



European Innovation Scoreboard

Technical note on the gender perspective in
innovation

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Technical note on the gender perspective in innovation

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1. Introduction

The **European Innovation Scoreboard (EIS)** is the EU's main tool for the measurement, monitoring and benchmarking of innovation performance of the EU, individual Member States and their regions, as well as associated countries.

Deloitte, Maastricht University (UNU-MERIT) and VVA will prepare the 2022 and 2023 edition of the EIS and contribute to methodological advancement of the tool.

In the context of improving the European Innovation Scoreboard, VVA has been exploring how the **gender perspective could be introduced in the current EIS/ Regional Innovation Scoreboard (RIS) framework conceptually and with the use of existing and new indicators.**

1.1. Objectives

Innovation is one of the main drivers of economic growth, technological and social development and a stimulus for overcoming current challenges. However, a gender perspective is rarely adopted either in innovation processes or in innovation policies¹.

Introducing the gender perspective in innovation processes and policies entails taking into account the gender differences in a given area². This requires a more systematic application of gender mainstreaming³ into innovation process and is expected to lead to a set of actions to promote gender equality. The benefits of fostering gender equality in innovation processes and policies relate not only to the improvement of the economic performance and innovation of organisations, but also to the increase in excellence in research and innovation⁴.

In line with the objective of the new European Innovation Agenda⁵ a gender perspective can support the understanding of how gender plays a vital role in research and innovation.

It is important to measure innovation in order to identify inequalities and evaluate policies and stimulate change, the objective of this methodological paper is to provide an exploratory analysis of how gender could be included in the EIS/RIS. Currently, the gender dimension is not included in the EIS and many indicators of the EIS and RIS measurement framework are not suited for the provision of gender breakdowns, given the nature of these indicators (e.g. use of information technologies, R&D investments).

To fill the gap, a set of indicators related to gender and innovation are identified in this paper from relevant projects, articles, indexes, and surveys that attempt to capture existing examples of a gender perspective in innovation.

¹ Policy brief on gender and innovation. ERAC Standing Working Group on Gender in Research and Innovation. May 2019 Available at: <https://data.consilium.europa.eu/doc/document/ST-1210-2019-INIT/en/pdf>

² European Commission, 1995, One hundred words for equality. A glossary of terms on equality between Women and Men. Available at: <https://op.europa.eu/en/publication-detail/-/publication/7342d801-86cc-4f59-a71a-2ff7c0e04123>

³ Gender mainstreaming involves the integration of a gender perspective into the preparation, design, implementation, monitoring and evaluation of policies, regulatory measures and spending programmes, with a view to promoting equality between women and man. Gender mainstreaming requires both integrating a gender perspective to the content of the different policies, and addressing the issue of representation of women and men in the given policy area.

⁴ European Commission, 2020, Communication on A new ERA for Research and Innovation. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0628&from=EN>

⁵ European Commission, 2022, Communication on a new European innovation agenda. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022DC0332&from=EN>

Moving forward, this approach could be adopted to include a small number of indicators in the EIS framework or to develop a module under the contextual part of the analysis presented in the EIS yearly reports.

1.2. Methodology

The methodology applied for this paper is first based on a literature review and an analysis of specific indicators, aiming to identify the most suitable way to include a gender perspective in the EIS/RIS framework. The following steps were developed:

- **Step 1:** Literature review, identifying publications relevant to shed light on the gender perspective in innovation. The focus of the review was to capture how the gender perspective is currently captured in innovation literature and the existing indicators, measuring the relation between gender and innovation.
- **Step 2:** Defining and analysing possible gaps in measuring the gender perspective, namely what should be captured to highlight the interlinkages between gender and innovation. Through this analysis, the project team identified 3 layers of action that could be undertaken to include a gender perspective in the EIS framework.
- **Step 3:** Conducting an expert workshop with gender and innovation experts. The workshop took place on the 28th September 2022 and had the objective to better understand the different gender dimensions in innovation activities and validate the project team's methodology. Additionally, experts provided important inputs to define potential indicators to be included in the EIS.
- **Step 4:** Developing selection criteria to identify indicators to be included in the EIS. The criteria included aspects such as periodicity of the results, type of data, and geographical coverage.
- **Step 5:** Identifying existing indicators and providing recommendations for creating new ones.

1.3. Definitions

- **Innovation:** a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)⁶.
- **Gender:** a concept that refers to the social differences between women and men that have been learned, are changeable over time and have wide variations both within and between cultures⁷.
- **Gender equality:** the concept meaning that all human beings are free to develop their personal abilities and make choices without the limitations set by strict gender roles; that the different behaviour, aspirations and needs of women and men are considered, valued and favoured equally⁸:

⁶ OECD, 2018, Oslo manual, Guidelines for collecting, reporting and using data on innovation. Available at: <https://www.oecd.org/sti/inno/oslo-manual-2018-info.pdf>

⁷ European Commission, 1995, One hundred words for equality. A glossary of terms on equality between Women and Men. Available at: <https://op.europa.eu/en/publication-detail/-/publication/7342d801-86cc-4f59-a71a-2ff7c0e04123>

⁸ *Ibid.*

- The quantitative aspect implies a distribution of women and men in all areas of society such as education, work, recreation and positions of power⁹.
 - The qualitative aspect implies that the knowledge, experiences and values of women and men are given equal weight and used to enrich and direct all areas of society¹⁰.
- **Gender perspective:** the consideration and attention to the differences in any given policy area/activity¹¹.
 - **Gender dimension:** implies analysing and taking into account the possible differences between men and women (biological characteristics as well as the social and cultural features), boys and girls, or males and females, in the R&I content of the project¹².
 - **Gender diversity:** The concept can refer to the number of women and men in an organisation or in a certain position and can also signify an intersectional perspective taking into consideration gender in connection with other social differentiation categories such as age, ethnicity, educational background, class and sexual orientation¹³.

2. How is the gender perspective currently captured

2.1. The gender dimension in the innovation literature

2.1.1. The lack of gender equality in innovation has a significant economic impact

In the last decades, the connection between innovation and gender has generated an increased interest among policy makers, academia and business. In particular, the focus has been on the role of gender equality (or lack of thereof) on the economic performance and innovation not only of businesses but of the economy as a whole. According to the European Institute for Gender Equality (EIGE), advancing women's equality would lead to an increase in EU (GDP) between 1.95 to 3.14 trillion Euros¹⁴.

The benefits also relate to the increase in economic performance and innovation of organisations, for example research has highlighted that ensuring a gender balanced board and among directors leads to a better understanding of the market, as well as more diverse

⁹ Vinnova, 2011, Innovation and Gender. Available at: <https://www.e-elgar.com/shop/gbp/research-handbook-on-gender-and-innovation-9781783478125.html>

¹⁰ *Ibid.*

¹¹ European Commission, 1995, One hundred words for equality. A glossary of terms on equality between Women and Men. Available at: <https://op.europa.eu/en/publication-detail/-/publication/7342d801-86cc-4f59-a71a-2ff7c0e04123>

¹² European Research Executive Agency, 2022, tackling gender equality in research and innovation. Available at: https://rea.ec.europa.eu/news/tackling-gender-equality-research-and-innovation-2022-03-07_en#:~:text=The%20gender%20dimension%20implies%20analysing,R%261%20content%20of%20the%20project. And European Commission, 2020, Gendered innovation 2: how inclusive analysis contributes to research and innovation. Available at: https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/gendered-innovation-2-how-inclusive-analysis-contributes-research-and-innovation_en

¹³ Vinnova, 2011, Innovation and Gender. Available at: <https://www.e-elgar.com/shop/gbp/research-handbook-on-gender-and-innovation-9781783478125.html>

¹⁴ European Institute for Gender Equality (EIGE), 2021, Economic case for gender equality in the EU. Available at: <https://eige.europa.eu/gender-mainstreaming/policy-areas/economic-and-financial-affairs/economic-benefits-gender-equality>

ideas being shared, and opportunities assessed¹⁵. Moreover, studies have demonstrated that gender diversity increases the innovative performance of individuals and R&D teams¹⁶. A study in Germany explains the benefits in terms of scientific results from the increased proportion of female researchers in research¹⁷.

The economic case for gender equality stresses the wider economic benefits that span individuals, enterprises, regions and nations. A gender perspective can strengthen innovation and increase innovative capacity. Hence, it is not just a matter of incorporating gender equality for ethical reasons, but framing diversity as a competitive advantage, enabling companies to increase profitability and enhance innovation¹⁸.

2.1.2. Measuring the gender aspect of innovation helps change attitudes, behaviours and outcomes

On the policy side, the Horizon 2020 Expert group - set up by the European Commission to support integration of the gender dimension into EU research and innovation - has highlighted the added value of integrating sex and gender analysis into research and innovation. In particular, the findings show how including a gender dimension in R&I helps researchers and innovators to question gender norms and rethink standards and reference models, leads to an in-depth understanding of diverse gender needs and behaviours, and contributes to the production of goods and services that are better suited to the population¹⁹.

2.1.3. Current research focuses on measuring the gender gap rather than explaining its causes

Previous studies have shown that the gender gap seems to increase along woman's career path:

- According to WIPO, on average, in high-income countries women not only have equal access to education opportunities that can drive their careers forward as men, but in fact more women graduate with bachelor degrees than men²⁰.
- However, over time with career progression, the gender distribution changes drastically²¹. For example, statistics show that fewer women graduate from PhD programmes than men, fewer women get positions as professors than men and women researchers earn,

¹⁵ Belghiti-Mahut et al. 2016, Gender gap in innovation: a confused link?, Journal of innovation economics and management, 2016/1, n.19. Available at: <https://www.cairn.info/revue-journal-of-innovation-economics-2016-1-page-159.htm?contenu=article>

¹⁶ *Ibid.*

¹⁷ Buhner s. et al, 2020, Evaluating gender equality effects in research and innovation systems, Scientometrics, 124. Available at: <https://link.springer.com/article/10.1007/s11192-020-03596-1>

¹⁸ European Commission, 2020, Gendered innovation 2: how inclusive analysis contributes to research and innovation. Available at: https://research-and-innovation.ec.europa.eu/knowledge-publications-tools-and-data/publications/all-publications/gendered-innovation-2-how-inclusive-analysis-contributes-research-and-innovation_en. See also, Vinnova, 2011, Innovation and Gender. Available at: <https://www.e-elgar.com/shop/gbp/research-handbook-on-gender-and-innovation-9781783478125.html>

¹⁹ European Commission, 2020, Gendered innovations 2, how inclusive analysis contributes to research and innovation. Available at: https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ki0320108enn_final.pdf

²⁰ WIPO, 2020, Innovation Gender Gap: What do we know about the Gender Gap in Innovation? Available at: https://www.wipo.int/about-ip/en/ip_innovation_economics/gender_innovation_gap/gender_by_fields.html

²¹ *Ibid.*

publish and patent less than men²². As also outlined in the study of the European Patent Office (EPO), there is a consistent pattern of a decreasing share of women in segments ranging from total employment to PhD enrolment, to PhD graduates in STEM, to R&D personnel and researchers, to patenting. According to the study, the findings suggest that women in EPO countries face increasing obstacles when progressing in STEM careers²³.

- Since there is no evidence of a productivity gap between innovative and creative women and men, it is important to understand the factors contributing to the gap.

Until now, indicators dealing with gender and innovation have mostly focused on providing an **overview of the gender gap rather than the factors contributing to it**. Research has revolved around statistics on the participation of women and men in different sectors, while there is no insight into the organisational and cultural issues associated with gender inequalities. For example, the SHE figures report²⁴ monitors the state of gender equality in R&I across Europe by looking at the participation of women in the labour market, their position in decision-making roles, and research and innovation outputs. However, there is little evidence about barriers faced by women and drivers of inequality.

Part of the issue relates to a **lack of indicators that can explain the gender gap and show the links between the socio-cultural and institutional context and gender**. As indicated by the EU expert group on Policy Indicators for Responsible Research and Innovation (RRI), existing indicators on innovation tend to provide a good overview of gender participation in different sectors, however, there is a lack of indicators measuring the underlying factors influencing career progression, work-life balance policies or institutional measures promoting gender balance²⁵.

2.1.4. Capturing the causes of gender inequalities in innovation requires new indicators

Another way to look at the gender gap is to dig into what is currently measured as “innovation”. In this regard, emerging literature shows that current indicators measuring innovation do not take into account all types of innovation (e.g. managerial or social innovation). This could mean that women-led innovations are overlooked marginalised as they do not belong to traditional forms, scopes and spheres of innovation²⁶.

Moreover, the traditional approach to measuring innovation has been focusing on measuring outputs and inputs used to innovate rather than the type and level of innovation²⁷. More specifically, **while current definitions of innovation seem to be gender neutral, in practice the indicators used to measure the concept have a strong male connotation**²⁸. According to the experts consulted for this study, this is the essence of the problem. The dominant idea of innovation seems to be gendered, and women often do not fit it. For

²² Ibid.

²³ European Patent Office, 2022, Women’s participation in inventive activity: evidence from EPO data, available at: <https://www.epo.org/service-support/publications.html?pubid=244#tab3>

²⁴ European Commission, 2021, She figures 2021, available at: <https://op.europa.eu/en/web/eu-law-and-publications/publication-detail/-/publication/67d5a207-4da1-11ec-91ac-01aa75ed71a1>

²⁵ Expert Group on Policy Indicators for Responsible Research and Innovation, 2015, Indicators for Promoting and Monitoring Responsible Research and Innovation, Publication Office of the European Union.

²⁶ Lindberg, M., 2016, Undoing gender in EU’s social innovation policies? International Journal of Social Entrepreneurship in Innovation. 4(1):67-79.

²⁷ Belghiti-Mahut et al. 2016, Gender gap in innovation: a confused link?, Journal of innovation economics and management, 2016/1, n.19. Available at: <https://www.cairn.info/revue-journal-of-innovation-economics-2016-1-page-159.htm?contenu=article>

²⁸ Expert workshop findings. See also: Vinnova, 2011, Innovation and Gender, Available at: <https://www.vinnova.se/contentassets/747b7b67e1594982be45942f5db53222/vi-11-03.pdf>

example, in innovation studies, attention has been given to output indicators, such as patents, copyrights, trademarks, which capture only a small part of innovation²⁹. Another example relates to “R&D expenditure”, which is a very common indicator used to measure innovation. While this indicator also measures risk-taking propensity, it does not capture the level of creativity in innovative activity.

Another point raised by the literature is that women are often hidden, and their role is invisible in innovation indicators. As an example, many high-tech firms considered as “frontrunners” in innovation are often managed by teams that are gender diverse. However, empirical studies tend to measure gender aspects by looking at how many women cover leading positions (i.e. CEO)³⁰. This approach disregards the role of other positions in the organisation that may have an even more significant impact on innovation. By only considering the role of one person – usually the CEO – who takes the decision to innovate, it appears that even in gender balanced teams, innovation is male dominated³¹.

2.2. The gender perspective in the EIS

The objective of this technical note is to provide an exploratory analysis of how gender could be included in the EIS. Currently, the gender dimension is not included in the EIS and many indicators of the EIS and RIS measurement framework are not suited for the provision of gender breakdowns, given the nature of these indicators (e.g. use of information technologies, R&D investments).

During the recent revision process of the EIS and the RIS, the need to establish effective indicators for measuring and assessing the impact of gender on the innovation performance of EU Member States was raised. This is in line with the European Commission’s commitments on gender equality set out in the Gender Equality Strategy 2020-2025³². A brief overview of the current EIS framework is provided below.

The European Innovation Scoreboard (EIS) provides an annual assessment to compare the performance of EU Member States and selected third countries in terms of research and innovation. Based on their average scores, Member States are classified into one of four categories: innovation leaders, innovators, moderate innovators, and emerging innovators. The current EIS uses a total of 32 indicators across 12 **innovation dimensions** and four categories:

- **Framework conditions:** the main drivers of innovation performance external to the firm, encompassing human resources (the availability of a high-skilled and educated workforce); the attractiveness of research systems (the international competitiveness of the science base); and digitalisation (the level of digital technologies).
- **Investments:** innovation performance capturing public and private investment in research and innovation, encompassing finance and support (including private funding

²⁹ Morand P, Manceau D., 2009, Pour une nouvelle vision de l’innovation, Rapport officiel, ESCP Europe, la documentation français.

³⁰ Diaz-Garcia, 2014, Gender diversity within R&D teams: its impact on radicalness of innovation, Organisation & Management, Volume 14, 2013, Issue 2. Available at: <https://doi.org/10.5172/impp.2013.15.2.149>

³¹ According to European Commission Gender Strategy, women are only 7.5% of board chairs and 7,7% of CEOs in the EU largest listed companies.

³² European Commission, 2020, A Union of Equality: Gender Equality Strategy 2020-2025, COM/2020/152 final. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52020DC0152>

such as VC investment); firm investments (investments that firms make to generate innovations); and use of information technologies (capturing the use of information technologies).

- **Innovation activities:** capturing the innovation efforts at the level of the enterprise, encompassing three innovation dimensions: innovators (to capture the share of SMEs having introduced innovations on the market or within their organisation); linkages (to measure innovation capabilities, such as collaboration efforts and mobility) and intellectual assets (with various forms of intellectual property rights).
- **Impacts:** covering the effects of a firm's innovation activities in terms of: employment impacts (to measure the impact on employment in knowledge intensive activities, and in innovative enterprises); sales impacts (i.e. the economic impact of innovation) and environmental sustainability (to captures improvements to reducing the negative impact on the environment).

Figure 1: Overview of the framework measurement of EIS

FRAMEWORK CONDITIONS

Human resources

- 1.1.1 New doctorate graduates (in STEM)
- 1.1.2 Population aged 25-34 with tertiary education
- 1.1.3 Lifelong learning

Attractive research systems

- 1.2.1 International scientific co-publications
- 1.2.2 Top 10% most cited publications
- 1.2.3 Foreign doctorate students

Digitalisation

- 1.3.1 Broadband penetration
- 1.3.2 Individuals who have above basic overall digital skills

INVESTMENTS

Finance and support

- 2.1.1 R&D expenditure in the public sector
- 2.1.2 Venture capital expenditures
- 2.1.3 Direct government funding and government tax support for business R&D

Firm investments

- 2.2.1 R&D expenditure in the business sector
- 2.2.2 Non-R&D innovation expenditures
- 2.2.3 Innovation expenditures per person employed in innovation-active enterprises

Use of information technologies

- 2.3.1 Enterprises providing training to develop or upgrade ICT skills of their personnel
- 2.3.2 Employed ICT specialists

INNOVATION ACTIVITIES

Innovators

- 3.1.1 SMEs with product innovations
- 3.1.2 SMEs with business process innovations

Linkages

- 3.2.1 Innovative SMEs collaborating with others
- 3.2.2 Public-private co-publications
- 3.2.3 Job-to-job mobility of Human Resources in Science & Technology

Intellectual assets

- 3.3.1 PCT patent applications
- 3.3.2 Trademark applications
- 3.3.3 Design applications

IMPACTS

Employment impacts

- 4.1.1 Employment in knowledge-intensive activities
- 4.1.2 Employment in innovative enterprises

Sales impacts

- 4.2.1 Medium and high-tech product exports
- 4.2.2 Knowledge-intensive services exports
- 4.2.3 Sales of product innovations

Environmental sustainability

- 4.3.1 Resource productivity
- 4.3.2 Air emissions by fine particulates PM2.5 in Industry
- 4.3.3 Development of environment-related technologies

Additionally, a set of contextual indicators were also introduced³³. They relate to performance and structure of the economy, business and entrepreneurship, innovation profiles, governance and policy framework, climate change, and demography.

³³European Commission, 2021, European Innovation Scoreboard 2021, Available at: <https://ec.europa.eu/docsroom/documents/46013>

Figure 2: Additional indicators added for the contextual analysis in the 2020 EIS analysis

PERFORMANCE AND STRUCTURE OF THE ECONOMY	GOVERNANCE AND POLICY FRAMEWORK
GDP per capita (PPS)	Ease of starting a business (0 to 100 best)
Average annual GDP growth (%)	Basic-school entrepreneurial education and training (1 to 5 best)
Employment share Manufacturing (NACE C) (%)	Government procurement of advanced technology products (1 to 7 best)
of which High and Medium high-tech (%)	Rule of law (-2.5 to 2.5 best)
Employment share Services (NACE G-N) (%)	CLIMATE CHANGE
of which Knowledge-intensive services (%)	Circular material use rate
Turnover share SMEs (%)	Greenhouse gas emissions intensity of energy consumption
Turnover share large enterprises (%)	Eco-Innovation Index
Foreign-controlled enterprises – share of value added (%)	DEMOGRAPHY
BUSINESS AND ENTREPRENEURSHIP	Population size
Enterprise births (10+ employees) (%)	Average annual population growth (%)
Total early-stage Entrepreneurial Activity (TEA) (%)	Population density
FDI net inflows (% GDP)	
Top R&D spending enterprises per 10 million population	
Buyer sophistication (1 to 7 best)	
INNOVATION PROFILES	
In-house product innovators with market novelties	
In-house product innovators without market novelties	
In-house business process innovators	
Innovators that do not develop innovations themselves	
Innovation active non-innovators	
Non-innovators with potential to innovate	
Non-innovators without disposition to innovate	

2.3. Key takeaways

To summarise, gender is an important aspect of innovation, and it must be captured in innovation indicators to identify gaps in innovation activities, understand drivers of women’s participation in innovation, and describe innovator profiles. According to the EU-funded project GenderAction and its analysis, there is a **positive correlation between the European Innovation Scoreboard and the Gender Equality Index**, in particular countries with high scores on gender equality have also high scores in innovation performance, compared to ones with low level of gender equality³⁴. Research also highlights that improvements in gender equality also improve innovation performance, for example Lin x, et al. provide evidence on the positive relation between gender equality improvements and level of green innovation performance at country level³⁵.

This study has identified three layers to address the challenges identified. The layers build on one another and they aim to include a gender perspective in the EIS, in particular:

- **Layer 1: Incorporating a gender perspective into the existing EIS indicators where this is possible**, building on existing research including SHE figures and capturing gender inequality in innovation activities that are currently measured as part of the EIS.

³⁴ Gender Action, 2020, Gender equality and research and innovation performance go hand in hand. Available at: <https://genderaction.eu/wp-content/uploads/2020/06/Gender-equality-and-RI-performance-go-hand-in-hand.pdf>

³⁵ Lin, X.-L., & Yin, H.-T. (2022). The Impact of Gender Equality on Green Innovation. *Energy RESEARCH LETTERS*, 3(Early View). <https://doi.org/10.46557/001c.36536>

- **Layer 2: Capturing the drivers of gender inequalities by measuring the socio-cultural and institutional context**, through a set of indicators that can shed light on the factors driving the gender gap in innovation, namely work-life balance, organisational culture, etc.
- **Layer 3: Ensuring that the contribution of women is comprehensively reflected by enlarging the scope of what is measured as innovation**, including a larger set of activities, encompassing non-technological innovations, and innovations with local impact (e.g. social, organisational, and environmental innovations) where women play key roles.

3. How should the gender dimension of innovation be measured?

As stated in the Gender Equality Strategy, including a gender perspective in all stages of policy design in all EU policy areas has become a high priority for the European Commission³⁶. While measuring innovation is often considered as a technical exercise, it is also a political process. In this context the choice on what to measure also reflects political priorities. The proposed three layers approach is presented below:

3.1. Incorporating a gender perspective into the existing EIS indicators where this is possible

Starting from the first layer, the **gender gap** in innovation could be included in the existing framework to show women's participation in innovation.

The inclusion of some indicators, such as women's **representation in leadership and decision-making positions**, patent applications would aim at capturing the tip of the iceberg. Gender indicators could be added to complement existing indicators (without replacing the existing ones), to shed light to the gender gap and better understand performance differences on particular indicators between countries.

Hence, the first layer would focus on selecting existing indicators to include in the EIS to provide a snapshot of current gender gap in innovation.

There are already a variety of indicators used in the SHE figures and in other studies released by other organisations, such as the European Investment Bank (EIB), the Organisation for Economic Cooperation and Development (OECD) that could be included:

- **Glass ceiling:** women's and men's representation in different grades of an academic career; women's representation in decision-making positions. The share of female fund managers and decision makers in venture capital funds (EIB study³⁷).
- **Participation:** women's and men's participation in science and technology occupations, women's representation among the pool of graduate and doctoral talent; participation as

³⁶ European Commission, 2021, Mapping the glass ceiling: the EU regions where women thrive and where they are held back, Monitoring EU regional gender equality with the female achievement and disadvantage indices Available at: https://ec.europa.eu/regional_policy/sources/docgener/work/gem2021/gender_equality_monitor_en.pdf

³⁷EIB, 2020, Study on funding women entrepreneurs. Available at: https://www.eib.org/attachments/thematic/why_are_women_entrepreneurs_missing_out_on_funding_en.pdf

researchers, women's and men's patterns of employment across key sectors of the economy, the share of women in part-time employment versus full-time employment.

- **Working conditions:** gender pay gap by country in digital vs less digital intensive industries (OECD study)³⁸, working conditions of women and men researchers, gender overall earning gap (measuring the impact of three factors: average hourly earnings, monthly average of the number of hours paid, and employment rate).
- **Outputs:** ratio of women to men amongst active authors publishing research³⁹, frequency of publication, citation impact of women and men's publications, representation within authorship teams, patent output and representation in academic-corporate collaboration teams. Funding success rate differences between women and men.

When it comes to “**investments**”, the gender perspective could highlight whether the areas that attract most funds are areas that have a gender perspective. Again, the SHE figures report presents some of the indicators that could be included, for example:

- Percentage of a country's research output that integrates a gender dimension into research and innovation content (also by field of R&D) (2015-2019). The indicator shows the proportion of peer-reviewed publications that integrate gender or sex-sensitive analysis⁴⁰, broken down by field of R&D and country. This indicator will reveal changes over time in the integration of a gender dimension in R&I content.
- Proportion of Horizon 2020 projects that integrates a gender dimension (also available for intersectionality approach), namely the percentage of projects that integrate a sex and/or gender analysis in their content.
- Venture Capital fundings for women-led companies in absolute and relative terms. The indicators available are Female founded VC deal count (%) and female founded VC capital (%)⁴¹; however, data are only at EU level (not disaggregated by EU Member State). In particular, regarding VC funding, one of the main issues relates to comparability of data across EU MS.
- Proportion (%) of women and men among the members and leaders of the boards of research funding organisations (EIGE data).
- Representation in academic-corporate collaboration teams (Average proportion of women among authors on publications that list, among the author affiliations, both a corporate entity and any other entity, in all fields of R&D).

While the “**impact**” dimension could capture whether we are innovating in areas that improve gender equality, a section on gender equality impacts could be added using existing

³⁸ OECD, 2019, a taxonomy of digital intensive sector, working papers 2018/14. High digital-intensive sectors include (ISIC Rev.4 Divisions): Transport equipment; Telecommunications; IT and other information services; Financial and insurance activities; Professional, scientific and technical activities; administrative and support service activities; and Other service activities.

³⁹ This indicator compares the number of women who can be classified as “active authors” to the number of men who can be classified as “active authors” within a seniority level, country or region and field of research.

⁴⁰ Meaning the number of peer-reviewed publications integrating a gender perspective (based on a set of keywords as a proxy for gender dimension in R&I content) in different scientific fields.

⁴¹ PitchBook data collection, The European VC female founders dashboard, available at: <https://pitchbook.com/news/articles/the-european-vc-female-founders-dashboard>

indicators, such as those found in the indices Female Achievement (FemAI), Female Disadvantage (FemDI)⁴², and the Gender Equality Index:

- **FemAI** measures the level of female achievement (assessed with 33 indicators) compared to the best regional female performance. FemAI varies between 0 (lowest performance) and 100 (best performance).
- **FemDI** assesses the level of female disadvantage by measuring regional differences when women are doing worse than men. The lowest possible score is 0 (no disadvantage) and the highest possible score is 100 (largest disadvantage). FemDI assesses how far women lag behind men in a region. Regions (NUTS 2 level) where women perform equally to or outperform men are both scored as having no female disadvantage.
- **Gender Equality Index (EIGE)**: the index gives the EU and the Member States a score from 1 to 100. A score of 100 would mean that a country had reached full equality between women and men.

3.2. Capturing the socio-cultural and institutional context

The second layer aims to contextualise the indicators mapped. The objective is to identify areas that explain why there is a gender gap, namely factors contributing to gender inequalities. The contextual dimension does not just encompass innovation, but also aims to capture cultural issues, the working environment and institutional arrangements that impact gender equality. Existing indicators measuring some of the areas mentioned below are available within the European Institute for Gender Equality (EIGE)⁴³.

The study team has identified the following key areas: open and inclusive work environment, culture of zero tolerance towards gender-based violence, and career progression and recruitment. One of the main reasons for the selection of these three key areas related to their importance in the Gender Equality Plan (GEP)⁴⁴, which recommended them as content-related areas that organisations may wish to include when applying for Horizon Europe.

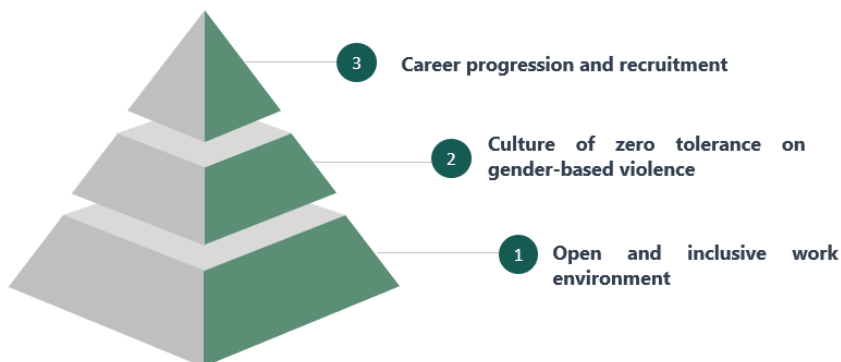
The Gender Equality Plan is a mandatory document for public bodies, higher education and research organisation, while it is only recommended for private-for-profit entities, non-governmental organisation and civil society organisations. Currently there are no available indicators on these three domains that are specific to innovation, hence the indicators identified encompass different sectors and are often qualitative.

⁴² European Commission, 2021, Mapping the glass ceiling: the EU region where women thrive and where they are held back, monitoring EU regional gender equality with female achievement and disadvantages indices. Available at: https://ec.europa.eu/regional_policy/sources/docgener/work/gem2021/gender_equality_monitor_en.pdf

⁴³ Available at: <https://eige.europa.eu/gender-equality-index/2021/BG>

⁴⁴ A GEP is a strategic document that requires an organisation to consider the gender profile of their organisation and to identify inequalities and actions that can be taken to redress these. It is a mandatory document for public bodies, higher education and research organisation, wishing to participate to Horizon Europe, while it is only recommended for private-for-profit entities, non-governmental organisation and civil society organisations. European commission, 2021, Horizon Europe Guidance on Gender Equality Plans. Available at: <https://op.europa.eu/en/publication-detail/-/publication/ffcb06c3-200a-11ec-bd8e-01aa75ed71a1/language-en/format-PDF/source-232129669>.

Figure 3: Overview of the key areas to take into account for the contextualisation



Source: VVA team

Open and inclusive work environment

- **Organisation level (firm and public organisations level)** - parental leave policies, flexible working time arrangement, support for caring responsibilities, workload management, reintegration of staff after career breaks, advice and support on work-life balance.
 - EIGE statistics on employees by flexibility of their working schedule and economic activity, employees by their perceived possibility to vary start and/or stop of the working day for family reasons; ineligibility for parental leave (percentage of women and men not eligible for statutory parental leave); main care related reasons for not working or working part-time, main childcare related reasons for not working or working part-time; proportion of research organisation that take action or measures towards gender equality by type of organisation.
- **Institutional level (regional and national level)** – policies supporting parental leave, caring responsibilities, financial support schemes on affordability, accessibility and quality of childcare, childcare provision.
 - EIGE statistics: gender mainstreaming: institutional mechanisms of gender equality and gender mainstreaming (status of commitment to the promotion of gender equality).

Culture of zero tolerance towards gender-based violence

- **Organisational level (firm and public organisations level)** – code of conduct for employees, policy on reporting and investigation, support victims, disciplinary measures and prosecution.
 - EIGE statistics on the number of employees who report incidents of sexual harassment at the workplace as a percentage of the total workforce; number of

private and public enterprises which have procedures for sanction in place for perpetrators of sexual harassment at the workplace as percentage of the total number of employees, violence and harassment location of the incident at work by gender⁴⁵.

- **Institutional level (regional and national level)** – measures in place to ensure culture of zero tolerance towards gender-based violence, and support services (national women helplines).

Career progression and recruitment:

- **Organisational level (firm and public organisations level)** – recruitment code of conduct, gender equality officers in recruitment, promotion committees.
- **Institutional level (regional and national level)** – (policies and measures in place to favour quotas in recruitment and career progression for women).

Considering that GEPS are public documents, a suggestion could be to enlarge the scope of the data collection with keywords related to innovation practices. This could be a step towards measuring the gender perspective in innovation in the public and higher education sector. For example, the uptake of GEP could be used as a proxy indicator, since GEPs report gender-disaggregated data for staff categories (useful for career progression and recruitment), and recommended areas such as gender-based violence and work-life balance. As carried out in the 2021 SHE Figures edition, web scraping techniques were used to present the Proportion (%) of Research Organisations that take actions or measures towards gender equality, by type of organisation (indicator 5.7)⁴⁶. For this approach, keywords based on the process-related requirements and content areas were selected. This approach could then be mirrored to capture the innovation dimension.

However, as mentioned earlier, the GEPS are mandatory only for public bodies, higher education and research organisations. Hence, they will not cover the business sector, which is the core focus of the EIS.

During the expert workshop, there was a suggestion to consider collecting further data on the organisations that will include these criteria in their GEP and enlarging the scope of the GEPs beyond public bodies, higher education and research organisation wishing to participate to Horizon Europe, but also private-for-profit entities, non-governmental organisation and civil society organisations applying for Horizon Europe.

3.3. Enlarging the scope of what is measured as innovation

Lastly, it is important to investigate the multidimensional nature of innovation, including where innovation happens and who participates in innovative activities. The third layer of the

⁴⁵ Available at: <https://fra.europa.eu/en/data-and-maps/2021/frs?mdq1=dataset>

⁴⁶ European Commission, 2021, She figures, Gender in Research and innovation statistics and indicators. Available at: https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_shefigures-2021-report.pdf

approach of this report is to provide a set of recommendations on how to further tackle the gap in measuring gender in innovation.

3.3.1. Where innovation takes place

Innovation encompasses a highly diverse set of activities and it includes both adoption of new technologies (defined broadly) into existing processes, products and services, as well as technology development through in-house research and innovation activities.

Many firms innovate not by improving new products but by improving their **business processes**. Business process innovations include process, marketing and organisational innovations. The current EIS framework has introduced a set of indicators to capture process innovation. The **Innovators dimension** includes two indicators measuring the share of SMEs that have introduced innovations on the market or within their organisations, covering both **product and business process innovators**.

1. Product innovation:

SMEs introducing product innovations (%): Number of SMEs who introduced at least one product innovation. A product innovation is the market introduction of a new or significantly improved good or service with respect to its capabilities, user friendliness, components, or sub-systems -> Eurostat (Community Innovation Survey).

2. Business process innovations:

SMEs introducing business process innovations (%): Number of SMEs who introduced at least one business process innovation either new to the enterprise or new to their market -> Eurostat (Community Innovation Survey).

Hence, the current EIS framework provides a fair overview of key dimensions in process innovation that can shed light on different types and levels of innovation.

3. Other forms of innovations:

Other forms of innovation, such as social innovation, volunteering work, and charitable work aiming at solving societal challenges are not captured in the EIS framework. Since the EIS captures business innovation, volunteering and charitable work is not relevant. When it comes to social innovation, as highlighted in the EIS exploratory study⁴⁷, measuring social innovation is challenging due to the complexity and multidimensionality of the concept, which cannot be captured by a small number of indicators.

As mentioned in the literature review, women-led innovations are often overlooked as they do not belong to traditional forms, scopes and spheres of innovation. Experts agreed that the definition of innovation has consequences in how we interpret what innovation is and who we perceive as innovative.

According to the experts, a narrow view of innovation limits the measurement to tangible products, while the definition of innovation should not exclude economic, social and other value-adding aspects. For example, social innovation relates to new forms of interaction,

⁴⁷ European Innovation Scoreboard, 2021, Exploratory report how to measure social innovation, available at: <https://www.spi.pt/wp-content/uploads/2021/10/EIS-social-innovation-Final-Report.pdf>

cooperation, governance and knowledge generation. Compared to commercial innovation, it comprises a broader variety of actors and hybrid business models.

As a first start, to include other forms of innovation, a suggestion could be to explore existing indicators measuring the presence of social focused business support⁴⁸, and/or the number business that aim to solve social problems⁴⁹.

3.3.2. Who participates in innovation

Another point raised by the literature is that women are often hidden, and their role is invisible and non-significant to statistics on innovation. Some ideas on how to better reflect women's role in innovation are listed below.

1. **Disaggregating the black box of the 'firm' to look at different activities where innovation takes place** - One way of measuring gender aspects of innovation could be to look at the gender composition of the team within the firm where innovation takes place.

It is important to mention that most firms do not have innovation teams, nor do they know how many people are involved in innovation activities. Hence, it becomes very challenging to capture the gender composition of the team within the firm where innovation takes place. A solution could be to ask for the share of women among a firm's highly educated workforce or the share of women holding a management position.

It could be proposed to explore the possibility of adding a question on the share of women among a firm's highly educated workforce to Section 3 of the Community Innovation Survey CIS50.

Additionally, the European Innovation Council (EIC) is currently developing a gender diversity index⁵¹ that could potentially address this aspect. In particular, the Pilot EIC Board provided some recommendations on broadening the definition of 'women-led' to recognise leading executives roles beyond the CEO, such as the Chief Technology Officer (CTO), Chief Security Officer (CSO), and Chief Operating Officer (COO)⁵². This approach is in line with the objective to capture other roles within a firm that play an important part in innovation (management positions).

Since the EIC work is still in a preliminary stage, it will be important to explore synergies in this regard in order to collect data on gender and diversity in innovation activities.

2. **Adding intangible output indicators** - Alongside indicators measuring inputs and outputs (i.e number of women in leading positions, % women that are innovators, etc.), experts mentioned that indicators measuring outputs that are intangible could be included, for example, civil society participation: % women members of

⁴⁸ F6S and Crunchbase (Number of socially focused accelerators and incubators) and Eurostat (GDP).

⁴⁹ Global Entrepreneurship Monitor

⁵⁰ Eurostat, 2018, Community Innovation Survey (CIS), CIS 2018 Survey Questionnaire, Available at : <https://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>

⁵¹EIC, 2022, Pilot european innovation gender and diversity index. Available at: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-eic-2022-gender-01-01>

⁵²European Innovation Council pilot advisory board, 2021, Statement on gender and diversity in EIC. Available at: https://eic.ec.europa.eu/system/files/2021-06/EIC_Gender_Diversity%20statement_June%202021.pdf

humanitarian or charitable organisation⁵³, % women working in organisations that aim to solve social problems; % women participating into volunteering work; and % women working in public sector.

However, it is important to mention that the EIS framework is focused on firms, without taking into consideration other types of organisations, such as civil society, social interest organisations and the public sector, where innovation can also take place. One of the main reasons for the focus on business innovation relates to the lack of available data on public sector on innovation activities, which makes it difficult to capture the full picture. Hence, only business-related indicators measuring outputs that are intangible could be included, for example % women working in organisations that aim to solve social problems.

4. Part 3: How could the above be operationalised in the EIS?

In this section, the analysis focuses on providing recommendations on how to incorporate these “new areas” into the EIS framework, and how they could be measured, by selecting indicators that capture the gender perspective of innovation.

4.1. Short-term recommendations

First, short-term recommendations are outlined in order to propose indicators to be included in the EIS. The selection of the indicators is based on the following criteria:

- Indicators that come from regular and reliable sources (including, for example, Eurostat, OECD and the World Bank);
- Indicators that are up-to-date (that have been published in 2018 or 2019);
- Frequency of publication (on a yearly basis);
- Indicators that cover at least the EU-27 countries, and in case available, data at regional level;

In order to include some indicators that measure gender equality, the **contextual section of the EIS could be enriched with a section focusing on the gender perspective**. The objective would be to complement existing indicators (without replacing the existing ones), to shed light to the gender gap.

The study has selected some indicators that could be included in the EIS as additional contextual indicators on the impact of structural differences between countries. This would allow a better understanding of the differences between countries in the performance of indicators concerning innovation.

In annex A, key indicators were screened for each of the dimensions analysed in this report. The selection was made in consultation with experts during the workshop. In order to provide a workable number of indicators to be included, the team has selected 7 indicators and 2 Indexes to be proposed in the contextual part.

⁵³ EIGE INDEX, Workers involved in voluntary or charitable activities, at least once a month

1. To provide an overview of the **glass ceiling in innovation and research activities**, the study team proposes to include 2 indicators:
 - **Representation in academic careers (academia):** Proportion of women among grade A positions.
 - **Rationale:** By comparing different years, this indicator allows one to track the progress made with regard to women's presence at the highest level of the academic career path.
 - **Representation in decision-making positions (business):** Proportion of women in decision-making positions.
 - **Rationale:** by looking at the share of women in decision-making positions it is possible to track progress made with regard to women's presence in leadership positions.

2. To include an overview of **women participation in innovation**, the study team proposes to include 2 indicators:
 - **Participation in academic careers (academia):** Proportion of women among the persons occupying positions at different grades of an academic career for a given year.
 - **Rationale:** By looking at the proportion of women present at each grade, one can track their progress in advancing through the stages of the academic career and identify the levels at which women are lost.
 - **Participation in knowledge-intensive activities (KIA):** Proportion of employment in knowledge-intensive activities (KIA) among total employment, by sex.
 - **Rationale:** this indicator reveals the extent to which women's full educational capacities are being utilised, by measuring the relative proportion of women and men in KIA.

3. **The gender earning gap** is also an important aspect to be captured, when looking at gender equality. The study team proposes selecting:
 - **Gender overall earnings gap (Eurostat):** synthetic indicator measuring the impact of three factors: (1) the average hourly earnings, (2) the monthly average of the number of hours paid (before any adjustment for part-time work) and (3) the employment rate, on the average earnings of all women of working age – whether employed or not employed – compared to men.
 - **Rationale:** this indicator reveals the earning gap between men and women. It provides a broader picture of the gap, by not only focusing on the pay gap, but also the combined impact of the average hourly earnings, the monthly average of the number of hours paid. For example, if we consider the gender pay gap in 2018, women earned 13.0% on average less per hour than men. On the other hand, the gender gap on overall earnings stood at 36.7% in 2018.

4. To include an overview of **women in innovation outputs**, the study team proposes to include 2 indicators:
 - **Women inventor rate:** percentage of women inventors named in all patent applications to the EPO by country (latest 2019).

- **Rationale:** this indicator reveals the patenting gap between men and women. It provides another measurement of women’s representation in scientific output.
 - **Average proportion of women among authors on publications that list among the author affiliations both a corporate entity and any other entity:** This indicator is the average proportion of women among authors on publications resulting from collaboration with a corporate entity. It is based on peer-reviewed scientific publications (articles, reviews, conference papers).
 - **Rationale:** this indicator reveals the authorship team composition resulting from collaboration between a corporate entity and any other entity within countries and fields of research and development (FORD).
5. To measure the **overall gender equality** at national level, it would be important to include two indexes that are not strictly related to innovation but capture the overall country performance in terms of gender equality (Gender Equality index) and the overall country and regional (NUTS 2) performance in terms of female disadvantage compare to men in the same country and region.
- **Gender Equality Index (EIGE):** composite indicator that measures the complexity of gender equality. It comprises 31 indicators capturing six domains (work, money, knowledge, time, power and health).
 - **Rationale:** the index allows one to track the progress of gender equality in the EU and benchmark the performance between countries and establish linkages between innovation performance and gender equality progress.
 - **Female Disadvantage Index (FemDI):** composite indicator assessing regional differences when women are doing worse than men in the same region. It is based on 33 indicators grouped into seven domains (work & money, knowledge, time, power, health, safety-security-trust and quality of life).
 - **Rationale:** the index facilitates an understanding of where women are disadvantaged. As such, FemDI differs from EIGE’s Gender Equality Index since it does not consider all gender gaps, regardless of whether they favour men or women, but focuses on women. The index provides an overview of the domains (such as employment or income) where women have a disadvantage.

4.2. Long-term suggestions

When it comes to more long-term suggestions, the study team has identified some areas that could be further investigated in order to capture the gender perspective in innovation, which are listed below.

1. When it comes to “investments”, the gender perspective could highlight whether the areas that attract most funds are areas where women are most active. For example, existing indicators are available to capture horizon projects with a gender dimension, and percentage of a country’s research output that integrates a gender dimension in their research and innovation content. These indicators, however, will capture only a small part of all research projects. Additionally, indicators capturing venture capital funding for women-led companies could be explored. At the moment these indicators

(i.e Female founded VC deal count (%), female founded VC capital (%))⁵⁴, are available only at European level (not disaggregated at national nor at regional level).

2. Additionally, synergies with the recent EIC pilot project of the European Innovation Gender and Diversity Index could be explored. In particular, the planned data collection activities could be useful for the development of some of the indicators to be also included in the EIS. For example, the Pilot EIC Board provided some recommendations on broadening the definition of 'women-led' to recognise leading executive's roles beyond the CEO, such as the Chief Technology Officer (CTO), Chief security Officer (CSO), and Chief Operating Officer (COO)⁵⁵. This approach is in line with the objective to capture other roles within a firm that plays an important role in innovation (management positions).
3. Nonetheless, it would still be important to explore how to capture women participation in innovation activities by not only looking at managerial position (CEO, CTO, etc). To do so, a question on the share of women among a firm's educated workforce could be included in the Community Innovation Survey. , if it is not possible to look at the team composition in Section 3 the Community Innovation Survey CIS⁵⁶.
4. To include other forms of innovation where women play a relevant role, existing indicators could be explored that measure the presence of social focused business support, and/or the number of businesses that aim to solve social problems. Alongside measuring inputs and outputs (i.e number of women in leading positions, % women that are innovators, etc..), indicators measuring intangible outputs could be included, for example % women working in organisations that aim to solve social problems.
5. Additionally, to capture the socio-cultural and institutional context, the uptake of GEP by public bodies, higher education and research organisation could be measured. GEPs report gender-disaggregated data for staff categories (useful for career progression and recruitment), and recommended areas such as gender-based violence and work-life balance. As carried out in the 2021 SHE Figures edition, web scraping techniques could be used to present the Proportion (%) of Research Organisations that take actions or measures towards gender equality, by type of organisation (indicator 5.7)⁵⁷. For this approach, keywords based on the process-related requirements and content areas could be selected to capture gender and innovation.
6. Lastly, during the expert workshop, there was a suggestion to consider collecting further data on the organisations that will include the recommended criteria⁵⁸ in their GEP. There was a proposal to enlarge the scope of the GEPs beyond public bodies, higher education and research organisation wishing to participate to Horizon Europe, but also

⁵⁴ PitchBook data collection, The European VC female founders dashboard, available at: <https://pitchbook.com/news/articles/the-european-vc-female-founders-dashboard>

⁵⁵ European Innovation Council pilot advisory board, 2021, Statement on gender and diversity in EIC. Available at: https://eic.ec.europa.eu/system/files/2021-06/EIC_Gender_Diversity%20statement_June%202021.pdf

⁵⁶ Eurostat, 2018, Community Innovation Survey (CIS), CIS 2018 Survey Questionnaire, Available at : <https://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>

⁵⁷ European Commission, 2021, She figures, Gender in Research and innovation statistics and indicators. Available at: https://ec.europa.eu/info/sites/default/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_shefigures-2021-report.pdf

⁵⁸ The recommended areas are open and inclusive work environment, culture of zero tolerance towards gender-based violence, and career progression and recruitment)

private-for-profit entities, non-governmental organisations and civil society organisations applying for Horizon Europe.

ANNEX A

Table 1: Glass ceiling

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Representation in academic career	DG Research and Innovation – WiS – Women in Science database, with data submitted with the WiS questionnaires	EU-27 & EU-28,	2015-2018	Glass ceiling	Proportion of women among grade A positions	She figures
Representation in decision-making positions (business)	EIGE Gender Statistic Database (link)	EU 27 EU 28	Annual Latest 2022	Glass ceiling	Percentage women's representation in decision-making positions	EIGE
Female fund manager and decision makers in venture capital funds	The pitchbook (link)	EU level	Not Available	Glass ceiling	Percentage of female co-founded Venture capital	EIB, funding women entrepreneurs

Table 2: Participation

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Participation in science and technology occupations	Eurostat- Human Resources in Science & Technology (link)	EU-27 & EU-28	Latest 2021	Participation	Proportion of women among tertiary-educated and employed as professionals or technicians (HRSTC) in the EU	She figures
Participation in academic career	DG Research and Innovation – WiS – Women in Science database, with data submitted with the WiS questionnaires	EU-27 & EU-28,	2015-2018	Participation	Proportion of women among the persons occupying positions at different grades of an academic career for a given year	She figures
Doctoral graduates	EIGE database (link)	EU 27	Annual latest 2020	Participation	Proportions (%) of women and men among graduates, by education level, programme orientation, and field of education	
Participation of women among total employment in the EU	Eurostat- Labour Market Statistics (link)	EU-27 & EU-28	Latest 2021	Participation	proportion of women in total employment as a starting point for considering their participation in	She figures

					different fields and sectors of the labour market.	
Employment in knowledge-intensive activities	Eurostat – High-tech industry and knowledge-intensive services (link)	EU-27 + Iceland, Norway, Switzerland UK, Montenegro, North Macedonia, Serbia, Turkey	Annual 2008- 2017	Participation	Proportion of employment in knowledge-intensive activities (KIA) among total employment, by sex	She figures

Table 3: Working conditions

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Gender overall earnings gap	Eurostat- Earnings and social inclusion (link)	EU 27	2018	Working condition	Synthetic indicators measuring the impact of three factors: (1) the average hourly earnings, (2) the monthly average of the number of hours paid (before any adjustment for part-time work) and (3) the employment rate, on the average earnings of all	

					women of working age - whether employed or not employed - compared to men	
Researcher under precarious contracts	European Commission - MORE Survey on mobility patterns and career paths of researchers (https://www.more-4.eu/).	EU 27	2019	Working condition	Proportion of researchers in the higher education sector (HES) working under precarious contracts, by sex	
Researcher employed part-time	European Commission - MORE Survey on mobility patterns and career paths of researchers (https://www.more-4.eu/).	EU 27	2018	Working condition	Proportion of researchers employed part-time among researchers in the higher education sector (HES), by sex	
Self-employed within ICT and S&E professional	Eurostat – European Labour Force Survey (EU-LFS).	EU 27	2019	Working condition	Proportion of women among self-employed individuals within Information and Communication Technology (ICT) and Science and Engineering (S&E) professionals	

Table 4: Outputs

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Number of publications	She figures	EU27	2019	Outputs	Women to men ratio of the average number of publications (all authorships) in all fields of R&D, by seniority level	EIGE database
Success rates in research funding	She figures	EU27	2019	Outputs	Research funding success rates by sex	EIGE database
Women to men ratio of inventorships, all International Patent Classification (IPC) sections	She figures	EU27	2019	Outputs	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	EIGE database

					total inventorships) over the corresponding proportion for men.	
Average proportion of women among authors on publications that list among the author affiliations, both a corporate entity and any other entity.	She figures	EU27	2019	Outputs	This indicator is the average proportion of women among authors on publications resulting from collaboration with a corporate entity. It is based on peer-reviewed scientific publications (articles, reviews, conference papers).	

Table 5: Investments

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Percentage of country's research output integrating a ^a	She figures Computed using Horizon 2020 data, retrieved from the EU Open Data Portal (link)	EU 27	2014-2020	Investments	Percent of a country's research output integrating a gender	

gender dimension in their research and innovation content					dimension in its research and innovation content (GDRIC)	
Proportion of Horizon 2020 projects integrating a gender dimension	She figures Computed using Horizon 2020 data, retrieved from the EU Open Data Portal (link)	EU 27	2014-2020	Investments	Gender dimension in research and innovation content in Horizon 2020 projects	
female founded VC capital	The pitchbook (link)	EU level	Not available	Investments	Percentage of female founded Venture Capital	EIB, funding women entrepreneurs

Table 6: Open and inclusive environment

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Research Performing Organisation gender equality measures	She figures			Open and inclusive work environment	Proportion of RPOs that have taken measures and actions to promote Gender	

					Equality, by type of organisation	
Harassment at work	European Foundation for the Improvement of Living and Working Conditions (Eurofound)-European Working Conditions Survey (EWCS) link	36 countries, including the EU Member States, the United Kingdom, Norway, Switzerland, Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia	2005, 2010, 2015, 2020	Open and inclusive work environment	Over the last 12 months, during the course of your work have you been subjected to harassment? (% of respondents, 15+ workers)	EIGE database
Work-life balance	European Foundation for the Improvement of Living and Working Conditions (Eurofound)-European Working Conditions Survey (EWCS) link	36 countries, including the EU Member States, the United Kingdom, Norway, Switzerland, Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia and Serbia	2005, 2010, 2015, 2020	Open and inclusive work environment	In general, how do your working hours fit in with your family or social commitments outside work? (% of respondents, 15+ workers)	

Table 7:Impacts

Indicator	Source	N. Countries	Periodicity	Fields of actions	Definition	Title of the project/article
Gender Equality Index	EIGE	EU 27	2019	Impacts	Index measuring the progress of gender equality in the EU	EIGE
FemAI	European Commission (link)	EU 27 (Nuts 2)	2019	Impacts	level of female achievement compared to the best regional female performance. FemAI varies between 0 (lowest achievements) and 100 (highest achievements).	Mapping the glass ceiling: The EU regions where women thrive and where they are held back
FemDI	European Commission (link)	EU 27 (Nuts 2_	2019	Impacts	level of female disadvantage by measuring if women are doing worse than men in the same region. The best score is 0 (no disadvantage) and the worst is 100 (largest disadvantage).	Mapping the glass ceiling: The EU regions where women thrive and where they are held back

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The European Innovation Scoreboard (EIS) is the EU's main tool for the measurement, monitoring and benchmarking of innovation performance of the EU, individual Member States and their regions, as well as associated countries. In the context of improving the European Innovation Scoreboard, VVA has been exploring how the gender perspective could be introduced in the current EIS/ Regional Innovation Scoreboard (RIS) framework conceptually and with the use of existing and new indicators.

Studies and reports

