the basic principles and the top structure of ISCO-88 (i.e. the ten major groups). However, significant sub structural changes were made in some areas. The updated classification is known as ISCO-08. The ILO provides a correspondence table linking ISCO-08 to ISCO-88 (ILO, 2012).

Among the ten major groups the She Figures looks at is Professionals and Technicians and associate professionals.
Professionals are subdivided into six sub major groups: science and engineering professionals; health professionals; teaching professionals; business and administration professionals; information and communications technology professionals; and legal, social and cultural professionals.

Technicians and associate professionals are subdivided into five sub major groups: science and engineering associate professionals; health associate professionals; business and administration associate professionals; legal, social, cultural and related associate professionals; and information and communications technicians.

Human Resources in Science and Technology (HRST)

The Canberra Manual (OECD, 1995) proposes a methodology to identify individuals from the European Union Labour Force Survey case data, according to educational attainment and occupation, to approximate Human Resources in Science and Technology (HRST). The types of HRST presented in this publication are:

- HRSTE: HRST Education – people who have successfully completed tertiary education in any field of education and training (see Science and Technology – S&T – fields of education and training below)

- HRSTO: HRST Occupation – people who are employed in S&T occupations as 'Professionals' or 'Technicians and Associate Professionals' (see ISCO definitions for explanation of S&T occupations)
- HRSTC: HRST Core – people who are both HRSTE and HRSTO.

Knowledge intensive activities (KIA and KIABI)

An activity is classified as knowledge intensive if tertiary educated people employed (according to ISCED97, levels 5 to 6 or ISCED11, levels 5 to 8) represent more than 33% of the total employment in that activity. The definition is based on the average number of employed persons aged 15-64 at aggregated EU-27 level in 2008 and 2009 according to the NACE Rev. 2 at 2-digit (see 'NACE categories' below), using the EU Labour Force Survey data.

There are two aggregates in use based on this classification: total Knowledge-Intensive Activities (KIA) and Knowledge-Intensive Activities – Business Industries (KIABI). Further reference can be found at Chapter 3.

Scientists and Engineers (S&E) in employment

With the new ISCO-08 classification, S&E are defined as people who work as:
- Science and engineering professionals (ISCO-08, Code 21)
- Health professionals (ISCO-08, Code 22)
- Information and communications technology professionals (ISCO-08, Code 25).

Researchers and R&D personnel

The Frascati Manual (OECD, 2015) provides an international definition for R&D personnel (§5.6): 'R&D personnel in a statistical unit include all persons engaged directly in R&D, whether employed by the statistical unit or external contributors fully integrated into the statistical unit's R&D activities, as well as those providing direct services for the R&D activities (such as R&D managers, administrators, technicians and clerical staff).'.

R&D personnel has three categories:
- Researchers (§5.35):'Researchers are professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in the management of the projects concerned'.
- Technicians and equivalent staff (§5.40): 'Technicians and equivalent staff are persons whose main tasks require technical knowledge and experience in one or more fields of engineering, physical and life sciences or social sciences and humanities. They participate in R&D by performing scientific and technical tasks involving the application of concepts and operational methods, normally under the supervision of researchers. Equivalent staff perform the corresponding R&D tasks under the supervision of researchers in the social sciences and humanities'.
- Other supporting staff (§5.43): 'Other supporting staff includes skilled and unskilled craftsmen, secretarial and clerical staff participating in R&D projects or directly associated with such projects'.

It must be noted that from the reference year 2012 onwards, it is not compulsory for countries to report technicians separately from other supporting staff when providing data for their R&D personnel to Eurostat.

Main fields of Research and Development (FORD)

The Frascati Manual (OECD, 2015) defines six main fields of R&D (FORD). These are adhered to in this publication, unless indicated otherwise. The following abbreviations have been used:
- NS: Natural sciences
- ET: Engineering and technology
- MS: Medical sciences
- AS: Agricultural sciences
- SS: Social sciences
- H: Humanities.

The breakdown of researchers by field of R&D is based on the field where they work and not according to the field of their qualification.

Indicators about scientific publications were also produced by the above FORD. Scientific publications in Scopus are assigned to several major and minor subject areas. Major subject areas are defined according to 27 All Science Journal Classification

(ASJC) categories. Each of the 27 subject categories is further subdivided into a total of 334 minor sub-categories. As some journals can be classified as multi-category (i.e., more than one subject), each publication may fall into more than one subject classification. For She Figures 2018, the ASJC classifications were mapped to the FORD. A full table of the mapping of FORD with the ASJC sub-categories can be found in the She Figures 2018 Handbook.

Sectors of the economy

The Frascati Manual (OECD, 2015) identifies and defines five sectors of the economy: the higher education sector (HES), the government sector (GOV), the business enterprise sector (BES), the private non-profit sector (PNP) and the 'Rest of the world' sector. The definitions for the first four sectors are:

HES (§3.67): 'It comprises all universities, colleges of technology and other institutions providing formal tertiary education programmes, whatever their source of finance or legal status, and all research institutes, centres, experimental stations and clinics that have their R&D activities under the direct control of, or administered by, tertiary education institutions'.

GOV (§3.60): 'The Government sector consists of the following groups of resident institutional units: all units of central (federal), regional (state) or local (municipal) government including social security funds, except those units that provide higher education services or fit the description of higher education institutions provided in this manual. It consists also of all non-market NPIs that are controlled by government units that are not part of the Higher education sector'.

BES (§3.51): 'The Business enterprise sector comprises all resident corporations, including not only legally incorporated enterprises, regardless of the residence of their shareholders. This group also includes all other types of quasi-corporations, i.e. units capable of generating a profit or other financial gain for their owners that are recognised by law as separate legal entities from their owners and set up for purposes of engaging in market production at prices that are economically significant. It comprises also the unincorporated branches of non-resident enterprises that are deemed to be resident because they are engaged in production on the economic territory on a long-term basis and all resident NPIs that are market producers of goods or services or serve business'.

PNP (§3.75):'The Private non-profit sector comprises all non-profit institutions serving households (NPISH), as defined in the SNA 2008, except those classified as part of the Higher education sector. For completeness of presentation it comprises also, households and private individuals engaged or not engaged in market activities, as explained in the section "Criteria for the classification of institutional sectors for R&D statistics" earlier in this chapter'.

The 'Rest of the world' sector is not referred to in this publication.

NACE categories

Researchers in the business enterprise sector are categorised using the Statistical Classification of Economic Activities in the European Community, Rev. 2 (NACE Rev.2). For a full listing of the NACE Rev.2 categories please see
https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-RA-07-015

Units – Head Count & Full Time Equivalent

The units of measurement of personnel employed on R&D as proposed by the Frascati Manual (OECD, 2015) are:

- HC (§5.58): Head count. The number of persons engaged in R&D at a given date or the average number of persons engaged in R&D during the (calendar) year or the total number of persons engaged in R&D during the (calendar) year.
- FTE (§5.49): Full time equivalent. It is defined as the ratio of working hours actually spent on R&D during a specific reference period (usually a calendar year) divided by the total number of hours conventionally worked in the same period by an individual or by a group.

Data in this publication are presented in HC, unless indicated otherwise.

R&D expenditure

The Frascati Manual (OECD 2015) defines intramural expenditures on R&D (§4.10) as all current expenditures plus gross fixed capital expenditures for R&D performed within a statistical unit during a specific reference period, whatever the source of funds.

Seniority grades of researchers/academic staff

Statistics on researchers/academic staff have been collected by sex, grade, main field of R&D and age group (for latest reference year only) using the Women in Science (WiS) questionnaire. The statistics on the seniority of researchers/academic staff are collected at the national level through Higher Education and R&D Surveys or directly from higher education institutions as part of their own monitoring systems and from administrative records. It is important to note that these data are not always completely cross country comparable as the seniority grades have not yet been implemented following the publication of the revised Frascati Manual guidelines (OECD 2015). Furthermore, since it was not always possible for countries to provide data on the preferred reference population in the She Figures 2018 – that is for researchers in the HES as defined by the Frascati Manual (OECD, 2015) – some countries provided data for an alternative reference population, namely 'academic staff' (see definition in UNESCO – Institute for Statistics et al, 2017) in the HES.

The grades presented in this publication are based upon national mappings according to the following definitions:

- A: The single highest grade/post at which research is normally conducted within the institutional or corporate system;
- B: All researchers working in positions which are not as senior as the top position (A) but definitely more senior than the newly qualified PhD holders (C); i.e.: below A and above C;
- C: The first grade/post into which a newly qualified PhD graduate would normally be recruited within the institutional or corporate system;
- D: Either postgraduate students not yet holding a PhD degree who are engaged as researchers (on the payroll) or researchers working in posts that do not normally require a PhD.

Internationally mobile researchers

Two 'She Figures 2018' indicators present the mobility rates of researchers, based on data from the MORE 3 Survey of Higher Education Institutions (European Commission, 2017c). One focuses on mobility during PhD for researchers in the early stages of their careers (R1 and R2 combined) and another focuses on mobility in the last 10 years for researchers in the post PhD phases of their careers (R2–R4).

The precise categories of mobility are as follows:

- 'International mobility during PhD' applies to researchers who have moved abroad for at least three months during their PhD to a country other than the one where they completed (or will obtain) their PhD. In She Figures 2018, the derived indicator is based on a direct question in the MORE3 Survey.
- 'International mobility in the post PhD career stages' applies to researchers who have worked abroad for more than three months at least once in the last 10 years, since obtaining their highest educational qualification (PhD or other). In She Figures 2018, the derived indicator is based on a direct question in the MORE3 Survey of Higher Education Institutions.

The MORE3 Survey also asks researchers to classify their career stage, using the categories defined in the European Framework for Research Careers (European Commission, 2011). These are:

- R1: First Stage Researcher (up to the point of PhD);
- R2: Recognised Researcher (PhD holders or equivalent who are not yet fully independent);
- R3: Established Researcher (researchers who have developed a level of independence); and
- R4: Leading Researcher (researchers leading their research area or field).

The MORE3 Survey applies the Frascati Manual (OECD, 2015) definition of researchers (see above).

Part time and precarious employment

Two indicators based on the MORE3 Survey focus on the employment status of researchers in the HES.

'Part time employment' covers respondents who self reported any of these three statuses: 'part time: more than 50 %'; 'part time: 50 %'; 'part time: less than 50 %'. It should be kept in mind that part-time employment is sometimes the choice of the researchers while sometimes it has been forced upon them. The indicator does not distinguish between these two cases.

'Precarious employment' includes:

- Researchers who indicated that they have a fixed term contract of one year or less;
- Researchers who indicated that they have no contract;
- Researchers who indicated that they have an 'other' non-fixed term, non-permanent type of contract (often associated with student status), unless they stated explicitly that they had a contract of indefinite duration.

This definition of 'precarious' employment differs from that of the Labour Market and Labour Force Statistics which describes as 'precarious' contracts with duration of three months or less (http://ec.europa.eu/eurostat/web/labour-market/quality-of-employment).

Gender equality plans

Two indicators in She Figures 2018 refer to the adoption of Gender Equality Plans (GEPs) by research performing organisations, based on data from the MoRRI project (European Commission, 2018).

A Gender Equality Plan (GEP) is a set of actions aiming at:
- Conducting impact assessment/audits of procedures and practices to identify gender bias;
- Identifying and implementing innovative strategies to correct any bias;
- Setting targets and monitoring progress via indicators.

(European Commission, 2012)

The European Institute for Gender Equality has developed the GEAR tool (https://eige.europa.eu/gender-mainstreaming/toolkits/gear), aimed at supporting research organisations and higher education institutions in setting up, implementing, monitoring and evaluating GEPs. Further details are provided in the info box, in the relevant section of chapter 5 of She Figures 2018.

Technological fields (IPC sections)

Statistics on inventorships were produced by using data from the EPO Worldwide Patent Statistical Database (PATSTAT). All EPO patent applications are classified based on the International Patent Classification (IPC) of the World Intellectual Property Organization (WIPO) in PATSTAT. This hierarchical classification is divided into eight sections (level 1), which are further divided into classes (level 2), sub-classes (level 3), main groups (level 4) and sub-ingroups (lower level). This classification is not mutually exclusive (i.e. each patent application is classified into one or more sections, classes, subclasses, main groups and subgroups). Thus, a given patent application can contribute to the scores of more than one of the eight sections for which statistics on inventorships were calculated:
- A: Human necessities
- B: Performing operations & transporting
- C: Chemistry & metallurgy
- D: Textiles & paper
- E: Fixed constructions
- F: Mechanical engineering, lighting, heating, weapons & blasting
- G: Physics
- H: Electricity.

Other data considerations

Age groups

Data referring to the labour force refer to all persons aged 15 and over living in private households and include the employed and the unemployed. Data referring to HRST refer to the age group 25-64.

Small numbers

For some countries with small populations, raw data relating to small numbers of people have been reported. The percentages and indicators have not always been included (mostly growth rates) and this is identified in the footnotes to the indicators. The reader is therefore asked to bear this in mind when interpreting the most disaggregated data, in particular for Cyprus, North Macedonia, Luxembourg and Malta, and, in some cases, for Estonia, Iceland, Latvia and Serbia.

EU estimates

EU totals estimated by DG Research and Innovation (as noted in the footnotes) are based upon existing data for the reference year (n) in combination with the next available year if the reference year is unavailable, in the following sequence (n-1, n+1, n-2, n+2 etc...).

The aggregates were estimated by DG Research and Innovation only when at least 60% of the EU population on a given indicator was available. These estimates are intended as an indication for the reader only.

Rounding error

In some cases, the row or column totals do not match the sum of the data. This may be due to rounding error.

Decimal places

All figures and tables display data up to the precision level of two decimal places. However, when needed, the text discusses the data at full precision.

Cut off date

Data from Eurostat, ILO, UIS and OECD were downloaded in April 2018. Updates from Eurostat until September 2018 were also incorporated. The planned data collection period of the WiS questionnaire was April-May 2018, however data were not finalised until December 2018.

Country Codes

Country names available in this publication have been abbreviated in accordance with the ISO Alpha-2 codes, with the exceptions of Greece and the United Kingdom, in the tables, figures, and footnotes, as follows:

EU Member States	
BE	Belgium
BG	Bulgaria
CZ	Czechia
DK	Denmark
DE	Germany
EE	Estonia
IE	Ireland
EL	Greece
ES	Spain
FR	France
HR	Croatia
IT	Italy
CY	Cyprus
LV	Latvia
LT	Lithuania
LU	Luxembourg
HU	Hungary
MT	Malta
NL	Netherlands
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
SE	Sweden
UK	United Kingdom
European Free Trade Association (EFTA)	
IS	Iceland
NO	Norway
CH	Switzerland
EU Candidate Countries	
ME	Montenegro
MK	North Macedonia
AL	Albania
RS	Serbia
TR	Turkey
Potential EU Candidate Countries	
BA	Bosnia and Herzegovina
Other Countries	
AM	Armenia
FO	Faroe Islands
GE	Georgia
IL	Israel
MD	Moldova
TN	Tunisia
UA	Ukraine

Countries listed in the tables and figures throughout this publication are displayed in one of the following ways:
• Ranked according to the values of indicators on women.
• Country codes listed in the order presented above, which is based on the original written form of the short name of each country.

Flags

The following flags have been used, where necessary:
– = data item not applicable
0 = real zero or < 0.5 of the unit
: = data not available
x = data included in another cell
c = confidential data
z = not applicable

Researchers/academic staff

The following list provides country-specific metadata for the reference population used in producing statistics on the seniority of researchers/academic staff using the Women in Science (WiS) questionnaire. The first column identifies the reference population used in producing She Figures 2018 by country. When available, the preferred reference population was researchers in the HES as defined by the Frascati Manual (OECD, 2015). Otherwise, data on academic staff in the HES as defined by the UOE 2017 manual were used instead.

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
BELGIUM	Researchers	**Dutch-speaking community**			
		A	ZAP1 - "Gewoon/buitengewoon hoogleraar" + ZAP2 - "Hoogleraar"	-	-
		B	ZAP3 - "Hoofddocent" + ZAP4 - "Docent" + ZAP5 - "Other"	-	-
		C	AAP2 - Doctor-assistant + WP3 - Postdoctoral of unlimited duration + WP4 - Postdoctoral of limited duration + Unpaid researchers (postdoctoral)	-	-
		D	AAP1 - Assistant + AAP3 - Other + WP1 - Predoctoral of unlimited duration + WP2 - Predoctoral of limited duration + Unpaid researchers (predoctoral)	-	-
		French speaking community			
		A	Ordinary and extraordinary professors, Research Directors (F.R.S.-FNRS)	PhD	-
		B	Other professors, Senior Research Associates (F.R.S.-FNRS)	PhD	-
		C	Assistant professors (or equivalent, including "Chargé de cours"), Lecturers (Maîtres de conférence), Research Associates (F.R.S.-FNRS)	PhD	-
		D	Scientific staff: Postdoctoral researchers, Scientific Research Workers, Teaching assistants, Research Fellows (or equivalent)	MSc	-
Comments		Dutch-speaking community: Classification provided by VLIR (Flemish Interuniversity Council). French-speaking community: With respect to T1 (head counts), a researcher who holds different positions within different Grade categories (A, B, C, D) could be counted several times.			

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
BULGARIA	Academic staff	A	Professors	ISCED 6	Teaching and Research
		B	Associate professors	ISCED 6	Teaching and Research
		C	-	-	-
		D	Assistants, Lecturers, Science assistants	ISCED 5	Teaching
Comments		No comments			
CZECHIA	Researchers	A	-	-	-
		B	-	-	-
		C	-	-	-
		D	-	-	-
Comments		No comments			
DENMARK	Researchers	A	Professor	PhD	-
		B	Associate professors, Senior researchers	PhD	-
		C	Assistant professors, Post docs	PhD	-
		D	PhD Students, other researchers (R&D advisors, research assistans and other VIPs)	MSc	-
Comments		No comments			
GERMANY	Academic staff	A	professors: W3/C4	Habilitation or equivalent	Teaching and Research
		B	C3, C2 auf Dauer, C2 auf Zeit, W2, Juniorprofessuren W1, Gastprofessuren (hauptberuflich), Hochschuldozenten, Universitätsdozenten, Oberassistenten, Oberingenieure, wissenschaftliche und künstlerische Mitarbeiter (höchster Abschluss: Habilitation)	PhD + professional experience outside the academia (universities of applied sciences) or habilitation or equivalent (universities)	Teaching and Research
		C	Hochschulassistenten, Wissenschaftliche und künstlerische Assistenten, Akademische (Ober)Räte-auf Zeit, wissenschaftliche und künstlerische Mitarbeiter (höchster Abschluss: Promotion), Lehrkräfte für besondere Aufgaben (höchster Abschluss: Promotion oder Habilitation)	PhD or habilitation (for some cases)	Normally both; some staff is only involved in research, some only in teaching
		D	wissenschaftliche und künstlerische Mitarbeiter (höchster Abschluss: Master/ Diplom oder Äquivalent), Lehrkräfte für besondere Aufgaben (höchster Abschluss: Master/ Diplom oder Äquivalent)	-	Normally both; some staff is only involved in research, some only in teaching
Comments		No comments			
ESTONIA	Academic staff	A	-	-	-
		B	-	-	-
		C	-	-	-
		D	-	-	-
Comments		No comments			

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
IRELAND	Academic staff	A	Full Professor on appropriate salary (€101,404 – €136,276). Grade A staff members are found in universities. While there are some staff members who are in the IoTs who are styled as professors, these are not returned as academic staff in the HEA returns, and therefore do not fit the definition of Grade A staff (the highest grade/post at which research is normally conducted).	Varies depending on institution and date of appointment	Teaching and Research
		B	Senior Lecturer (all grades), Associate Professor, (it would be expected that once the staff database is established Grade B staff will also include Lecturer 'above the bar', as these positions are held by those 'more senior than newly qualified PhD holders').	Varies depending on institution and date of appointment	Teaching and Research
		C	Lecturer (and 'Assistant Lecturer' in the IoTs)	Varies depending on institution and date of appointment	Teaching and Research
		D	-	-	-
Comments		No comments			
GREECE	Academic staff	A	Professor	ISCED8	Teaching and Research
		B	Deputy Professor	ISCED 8	Teaching and Research
		C	Assistant Professor, Lecturer	ISCED 8	Teaching and Research
		D	other Academic Staff	-	-
Comments		No comments			
SPAIN	Researchers	A	Full professor	-	-
		B	Associate Professor (civil servant and non-civil servant permanent) and Post-Doc contract for oustanding research careers (non permanent)	-	-
		C	Assistant Professor (PhD holder), Other researchers in non-permanent positions that require a PhD, Visiting Researchers and Other researchers in non-permanent positions that require a PhD	-	-
		D	PhD Candidate engaged as researcher and Researchers in non-permanent post that do not normally require a PhD	-	-
Comments		Grade D: From 2014/15 data are not available. There is a methodological change in 2015/2016 for Frascasti manual 2015.			
FRANCE	Researchers	A	-	ISCED8	Teaching and Research
		B	-	ISCED7/8	Teaching and Research
		C	-	ISCED7/8	Research
		D	-	ISCED8	Teaching and Research
Comments		No comments			
CROATIA	Researchers	A	Researchers with highest scientific title	PhD	Research
		B	Researchers with scientific title	PhD	Research
		C	Researchers without scientific title	PhD	Teaching and Research
		D	Researchers (Postgraduate students whithout PhD)	Postgraduate level that is no PhD	Teaching and Research
Comments		No comments			

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
ITALY	Academic staff	A	FULL PROFESSORS (permanent employment)	Since 2010, a reform of the University (Law 240/2010) has reorganized the recruitment procedures of the academic staff and has established a "national scientific qualification" which is a necessary prerequisite for access to grades A and B. Before then, it was enough to hold a degree and passing a specific public competition.	Teaching and Research
		B	ASSOCIATE PROFESSORS (permanent employment - lower level)	cfr. A - Minimum level of education required.	Teaching and Research
		C	ACADEMIC RESEARCHERS (permanent employment and fixed-term employment)	Since 2010, ISCED 8 level (PhD) attainment. ISCED 7 level attainment before 2010.	Teaching and Research, but they are more involved in research activities than in teaching
		D	FELLOWSHIP RESEARCHERS	PhD or equivalent is an advantage to the attribution of grants.	Research
Comments		No comments			
CYPRUS	Researchers	A	Professors	PhD	Teaching and Research
		B	Associate Professors	PhD	Teaching and Research
		C	Assistant Professors, Lecturers & Teaching Support Staff	PhD (for Assistant Professors); MSc and/or PhD (for Lecturers & Teaching Support Staff)	Teaching and Research
		D	Research Associates & Other Staff	Other post-secondary diplomas to PhD	Research
Comments		Academic staff usually do a mixture of teaching and research. The data reported cover only the academic staff that engage (fully or partly) in research. However, there exist cases (especially in ISCED level 5B) where staff only engages in teaching; this staff is not included. In essence, the academic staff reported in the WiS questionnaire corresponds to Higher Education Researchers, as defined in the Frascati Manual. Research associates working in certain projects only undertake research.			
LATVIA	Academic staff	A	Full professors	-	-
		B	Associate professors	-	-
		C	Assistant Professors, Assistants, Lecturers, Researchers	-	-
		D	-	-	-
Comments		No comments			
LITHUANIA	Academic staff	A	Professor - teaching staff, Chief Researcher - research staff	PhD	Teaching and Research
		B	Associate professor - teaching staff, Senior Researchers - research staff	PhD	Teaching and Research
		C	Lecturers - teaching staff, Researchers - research staff	At least a Master's qualification degree or higher education qualification equivalent	Teaching and Research
		D	Assistants - teaching staff, Junior Researchers - research staff	At least a Master's qualification degree or higher education qualification equivalent	Teaching and Research
Comments		No comments			
LUXEMBOURG	Academic staff	A	-	PhD	Teaching and Research
		B	-	PhD	Teaching and Research
		C	-	PhD	Teaching and Research
		D	-	Master	Teaching and Research
Comments		No comments			
HUNGARY	Researchers	A	Professors	ISCED 8	-
		B	Assistant Professor	ISCED 8	-
		C	Lecturers	ISCED 8	-
		D	-	-	-
Comments		No comments			
MALTA	Researchers	A	-	-	-
		B	-	-	-
		C	-	-	-
		D	-	-	-
Comments		No comments			

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
NETHERLANDS	Academic staff	A	Full professor	-	Teaching and Research
		B	Associate Professor	-	Teaching and Research
		C	Assistant professor	-	Teaching and Research
		D	Other scientific personnel and Postgraduates	-	Depends on the subcategory. Some subcategories within "other scientific personnel" are oriented to education, some to research. Postgraduades have a small educational task.
Comments		No comments			
AUSTRIA	Researchers	A	Universitätsprofessor/in, Stiftungsprofessor/in, Gastprofessor/in nur mit F&E-Tätigkeit, Emeritierte/r Universitätsprofesor/in und Professor/in im Ruhestand nur mit F&E-Tätigkeit	-	Teaching and Research
		B	Assozierte/r Professor/in, Dozent/in, Assistenzprofessor/in	-	Teaching and Research
		C	Universtitätsassitent/in, Staff Scientist, Senior Scientist/Artist, Assistenzarzt/-ärztin, Arzt/Ärztin, Projektmitarbeiter/in und Sonstiges wissenschaftliches Personal mit PhD	-	Teaching and Research
		D	Projektmitarbeiter/in und Sonstiges wissenschaftliches Personal ohne PhD, Senior Lecturer, Bundes- und Vertragslehrer/in, Wissenschaftliche Beamte, Wissenschaftliche Vertragsbedienstete, Studentische/r Mitarbeiter/in (mit F&E-Tätigkeit)	-	-
Comments		Projektmitarbeiter/innen and Sonstiges wissenschaftliches Personal with PhD: Grade C, without PhD Grade D (separated since 2013). Studentische/r Mitarbeiter/in without R&D are not included (since 2013).			
POLAND	Researchers	A	Profesor (Professor)	Doctor habilis with the title of professor	Teaching and Research
		B	Doktor habilitowany (Doctor habilis/ Habilitated PhD)	Habilitation	Teaching and Research
		C	Doktor (PhD)	PhD	Teaching and Research
		D	Magister	Masters Degree	Teaching and Research
Comments		Responsibilities of scientists does not depend on their grade, but on job title. For most scientists, both research and teaching are obligatory.			
PORTUGAL	Researchers	A	Professor Catedrático Professor Coordenador Principal (from 2010) Investigador Coordenador	PhD	Teaching and Research
		B	Professor Associado (com e sem agregação) Professor Coordenador (com e sem agregação) Investigador Principal	PhD	Teaching and Research
		C	Professor Auxiliar Professor Adjunto Investigador Auxiliar	PhD	Teaching and Research
		D	Assistentes Leitor Monitor Outros	PhD and others	Teaching and Research
Comments		Not all the reseachers are classified by grades in the national R&D survey, so the totals of the Table 1 (ALL grades), for all years, may not be equal of the totals of researchers displayed by Eurostat.			
ROMANIA	Researchers	A	Principal scientist 1	ISCED8 (PhD)	Research
		B	Principal scientist 2	ISCED8 (PhD)	Research
		C	Principal scientist	ISCED8 (new qualified PhD)	Research
		D	Research assistant/postgraduate students not yeld holding a PhD/Researcher who works in positions that do not require the title of doctorate holder	ISCED7	Research
Comments		No comments			

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
SLOVENIA	Academic staff	A	Full professors	-	-
		B	Associate professors	-	-
		C	Assistant professors, senior lecturers, lecturers, lectors	-	-
		D	Young researchers	-	-
Comments		No comments			
SLOVAKIA	Academic staff	A	Full professor ("profesor")	degree of "docent" , successful completion of appointment procedure	Teaching and Research
		B	Associate professor ("docent")	higher education of the third level,	Teaching and Research
		C	Lecturer ("odborný asistent")	higher education of the third level (or second level) - majority of them has "PhD", if not they educate themselves to receive it	Teaching and Research
		D	Assistant lecturer, lector ("asistent", "lektor")	higher education of the second level, HE Institution creates for assistent lecturer space for education leading to "PhD" (lector - second or first level)	Assistant lecturer - Teaching and Research; lector - Teaching
Comments		Data cover both full and part time academic staff			
FINLAND	Researchers	A	Research career model, 4th stage: professorship (Previously: Professors)	-	-
		B	Research career model, 3rd stage: independent research and education professionals capable of academic leadership (Previously: Lecturers, senior assistants)	-	-
		C	Research career model, 2nd stage: career phase of researchers who have recently completed their doctorate (Previously: Assistants, full-time teachers)	-	-
		D	Research career model, 1st stage: young researchers working on their doctoral dissertation (Previously: researchers)	-	-
Comments		No comments			
SWEDEN	Academic staff	A	Professor	Phd	Teaching and Research
		B	Associate professor, senior researcher, other academic staff with a doctoral degree	Phd	Teaching and Research
		C	Assistant professor, Post.Doc fellowship holders	Phd	Teaching and Research
		D	Graduate students, junior lecturers, other academic staff without doctoral degree	Generally requires ISCED 5 Degree	Teaching and Research
Comments		No comments			
UNITED KINGDOM	Researchers	A	A0 to F2	-	-
		B	I0 to K0	-	-
		C	L0	-	-
		D	M0 to P0	-	-
Comments		Definitions of National Classifications come from *XpertHR* and *UCEA* combined levels - see https://www.hesa.ac.uk/collection/c16025/combined_levels Staff with an academic function of either 'Research only' or 'both Teaching and Research' - see https://www.hesa.ac.uk/collection/c16025/a/acempfun			
ICELAND	Academic staff	A	Full professors	-	Teaching and Research (Requirements: Teaching 48%; research 40%; administration 12%)
		B	Associate professors	-	Teaching and Research (Requirements: Teaching 52%; research 42%; administration 6%)

Country	Reference population	Grade	National classification	Minimum level of education required	Responsibilities of the post
ICELAND	Academic staff	C	Assistant professors	-	Teaching and Research (Requirements: Teaching 52%; research 42%; administration 6%)
		D	-	-	-
Comments		Other staff at tertiary level include other teachers than ABC (large group of part time teachers), professionals and managers.			
NORWAY	Researchers	A	Full professor	-	Teaching and Research
		B	Associate professor, college reader, senior lecturer, dean, head of department, researchers with a doctorate awarded more than five years ago, senior physicians and senior researchers at university hospitals	Requires a PhD or equal competence. For researchers employed in temporary positions (related to projects), only those with a PhD older than 5 years are included in Grade B	Teaching and Research
		C	Post doctor, researcher with a doctorate awarded less than six years ago, junior physician and clinical psychologist at university hospitals with a doctoral degree	Post doctor positions, and researchers with a doctorate less than 6 years ago	Research
		D	Lecturer, research fellow, research assistant, other positions not requiring doctoral competence	MSc	Teaching and Research
Comments		Classification from 2011 and onwards is revised. This is mainly based on more detailed division of personnel regarding when they received a PhD.			
SWITZERLAND	Researchers	A	-	-	-
		B	-	-	-
		C	-	-	-
		D	-	-	-
Comments		No comments			
TURKEY	Researchers	A	-	-	-
		B	-	-	-
		C	-	-	-
		D	-	-	-
Comments		Not available for grades			
BOSNIA & HERZEGOVINA	Researchers	A	-	ISCED 8	-
		B	-	ISCED 8	-
		C	-	ISCED 8	-
		D	-	ISCED6, ISCED 7	-
Comments		No comments			
ISRAEL	Academic staff	A	Full Professor	PhD and post	Teaching and Research
		B	Associate Professor and	PhD and post	Teaching and Research
		C	Lecturer	PhD and post	Teaching and Research
		D	Junior staff, Research Fellows	MA	Teaching and/or Research
Comments		No comments			

Research funds

The following list details each of the national funding bodies which have provided data for both applicants and beneficiaries of research funds. For the funding success rate, only those funds that have data available for both applicants and beneficiaries have been used in the calculation.

Country	Research Funds
BELGIUM	Funds from Institute for the Promotion of Innovation by Science and Technology in Flanders (IWT) Funds from Research Foundation Flanders (FWO) Fonds de la Recherche Scientifique (FNRS)
BULGARIA	National Science Fund
DENMARK	Independent Research Fund Denmark (IRFD; former reported as DCIR - Danish Council for Independent Research) Innovation Fund Denmark (IFD) The Danish National Research Foundation (DNRF)
GERMANY	Funds from Deutsche Forschungsgemeinschaft (DFG; German Research Foundation) Funds from BMBF
ESTONIA	Estonian Research Council Estonian Science Fund
GREECE	National Funding (National Strategic Reference Programme)
SPAIN	Funds from National R&D plan - DGIC INNCORPORA Funds from National R&D plan - DGICT - Granted Research Projects: Non-guided fundamental research projects (2011-2012) & R&D projects, complementary actions and RDI Programmes for Strengthening Centres and Units of Excellence (2013-2014) Funds from National R&D plan - DGICT - Fellowships: Ramón y Cajal, Torres Quevedo, Juan de la Cierva, FPI, and Técnicos de apoyo; Ayudas para incentivar la incorporación estable de doctores and "Doctorados industriales"
ITALY	FIRST-PRIN (Research Projects of National Interest) - (Co-financing MIUR+Universities+RPO) FIRST-FARE (Framework per l'Attrazione e il Rafforzamento delle Eccellenze per la ricerca in Italia) - (Co-financing MIUR+Universities+RPO) FFO - Programma "Rita Levi Montalcini" (Programme for the recruitment of young researchers "Rita Levi Montalcini") - (funded by MIUR) FIRST-SIR (Scientific Independence of young Researchers) - (Co-financing MIUR+Universities+RPO)
CYPRUS	Research Promotion Foundation (RPF)
LITHUANIA	State buget allocations from Ministry of Education and Science State buget allocations from Lithuaniana State Science and Studies Foundation
LUXEMBOURG	Fonds National de la Recherche European Commission - Horizon 2020 (h2020)
HUNGARY	National Research, Development and Innovation Fund (NRDIF; previously known as OTKA)
MALTA	National Research and Innovation Programme (Funds from Central Government Ministries & Departments, Extra Budgetary Units, Local Councils) Malta Council for Science and Technology (MCST)
NETHERLANDS	NWO - programmes/ thematic research NWO - individual talent programmes NWO - free competition NWO - research facilities NWO - other
AUSTRIA	FwF (Fonds zur Förderung der wissenschaftlichen Forschung - Austrian Science Fund) ÖAW (Österreichische Akademie der Wissenschaften - Austrian Academy of Sciences) FFG (Austrian Research Promotion Agency) CDG (Christian Doppler Research Association)
POLAND	Ministry of Science and Higher Education (Government grants:"National Programme for the Development of Humanities";"Iuventus Plus"; "Diamond Grant") National Science Centre
PORTUGAL	Programmes of Advanced Training of Human Resources (Fundação para a Ciência e a Tecnologia (FCT))
ROMANIA	HUMAN RESOURCES - Research projects to stimulate the establishment of young independent research teams BILATERAL CO_OPERATION COMPETITIONS - Mobility Projects(PM) P3-PM-RO-BE BASIC AND FRONTIER RESEARCH Exploratory research(PCE) P4-PCE BILATERAL CO_OPERATION COMPETITIONS - Mobility Projects(PM) P3-PM-RO-MD BILATERAL CO_OPERATION COMPETITIONS - Bilateral Co-operation Romania-France (Brancusi Integrated Action Program) -P3-PM-RO-FR RESEARCH,DEVELOPMENT AND INNOVATION-Bridge Grant (Transfer of knowledge to the trade) (BG) P2-BG RESEARCH,DEVELOPMENT AND INNOVATION-Experimental demonstration project(PED) RESEARCH,DEVELOPMENT AND INNOVATION Solutions (SOL) P2-SOL RESEARCH,DEVELOPMENT AND INNOVATION Checks innovation (CI) P2-CI INSTITUTIONAL PERFORMANCE Complex projects completed in consortia (CDI) P1-PCCDI

Country	Research Funds
SLOVENIA	F1 (Slovenian Research Agency) F2 (Slovenian Research Agency) F3 (Slovenian Research Agency)
SLOVAKIA	Funds from Slovak Research and Development Agency Funds from Ministry of Education, Science, Research and Sport: Incentives for Research and Development
FINLAND	Academy of Finland-Research project funding team leaders Academy of Finland-Academy Professor Academy of Finland-Academy Research Fellow Academy of Finland-Postdoctoral Researcher
SWEDEN	Funds from Swedish Research Council Funds from Swedish Research Council for Health, Working Life and Welfare Funds from Swedish Research Council Formas
UNITED KINGDOM	AHRC (Arts and Humanities Research Council) BBSRC (Biotechnology and Biological Science Research Council) EPSRC (Enginering and Physical Sciences Research Council) ESRC (Economic and Social Research Council) MRC (Medical Research Council) NERC (Natural Environment Research Council) STFC (Science and Technologies Facilities Council)
ICELAND	F11 The Research Fund of the University of Iceland F13 The Research Fund (as of 2004) F14 The Technology Development Fund (as of 2004) F15 AVS R&D Fund of Ministry of Fisheries (and Agriculture) in Iceland (as of 2003) F17 The Research Fund of the University of Akureyri (as of 2004) Infrastructure Fund (as of 2013)
NORWAY	The Research Council of Norway
SWITZERLAND	Project Funding Basic Research Career Funding (Ambizione, Professorships, MHV, Doc.CH) Fellowships (Advanced Postdoc.Mobility + Early Postdoc.Mobility + Doc.Mobility) Sinergia
ISRAEL	NSF-BSF joint program U.S.-Israel Binational Science Foundation (BSF) German-Israeli Foundation for Scientific Research and Development (GIF) Israel Science Foundation (ISF) Ministry of Science and Technology (MOST)

Boards

A scientific board of a research organisation is defined as 'A publicly or privately managed and financed group of elected or appointed experts that exists to implement scientific policy by, amongst other things, directing the research agenda, resource allocation and management within scientific research.'

Country	Boards
BELGIUM	FNRS
BULGARIA	Scientific boards
	Bilateral Cooperation
CZECHIA	Czech Academy of Sciences - Council for Sciences
	Technology Agency of the Czech Republic - Scientific Board
	Grant Agency of the Czech Republic - Scientific Advisory Board
DENMARK	IRFD (former reported as DCIR)
	DNRF (Danish National Research Foundation)
	IFD (Innovation Fund Denmark)
	IRFD | Social Sciences (former reported as DSSR)
	IRFD | Technology and Production (former reported as DRCTP)
	IRFD | Humanities (former reported as DRCH)
	IRFD | Natural Sciences (former reported as DNR)
	IRFD | Medical Sciences (former reported as DMR)
GERMANY	DFG (German Research Foundation) - Executive Committee
	DFG (German Research Foundation) - Senate
	DFG (German Research Foundation) - Review Boards
	DFG (German Research Foundation) - Joint Committee
	German Federal Environmental Foundation
	German Foundation for Peace Research
	German Federation of Industrial Research Associations - Expert Groups
	German Federation of Industrial Research Associations - Scientific Council
ESTONIA	The Research and Development Council
	Research Policy Committee of the Estonian Ministry of Education and Research
	Centres of Excellence COUNCIL
	Evaluation committee of the Estonian Research Council
IRELAND	Science Foundation Ireland (SFI)
	Irish Research Council (IRC)
	Health Research Board (HRB)
GREECE	National Council for Research and Technology (NCRT)
	Special Permanent Committee on Research and Technology
	Sectorial Scientific Councils
	Hellenic Foundation for Research and Innovation
SPAIN	The Spanish National Research Council (CSIC) Governing Board
	Institute of Health Carlos III (ISCIII) Governing Board
	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) Governing Board
	National Institute for Agricultural and Food Research and Technology (INIA) Governing Board
	Spanish Institute of Oceanography (IEO) Governing Board
	The Geological Survey of Spain (Instituto Geológico y Minero de España (IGME) Governing Board
	The Canarian Institute of Astrophysics (IAC) Governing Board
	National Institute of Aerospace Technology (INTA) Governing Board
	State Research Agency (AEI) Scientific and Technical Committee
FRANCE	ANR (Agence Nationale de la Recherche/ French National Research Agency)
CROATIA	The Board of Croatian Science Foundation
	The National Council for Science, Higher Education and Technological Development
ITALY	Ministry of Education, University and Research (MIUR) - Directorate-General for the coordination, promotion and enhancement of research
	Consiglio Nazionale delle Ricerche (CNR) – National Research Council
	Istituto Nazionale di Fisica Nucleare (INFN) – National Institute for Nuclear Physics
	Agenzia Nazionale per le nuove tecnologie, l'Energia e lo Sviluppo economico sostenibile (ENEA) – National Agency for New Technologies, Energy and Sustainable Economic Development
	Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) – Agricultural Research Council
	Agenzia Spaziale Italiana (ASI) - Italian Space Agency
CYPRUS	Research Promotion Foundation (RPF) Board of Directors
LATVIA	Expert commission on natural sciences and mathematics/Latvian Council of Science
	Expert comission on engeneering and computer science /Latvian Council of Science
	Expert comission on biology and medical sciences /Latvian Council of Science
	Expert comission on agricultural, environmental, and forest sciences /Latvian Council of Science
	Expert comission on humaritan and social sciences/Latvian Council of Science
LITHUANIA	Research Council of Lithuania

Country	Boards
LUXEMBOURG	Fonds National de la Recherche (FNR)
HUNGARY	National Research, Development and Innovation Office (basic research funding)
MALTA	Malta Council for Science and Technology
NETHERLANDS	Royal Netherlands Academy of Arts and Sciences (KNAW)
	The Netherlands Organisation for Scientific Research (NWO)
AUSTRIA	Council for Research and Technology Development
	Scientific Advisory Boards of OeAW-Institutes
	Research Board of OeAW - Austrian Academy of Sciences
	Austrian Science Board
	Board (Kuratorium)
	International START-Wittgenstein Jury
	PEEK Board (Programme for Arts-based Research)
	WissKomm Jury (Science Communication Programme)
	KLIF-Jury (Programme Clinical Research)
	Christian Doppler Forschungsgesellschaft Scientific board / Senat
POLAND	Board of the National Centre for Research and Development
	Board of the National Science Centre
	Central Commission for Academic Degrees and Titles
	Commitee for Evaluation of Scientific Research Institutions
	Polish Accreditation Committee
PORTUGAL	Foundation of Science and Technology
	Agency for Competitiveness and Innovation (IAPMEI)
	National Innovation Agency (ANI)
	Lisbon Academy of Sciences (Academia de Ciências de Lisboa)
ROMANIA	Ministry of Research & Innovation
SLOVENIA	Scientific Council of the Slovenian Research Agency
	Scientific research councils for individual fields (of the Slovenian Research Agency)
SLOVAKIA	The Council of Government of the Slovak Republic for Science, Technology and Innovation
	The Presidium of the Slovak Research and Development Agency
	Scientific Council of the Slovak Academy of the Sciences
FINLAND	Scientific board, Academy of Finland
	Reseach council for Biosciences and Environment
	Research council for Culture and Society
	Research Council for Natural Sciences and Engineering
	Research Council for Health
SWEDEN	Board of the Swedish Research Council
	Scientific Council for Humanities and Social Sciences of the Swedish Research Council
	Scientific Council for Medicine and Health of the Swedish Research Council
	Scientific Council for Natural and Engineering Sciences of the Swedish Research Council
	Committee for Educational Sciences of the Swedish Research Council
	Council for Research Infrastructures of the Swedish Research Council
	Board of the Swedish Research Council for Health, Working Life and Welfare
	Board of the Swedish Research Council Formas
	VINNOVA, Sweden"s innovation agency
	Committee of Clinical Therapy Research of Swedish Research Council
	Committee for Development Research of the Swedish Research Council
ICELAND	Council for Science and Technology Policy
	Council for Science and Technology Policy - Science Board
	Council for Science and Technology Policy - Technology board
NORWAY	The Research Council of Norway (RCN) Executive Board
	The Research Council of Norway (RCN) Division for Science
	The Research Council of Norway (RCN) Division for Innovation
	The Research Council of Norway (RCN) Division for Energy, Resources and the Environment
	The Research Council of Norway (RCN) Division for Society and Health
SWITZERLAND	SNSF National Research Council
	SNSF Presidency of National Research Council
	Scientific board of the Commission for Technology and Innovation

Country	Boards
BOSNIA & HERZEGOVINA	Board for Economic Sciences
	Board for Pedagogical Sciences
	Board for Legal Sciences
	Board for Social Sciences
	Board for History Sciences
	Board for Psychiatric and Neurological Research
	Board for Cardiovascular Pathology
	Board for the study of antimicrobial resistance
	Board for the Malignant diseases
	Board for the Natural resourses
	Other Boards
ISRAEL	Minstry of Science Technology and Space - Chief Scientist Forum
	ISF - Call Committee
	BSF - Call Committee
	GIF - Call Committee

An **administrative/advisory board of a research organisation is** defined as 'A publicly or privately managed and financed group of elected or appointed experts that exists to support the research agenda in a non-executive function by, among other things, administering research activities, consulting and coordinating different actors and taking a general advisory role'.

Country	Boards
BULGARIA	Executive board (National Science Fund)
CZECHIA	Research, Development and Innovation Council (Government of the Czech Republic)
DENMARK	IRFD (Independent Research Fund Denmark)
	DFIR (Danish Council for Research and Innovation Policy)
GERMANY	German Science Council
	German Federation of Industrial Research Associations - Scientific Council
	German Rectors' Conference - Executive Board
	German Rectors' Conference - Senate
ESTONIA	Board of the Estonian Research Council
	Supervisory Board of the Archimedes Foundation
	Estonian Academy of Science
GREECE	Hellenic Universities Rectors' Synod
	Hellenic Technological Insitutes Presidents' Synod
	Hellenic Research Institutes Presidents' Synod
SPAIN	The Spanish National Research Council (CSIC) Governing Board
	Institute of Health Carlos III (ISCIII) Governing Board
	Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) Governing Board
	National Institute for Agricultural and Food Research and Technology (INIA) Governing Board
	Spanish Institute of Oceanography (IEO) Governing Board
	The Geological Survey of Spain (Instituto Geológico y Minero de España – IGME) Governing Board
	The Canarian Institute of Astrophysics (IAC) Governing Board
	National Institute of Aerospace Technology (INTA) Governing Board
	State Research Agency (AEI) Governing Board
FRANCE	ANR (Agence Nationale de la Recherche/ French National Research Agency)
CROATIA	Croatian Academy of Sciences and Arts (Presidency)
ITALY	Ministry of Education, University and Research (MIUR) - Directorate-General for the coordination, promotion and enhancement of research
	Ministry of Education, University and Research (MIUR) - National Committee of Guarantors for Research (CNGR)
	National Research Council (CNR) - Board of Directors
	National Institute for Nuclear Physics (INFN) - Executive Board
	National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) - Board of Directors
	Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA) – Agricultural Research Council (CREA) - Board of Directors
	Italian Space Agency (ASI) - Board of Directors
CYPRUS	Research Promotion Foundation (RPF) Board of Directors

Country	Boards
LITHUANIA	Agency for Science, Innovation and Technology - Board of Social Sciences
	Agency for Science, Innovation and Technology - Board of Biomedical and Agricultural Sciences
	Agency for Science, Innovation and Technology - Board of Physical and Technological Sciences
LUXEMBOURG	Fonds National de la Recherche (FNR)
	Luxembourg Institute of Science and Technology (LIST)
	Institute of Socio-economic Research (LISER)
	Luxembourg Institute of Health (LIH)
HUNGARY	National Research, Development and Innovation Office - Administrative / advisory board - Research Council
AUSTRIA	Council for Research and Technology Development - Administrative board
	Administrative / advisory board OeAw
	Administrative board / Austrian Science Board ÖWR
	FWF Executive Board (Präsidium)
	FWF Managing Director (Geschäftsführung)
	FWF Supervisory Board (Aufsichtsrat)
	CDG (Christian Doppler Forschungsgesellschaft)
POLAND	Main Council of Science and Higher Education
	Main Council of Research Institutes
	Ministry of Science and Higher Education - Committee for Science Policy
	Ministry of Science and Higher Education - Council of Young Scientists
	Ministry of Science and Higher Education - Board of the National Programme for the Development of Humanities
	Presidium of the Conference of Rectors of Academic Schools in Poland
	Presidium of the Conference of Rectors of Non-Academic Higher Education Institutions in Poland
	Council of the Polish National Agency for Academic Exchange
PORTUGAL	Foundation of Science and Technology (Fundação para a Ciência e a Tcnologia)
	Agency for Competitiveness and Innovation (IAPMEI - Agência para a Competitividade e
	National Innovation Agency (ANI - Agência Nacional de Inovação, S.A.)
	COMPETE 2020 - Managing Authority of the Operational Thematic Competitiveness and Internationalization Programme (Autoridade de Gestão do Programa Operacional Temático Competitividade e Internacionalização)
ROMANIA	National Council for Scientific Research (CNCS)
	Consulting Council for RD&I (CCCDI))
	National Council for Ethics of Scientific Research, Technological Development and Innovation (CNECSDTI)
	National Council for Tehnology Transfer and Innovation (CNTTI)
SLOVENIA	Slovenian Research Agency - Management Board
SLOVAKIA	Board of the Slovak Academy of the Sciences Assembly
	The Presidium of the Slovak Academy of the Sciences
	Council of Universities of the Slovak Republic (Rada vysokých škôl)
	Slovak Rectors' Conference (Slovenská rektorská konferencia)
FINLAND	Tekes - Finnish Funding Agency for Innovation - Management team
	Tekes - Finnish Funding Agency for Innovation - Board of directors
ICELAND	Icelandic Research Fund board
	Icelandic Research Fund advisory boards
	Infrastructure Fund board
	Infrastructure Fund advisory board
	Technology Development Fund Board
	Technology Development Fund advisory boards
	AVS Fund board
	AVS Fund Advisory boards
NORWAY	Universities Norway
	The Norwegian Academy of Science and Letters
SWITZERLAND	SNSF (Executive Committee of the Foundation Council)
	Administrative board of the Commission for Technology and Innovation
BOSNIA & HERZEGOVINA	Council for Science of Bosnia and Herzegovina, BiH
ISRAEL	Universities - Hiring and Advancement Boards, Tenure Boards, etc.

Heads of institutions in the higher education sector – Heads of universities or assimilated institutions

An institution is assimilated to a university if it is accredited to deliver PhD degrees.

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Equality between women and men is a core value of the European Union, actively promoted in all aspects of life by the European Commission. What is the situation in Research and Innovation? Are women participating and contributing to it to the same extent as men? Or is the so-called 'leaky pipeline', the phenomenon of women dropping out of research and academic careers at a faster rate than men, still prevalent?

The She Figures 2018 presents the latest available official statistics on the footprint of women in the research landscape. The data follow the 'chronological journey' of researchers, from graduating from higher education programmes to acquiring decision-making roles, while considering their working conditions and intellectual outputs. The publication highlights also the differences between women and men in all these respects.

Produced in close collaboration between the European Commission and the Statistical Correspondents of the EU Member States and Associated Countries, She Figures 2018 is recommended reading for policymakers, researchers and anybody with a general interest in these issues.

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