



Brussels, 15.9.2014
SWD(2014) 280 final

COMMISSION STAFF WORKING DOCUMENT

**EUROPEAN RESEARCH AREA
FACTS AND FIGURES
2014**

Accompanying the document

**COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND THE
EUROPEAN PARLIAMENT**

European Research Area Progress Report 2014

{ COM(2014) 575 final }

Facts and Figures accompanying the ERA Progress Report 2014

Contents

1. INTRODUCTION AND PRELIMINARY REMARKS	7
2. WHY ERA?.....	9
3. ERA PRIORITIES	13
3.1. Effectiveness of national research systems.	13
3.1.1. National strategies for R&I.....	14
3.1.1. Public funding for R&D and its evolution	14
3.1.2. Competition for public funding	16
3.1.3. Institutional funding	18
3.2. In terms of pan-European cooperation and competition	19
3.2.1. Transnational cooperation	19
3.2.2. International cooperation	22
3.2.3. Interoperability	25
3.2.4. Financial commitments for the construction and operation of European Strategy Forum on Research Infrastructures (ESFRI), national, regional research infrastructures (RIs) of pan-European interest	27
3.2.5. Access to RIs of pan-European interest.....	28
3.3. An open labour market for researchers	28
3.3.1. Open, transparent and merit based recruitment of researchers.....	29
3.3.2. Researchers' careers	31
3.3.3. Support structured innovative doctoral training programmes	31
3.3.4. Removing the barriers to international mobility.....	33
3.3.5. Support mobility between private and public sector	36
3.4. In terms of gender equality and gender content in research	37
3.4.1. Gender equality in research	37
3.4.2. Gender balance in decision making process.....	42
3.4.3. Gender dimension in research content/programmes	46
3.4.4. Gender equality at EU level.....	49
3.5. In terms of circulation of and access to scientific knowledge.....	50
3.5.1. Open access	50

3.5.1.	Open innovation (OI) and knowledge transfer (KT) between public and private sectors	56
3.5.2.	Policies for public e-infrastructures and associated digital research services	63
3.6.	Actions in support of ERA by the members of the Stakeholder platform	66
3.6.1.	Conference of European Schools for Advanced Engineering Education and Research (CESAER).....	67
3.6.2.	European Association of Research and Technology Organisations (EARTO)	69
3.6.3.	European University Association (EUA)	70
3.6.4.	League of European Research Universities (LERU).....	72
3.6.5.	NordForsk	73
3.6.6.	Science Europe	74
3.7.	Actions in support of ERA by the members of EIROforum	75
3.7.1.	CERN (Conseil Européen pour la Recherche Nucléaire).....	75
3.7.2.	EMBL (European Molecular Biology Laboratory)	77
3.7.3.	ESO (European Southern Observatory)	78
3.7.4.	ESRF (The European Synchrotron Radiation Facility).....	79
4.	FINAL REMARKS	80
4.1.1.	Progress in policy support is constantly observed.....	80
4.1.2.	ERA national policies lead to ERA implementation	82
5.	ANNEXES	84
5.1.	Assessment of the ERA indicators	84
5.2.	Methodology for clustering the RPOs (2014 ERA survey).....	88
5.3.	The 2014 ERA survey	88
5.4.	Clustering RPOs according to ERA compliance	90
5.5.	Matching ERA policies with ERA implementation	95
5.6.	How to analyse the results of the survey in the country fiches	98
5.7.	Glossary	102
5.8.	Concepts used in the analysis of national policy context in support of ERA	110
5.9.	Sources of information	119
5.10.	Results of the survey by country	121

Graphs

Graph 1: Number of institutions (left) and share of institutions weighted by number of researchers (right) in each ERA cluster, 2013	9
Graph 2: Share of RPOs (weighted) by cluster of ERA compliance, 2013	10
Graph 3: Outputs by RPOs according to their cluster of ERA compliance, 2013	11
Graph 4: Share of organisations within each cluster implementing some of the ERA actions (according to their ERA compliance), 2013	12
Graph 5: GBAORD per capita, 2012 (in EUR).....	15
Graph 6: Evolution of GBAORD compared with total government expenditures (2007=1)	16
Graph 7: Allocation of funding according to different modalities, by funders in Member States, 2013.....	16
Graph 8: Share of funder's R&D budget dedicated to joint defined research agendas with non-national funders, 2013	20
Graph 9: Share of R&D budget allocated to collaboration programmes carried out with third countries, 2013	23
Graph 10: Share of organisations' R&D budget originating from third countries, 2013 .	25
Graph 11: Share of funders which can base their project based R&D decisions on peer reviews carried out by non-national funders, 2013	25
Graph 12: Share of project based R&D budget allocated through peer review carried out by funders outside the country, 2013	26
Graph 13: Open, excellent and attractive research systems and innovation performance (2014)	29
Graph 14: Share of university-based researchers satisfied with the extent to which research job vacancies are publicly advertised and made known by their institution, Europe (2012) (%).....	30
Graph 15: New doctoral graduates per thousand population aged 25-34, EU-27, US and Japan, 2000-2011.....	32
Graph 16: Types of queries received by EURAXESS Service Centres 2010-2013.....	34
Graph 17: Share of women researchers, 2011 (headcount).....	37
Graph 18: Share of funders frequently supporting gender equality in research and the inclusion of gender dimension in research content, 2013	38
Graph 19: Share of RPOs which have adopted GEPs, 2013	38
Graph 20: Share of RPOs implementing recruitment and promotion policies for female researchers, 2013	41
Graph 21: Share of RPOs whose heads were women, 2013	43

Graph 22: Share of gender-balanced research evaluation panels in funders, 2013.....	44
Graph 23: Share of gender-balanced recruitment committees for leading researchers in RPOs, 2013.....	45
Graph 24: Share of funders supporting gender equality in research and the inclusion of the gender dimension in research content, 2013	46
Graph 25: Share of RPOs which include the gender dimension in research content, 2013	47
Graph 26: Share of funders funding open access to publications, 2013	51
Graph 27: Share of funders systematically funding open access to data, 2013	52
Graph 28: Share of research performing organisations systematically making available online and free of charge [publicly funded] scientific research data, 2013.....	54
Graph 29: Share of funders systematically supporting the implementation of knowledge transfer as part of their institutional and/or project based funding, 2013.....	56
Graph 30: Share of research performing organisations having or using a structure for knowledge transfer activities, 2013	59
Graph 31: Share of research performing organisations having dedicated staff employed in knowledge transfer activities, 2013	60
Graph 32: Share of research and development budget financed by private sector, 2013	61
Graph 33: Share of staff employed by RPOs whose primary occupation is in the private sector (in Full Time Equivalents), 2013	62
Graph 34: Share of research performing organisations providing digital research services (i.e. cloud services, research collaboration platform, etc.), 2013	64
Graph 35: Share of research performing organisations providing federated electronic identities for their researchers, 2013	65
Graph 36: Representativeness of fs when compared with national GBAORD 2012.....	89
Graph 37: Share of total funding managed by responding funders, by country.....	89
Graph 38: Representativeness of RPOs in terms of total researchers in the country	89
Graph 39: Share of country's researchers among the total number of researchers in responding RPOs.....	90
Graph 40: Variables projected onto the first factorial plane F1-F2.....	91
Graph 41: First factorial plane with organisations identified by size and jointly projected with patents.....	91
Graph 42: Number of areas in which policy has been adopted in the different Member States.....	96

Graph 43: Number of areas in which implementation by Member State is above the EU average.....	97
--	----

Tables

Table 1: Classification of countries according to ERA policies and implementation of the ERA actions.....	8
Table 2: Correlations between the share of RPOs (weighted) (2013) with three indicators of performance.....	12
Table 3: Number of initiatives taken by Member States since last year's ERA Progress Report.	80
Table 4: Number of measures adopted (or being adopted) by area of intervention	81
Table 5: Score given for each domain of activity to the policy support and to the implementation by funders or performers	95

Maps

Map 1: Classification of EU Member States according to support to project based funding in the R&I strategy and the share of funding allocated as project based by funders, 2013	17
Map 2: Classification of EU Member States according to the identification of measures in support of institutional funding allocated on the results of institutional assessment and the share of funding allocated by funders using this modality, 2013	18
Map 3: Classification of EU Member States according to the measures in support of the implementation of joint research agendas and financial support provided by funders, 2013	21
Map 4: Classification of EU Member States according to the measures in support of collaboration with third countries and the share of funding allocated by funders to this type of activity, 2013	23
Map 5: Classification of EU Member States according to measures supporting gender equality and the adoption of GEPs, 2013	39
Map 6: Classification of EU Member States according to the measures in support of recruitment and their implementation by RPOs, 2013	41
Map 7: Classification of EU Member States according to the support to improve gender balance in the decision making process and the share of women who are heads of RPOs, 2013.....	43
Map 8: Classification of EU Member States according to the support to the inclusion of gender content in research programmes and frequent support provided by funders, 2013	46
Map 9: Classification of EU Member States according to the support to the inclusion of gender contents in research programmes and the implementation by research performing organisations, 2013.....	48

Map 10: Classification of EU Member States according to the support open access to publications and frequent support provided by research funding organisations, 2013	51
Map 11: Classification of EU Member States according to the support of open access to data and frequent support provided by research funding organisations, 2013	53
Map 12: Classification of EU Member States according to the support of open access to data and the implementation by research performing organisations, 2013	54
Map 13: Classification of EU Member States according to the existence of a knowledge transfer strategy and and the support provided by research funding organisations, 2013	57
Map 14: Classification of EU Member States according to the existence of a knowledge transfer strategy and the existence of Technology Transfer Offices in research performing organisations, 2013	59
Map 15: Classification of EU Member States according to the support provided to federated identities and their provision by research performing organisations, 2013	65
Map 16: Classification of Member States according to their policies in support of ERA and their implementation	82

1. INTRODUCTION AND PRELIMINARY REMARKS

The Commission has developed the ERA Monitoring Mechanism (EMM) with the objective of assessing progress in the compliance of ERA at three different but interrelated levels: national and regional policies, funders and research performing organisations (RPOs).

This report presents progress observed in Member States in terms of adoption of measures in support of ERA¹. In collaboration with Member States and some Associated Countries², the Commission identified new measures and updated the contents of last year's state of play.

It also presents - for the first time and based on results from the ERA survey 2014³ - the state of play in terms of support provided by funders (RFOs) for the adoption of ERA measures as well as the implementation of ERA in the different research performing organisations (RPO).

For the funders' level, there are no official sources of information on ERA implementation, which motivated the Commission to launch the first ERA survey in 2012. The responses to the first exercise were not sufficiently representative. Member States suggested fine-tuning the indicators for the purpose of this exercise. Therefore, the indicators to use and the questionnaire of the ERA survey 2014 have been discussed and agreed with Member States which participate in the European Research Area Committee (ERAC) ad hoc group on the EU semester and ERA monitoring⁴. Strong support by national authorities motivated many funders to answer the survey.

For the RPO level most information on ERA implementation did not exist in official statistical sources. The first ERA survey in 2012 raised a great deal of interest. However, the questionnaire was too long and gathered too much information which turned out not to be necessary to estimate ERA implementation. Therefore, the indicators to use and the questionnaire to employ have also been discussed and agreed with Member States which participate in the ERAC ad hoc group on the EU semester and ERA monitoring⁴. The ERA survey 2014 received a similar number of responses as in the 2012 exercise.

¹ The identification of new measures undertaken by Member States was based on the analysis of the 2014 National Reform Programmes and also on information provided by the Joint Research Centre, notably the specific analysis of the implementation at national level of the ERA Communication priorities carried out with the support of independent national experts.

² It concerns those Associated Countries which indicated their willingness to participate in the exercise at the Commission's invitation.

³ There is no register of public funders or of research performing organisations in ERA. With the help of national authorities Commission services developed a list of around 600 public funders and around 8,500 research performing organisations which were invited to participate in the ERA survey 2014. The organisations were requested to provide the information on a voluntary basis. This implies that the results are biased, as they correspond **only** to the situation in those institutions which answered the survey and not the overall situation in each Member State.

⁴ See annex 5.1

The results presented in the report provide an indication of the situation **only** among those institutions which responded to the survey⁵, which include funders which manage 34 % of total GBAORD in the EU, and performers which employ 32 % of total staff and 20 % of researchers in RPOs. The constituency in the survey gathers 20 % of the most important RPOs as identified by Member States⁶.

All indicators have been estimated weighting the answers provided by the organisations. In the case of funders, the answers were weighted by the total funding managed by the responding funders institutions, in comparison with the total funding handled at national or EU level. In the case of RPOs, the results were weighted by the number of researchers (headcount) in the institutions and compared with the total number of researchers in the responding organisations (at national or EU level).

Throughout the analysis it will be shown that the level of ERA implementation varies across countries, reflecting the national situations and contexts. To classify the countries two criteria were used. The first is the existence of specific measures in support of ERA as identified by Commission services. The second is the level of implementation by funders and/or RPOs in comparison with the EU average. In the absence of targets or identified desirable levels of implementation, it is difficult to identify and assess an adequate level of ERA implementation for each of the actions. Whenever meaningful, the degree of support and the implementation are compared with the average observed at EU level. The use of the EU average does not imply that it should be considered to target a desirable level of implementation. On this basis, four (or in some cases five) possible groups could be identified (see Table 1).

Table 1: Classification of countries according to ERA policies and implementation of the ERA actions

	Specific measures in support of ERA	No specific measures in support of ERA
Implementation above EU average	Top-down ERA proactive	Bottom-up ERA proactive
Implementation below EU average	Limited implementation by stakeholders	Limited measures and limited implementation
		Limited measures and no implementation

It should be noted that the EU averages are influenced by the high response rate by German institutions and the low responses by UK RPOs. They influence the average in both directions: upwards in situations where the country's institutions are very advanced

⁵ The use of “micro” data for the identification of ERA implementation and possibly policy assessment appears to be extremely interesting. However, the limited response rate restrains the scope of the results. In future similar exercises Member States and the Commission need to continue interacting to identify possible ways to further motivate the national organisations to participate in the exercise.

⁶ Member States were requested to identify among the full list of organisations the most important research performers in their countries. This information was matched with the respondents to the survey.

in the implementation of ERA, and downwards on a few other issues for which the level of implementation by German institutions is low.

Finally, it should be noted that the results have to be analysed and used with care by Member States and the Commission. Responding organisations did not provide any answer for a number of questions, which requires further analysis to explain this lack of responsiveness. Therefore, Member States are invited to check the scope of the results with their constituency when identifying their national policy priorities.

Nevertheless, it is expected that the results included in this report which accompanies the recently adopted Commission's Communication 'Research and innovation as sources of renewed growth' will help Member States and Stakeholders in identifying areas where more effort is needed on ERA implementation.

2. WHY ERA?

- *Compliance to ERA differentiates RPOs and also research performance.*
- *ERA compliant organisations produce more patent applications and publications by researcher.*
- *ERA related reforms are still needed, even among ERA compliant organisations, and in some countries, the importance of organisations in the limited compliance to ERA clusters calls for serious attention by the authorities.*

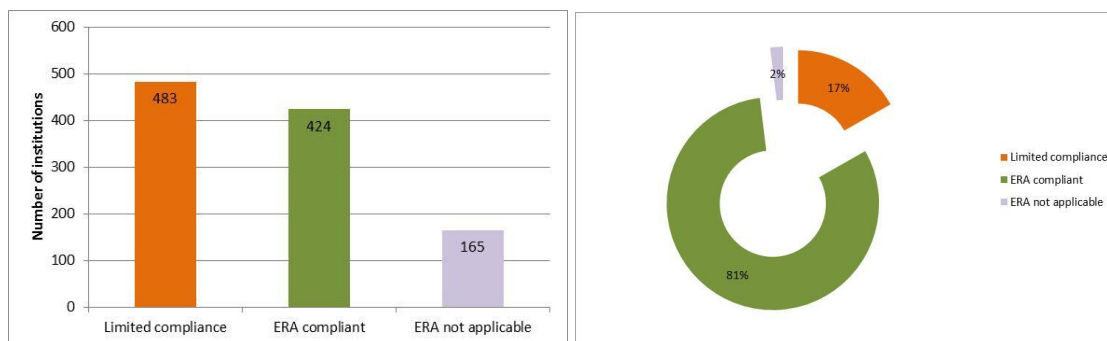
Statistical analysis⁷ of the responses to the ERA survey 2014 indicates that three types of organisations can be singled out according to their compliance to ERA:

- **ERA compliant:** organisations which are implementing some or all of the ERA actions with high intensity.
- **Limited compliance to ERA:** organisations which are implementing some of the ERA actions with low intensity.
- **ERA not applicable:** organisations in which research is a minor activity or in which the implementation of the ERA actions is not compatible with their mandate.

In terms of number of organisations, the second cluster, Limited compliance to ERA, is the largest. However, the importance of the clusters varies significantly when the number of institutions is weighted by the number of researchers. Then the cluster ERA compliant becomes the largest, gathering 81 % of the researchers (see Graph 1)

Graph 1: Number of institutions (left) and share of institutions weighted by number of researchers (right) in each ERA cluster, 2013

⁷ The methodology to identify the clusters is presented in annex



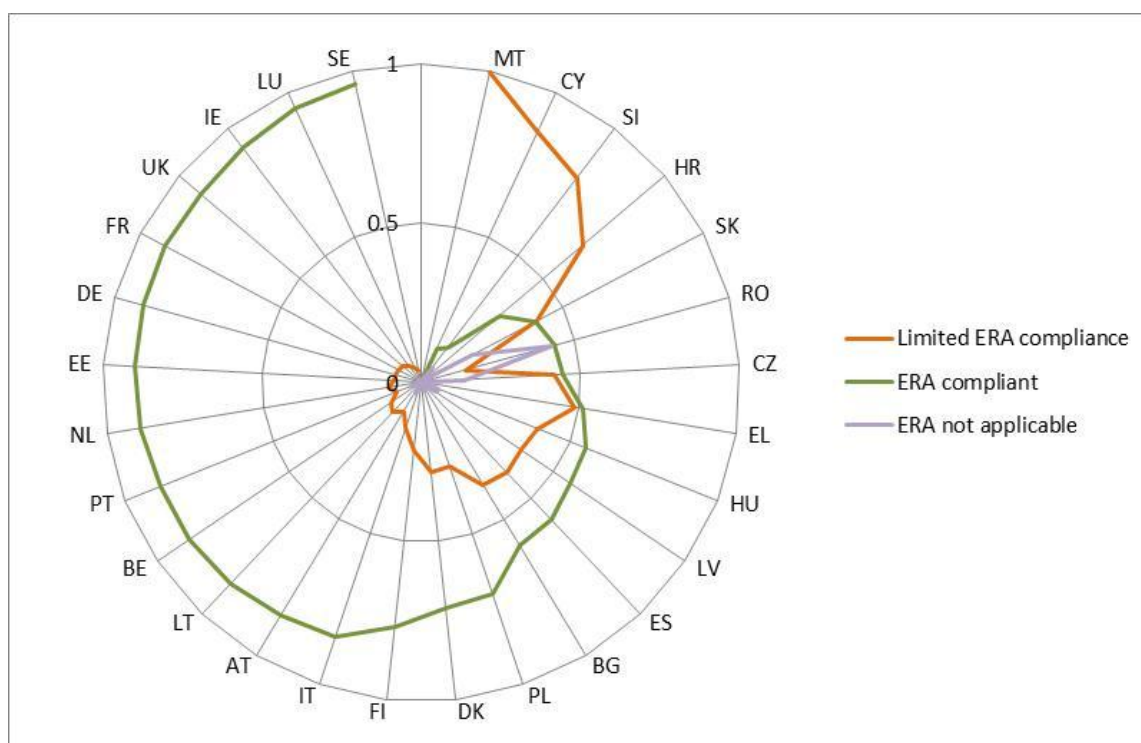
Source: ERA survey 2014

NB: International organisations are not considered in the graph.

It should be mentioned that these figures concern research performing organisations which answered the ERA survey in 2014, which employ 515,000 researchers (around 20 % of total EU researchers employed in the private and public sector).

As shown below, the importance of the clusters (weighted) varies between countries. According to the ERA survey results, in MT, CY, SI and HR, most of the organisations are in the 'Limited compliance' cluster. In CZ, EL and SK the share of organisations is similar in the clusters 'Limited compliance' and 'ERA compliant' (see Graph 2).

Graph 2: Share of RPOs (weighted) by cluster of ERA compliance, 2013

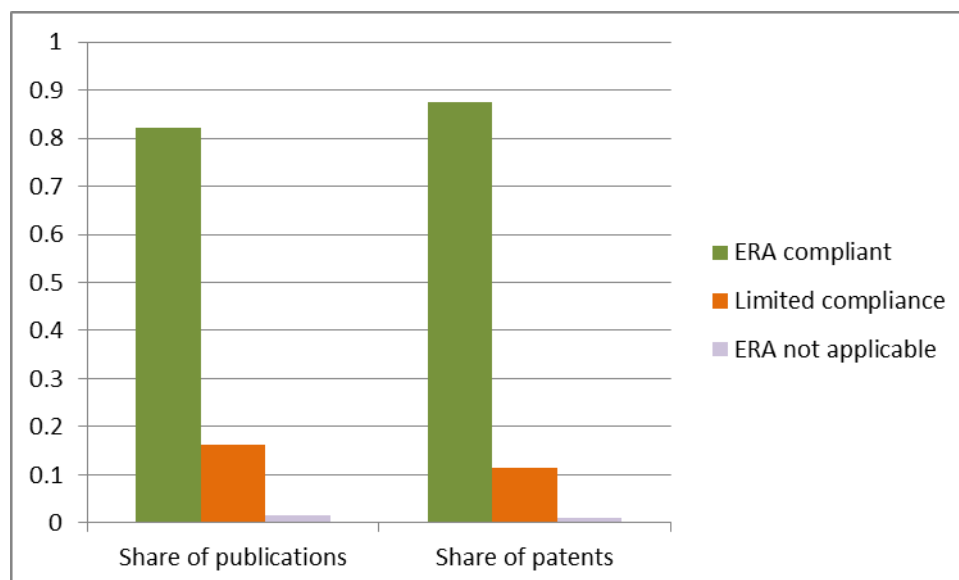


Source: ERA survey 2014

According to the ERA survey 2014 results, a higher the share of publications and a higher the number of patent applications are observed in the ERA compliance cluster in the sample. This result is due not only to the higher number of researchers in the cluster,

but also because researchers in this cluster are respectively 15 % and 50 % more productive on publications⁸ and patent applications than in the cluster Limited compliance to ERA (see Graph 3).

Graph 3: Outputs by RPOs according to their cluster of ERA compliance, 2013



Source: ERA survey 2014

A positive correlation is also observed between national performance indicators and the share of organisations in the ERA compliance group identified through the ERA survey, while it is negative for the other two clusters. This correlation compares the share of RPOs (weighted) with three indicators of performance at national level: the first is scientific and technological research excellence⁹, which can be defined as the top-end quality outcome of systematically performed creative work undertaken to increase the stock of knowledge and new applications; the second is the Innovation index, as presented in the Innovation Union scoreboard 2014¹⁰, and the third is the Innovation output indicator¹¹ (see Table 2).

⁸ This figure reflects the number of publications by researcher, excluding the outliers (institutions with more than 5 publications by researcher) in the sample.

⁹ The top-quality output of scientific and technological research activities at the national level is measured considering four variables: (i) a field-normalised number of highly cited publications of a country as measured by the top 10 % most cited publications (in all disciplines) per total number of publications (HICIT); (ii) the number of high quality patent applications of a country as measured by the number of patent applications filed under the Patent Cooperation Treaty (PCT) per million inhabitants (PCTPAT); (iii) the number of world class universities and research institutes in a country as measured by the number of organisations of a country in the top 250 universities and 50 research institutes divided by gross expenditures in R&D of a country per (TOPINST); and (iv) the number of high prestige research grants received by a country as measured by the total value of European Research Council grants received divided by public R&D expenditures of a country (ERC). For details see Hardeman et al., 2013.

¹⁰ http://ec.europa.eu/enterprise/policies/innovation/policy/innovation-scoreboard/index_en.htm

¹¹ http://ec.europa.eu/research/press/2013/pdf/staff_working_document_indicator_of_innovation_output.pdf

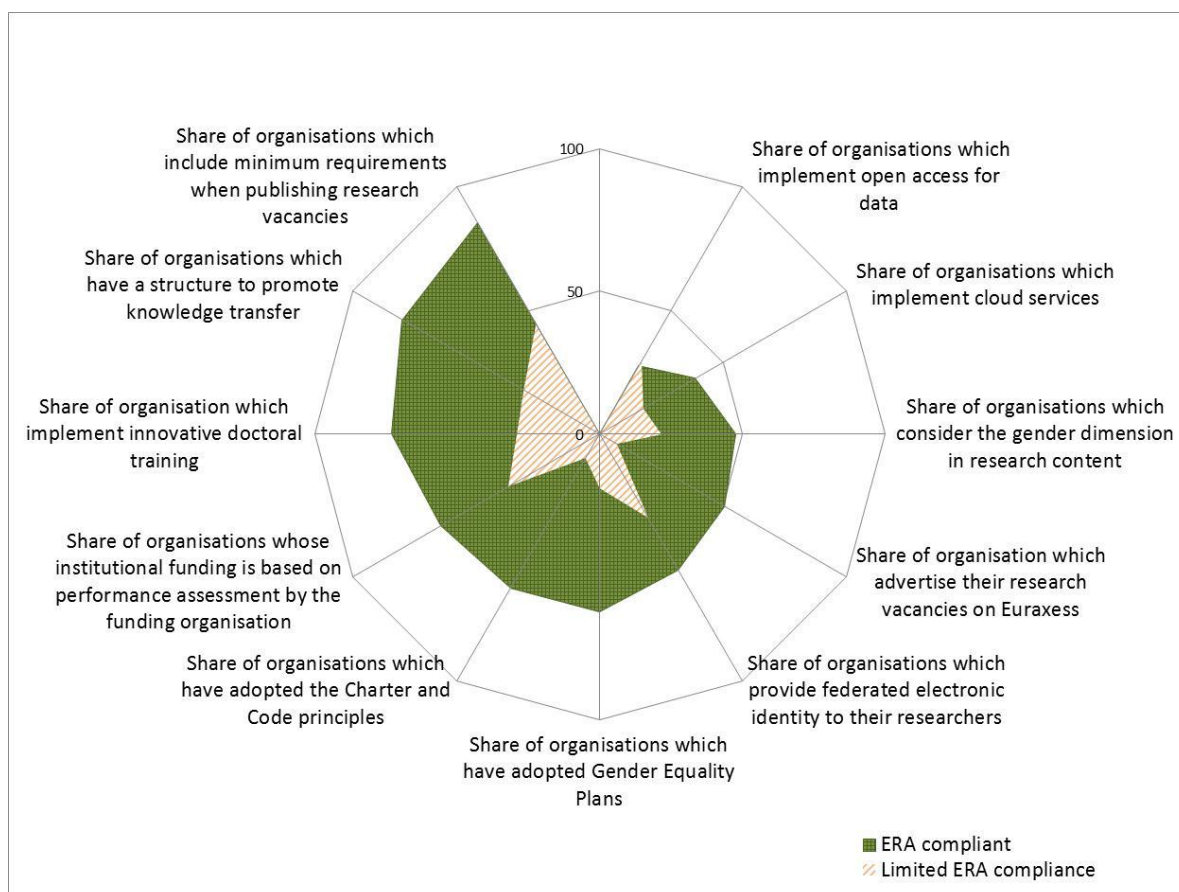
Table 2: Correlations between the share of RPOs (weighted) (2013) with three indicators of performance

	Research Excellence		Innovation Performance		Innovation output indicator	
	Number	Weighted	Number	Weighted	Number	Weighted
ERA compliant	19 %	52 %	21 %	52 %	21 %	42 %
Limited ERA compliant	-24 %	-43 %	-21 %	-42 %	-30 %	-38 %
ERA not applicable	-2 %	-35 %	-7 %	-40 %	1 %	-21 %

Source: Innovation scoreboard, ECFIN, ERA survey 2014

The implementation, as well as the intensity of implementation (i.e. frequently vs. occasionally) of ERA actions, is not homogeneous within the groups. As observed in Graph 4 according to the ERA survey 2014, even in the ERA compliant cluster the share of institutions implementing the different ERA actions is not close to 100 %. For example, only 50 % of the organisations in this cluster frequently advertise their vacancies in EURAXESS.

Graph 4: Share of organisations within each cluster implementing some of the ERA actions (according to their ERA compliance), 2013



Source: ERA survey 2014

More detail on the situation in each country is presented in the Country fiches annexed to this document, including the share of organisations in each cluster. They also include the comparison of the results at country and EU level for the ERA compliant cluster.

3. ERA PRIORITIES

3.1. Effectiveness of national research systems.

- *Guidance through national R&I strategies is present in almost all countries.*
- *Differences in R&I funding remain.*
- *The importance of competitive funding through calls for proposals is difficult to identify. Institutional funding based on institutional assessment is not broadly used by Member States. However, survey results show that the latter is associated with better performance by researchers in RPOs.*

Improving the effectiveness of national research systems is an important priority in ERA. Competition to access public funding is an important factor linked with effectiveness. Before presenting the state of play on the allocation mechanisms at national level, the

next sections present a brief update on national R&I strategies and the related public funding.

3.1.1. National strategies for R&I

R&I strategies are important as they present the priorities of national and/or regional authorities in these fields. The Commission could identify that all Member States with the exception of Portugal have adopted a national strategy for R&I. In IT, MT, RO and SK the strategies have been adopted/adapted since 2013. There are specific mentions to all or some of the ERA priorities in the strategies of AT, DE, ES, FI, HU, IT, LU, MT, RO, SE, SI, SK and the UK.

For its part, the Commission launched the Smart Specialisation Platform (S3 Platform) in 2012 to support EU countries and regions in the preparation and development of their smart specialisation strategies, facilitating mutual learning and sharing of tools, techniques and practice through a genuine bottom-up approach. By the end of June 2014, more than 150 EU regions and 15 EU countries had registered on the Platform and the vast majority have participated in at least one mutual learning or sharing workshop. In particular, the S3 Platform has developed its own peer-review methodology, which allowed around 60 EU regions and countries to submit their smart specialisation strategy to their peers and experts, receive feedback and decide on the appropriate follow-up action to take. This has been the most comprehensive mutual learning support tool ever launched by the Commission on regional R&I strategies, and proved to be well received by the stakeholders. A more thematic approach was launched in 2013, first via the establishment of the Eye@RIS3, an online publicly accessible mapping tool, which gathers the R&I priorities declared by regions and countries in their smart specialisation strategies, and second via the organisation of specific workshops/events around 'common issues' raised by regional or national policy-makers (e.g. the involvement of universities and science parks, the discussion of common priorities, the role of key enabling technologies etc.).

Also, the Commission organised and funded 15 expert groups which visited EE, LT, LV, SK, SI, HU, RO, BG, PL, CZ, EL, ES and PT in order to help local authorities responsible for R&I in preparing their Smart Specialisation Strategies. The reports were formally sent to all relevant Commission services plus the relevant Permanent Representations of these Member States. The reports were extremely pertinent to the governments of these countries as they helped to identify both weaknesses and proposed solutions.

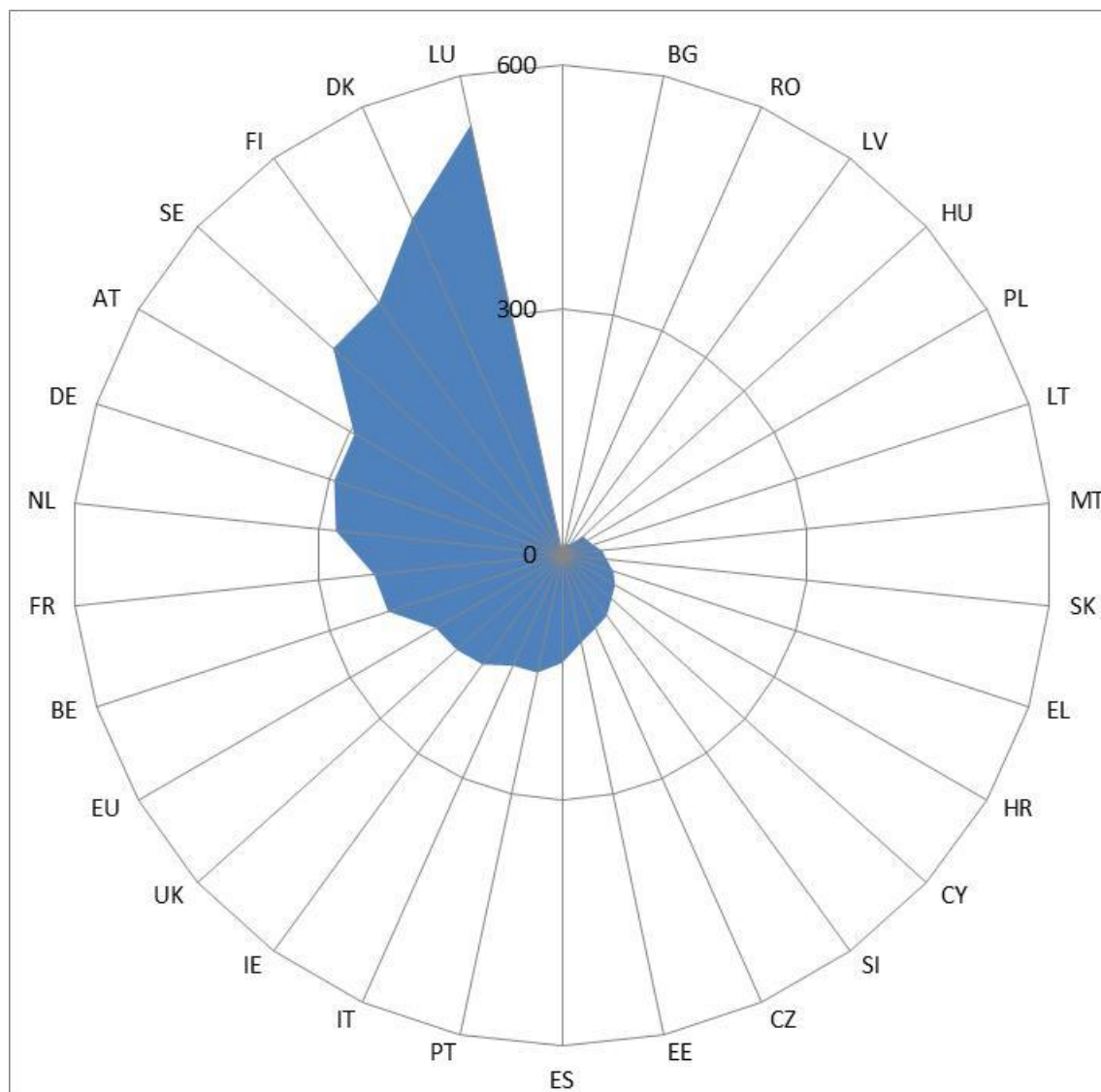
Since February 2014, 11 institutions were awarded an ERA Chair for a period of five years. A new call under Horizon 2020 - Widespread - was published on 11 December 2013 with a call deadline on 15 October 2014. The budget for this call is EUR 34 million. The ERA Chairs brings outstanding researchers to universities and other research institutions that have high potential for research excellence. From their side, institutions mobilise support from different funding sources, including the ESIF, to invest in facilities and infrastructures in the context of their national/regional Smart Specialisation Strategies and commit to institutional change in addition to broader support for innovation.

3.1.1. Public funding for R&D and its evolution

In terms of public funding for research measured through the Global Budget Appropriations or Outlays on Research and Development (GBAORD), big differences

remain. Expenses in R&D per citizen are 39 times higher in LU than in BG (See Graph 5). The differences are partly explained by differences in national income and purchasing power. However, it should be noted that GBAORD does not consider other efforts undertaken by national authorities in support of R&D such as tax incentives, credits, etc. whose importance has risen in the past few years, but for which limited information is available.

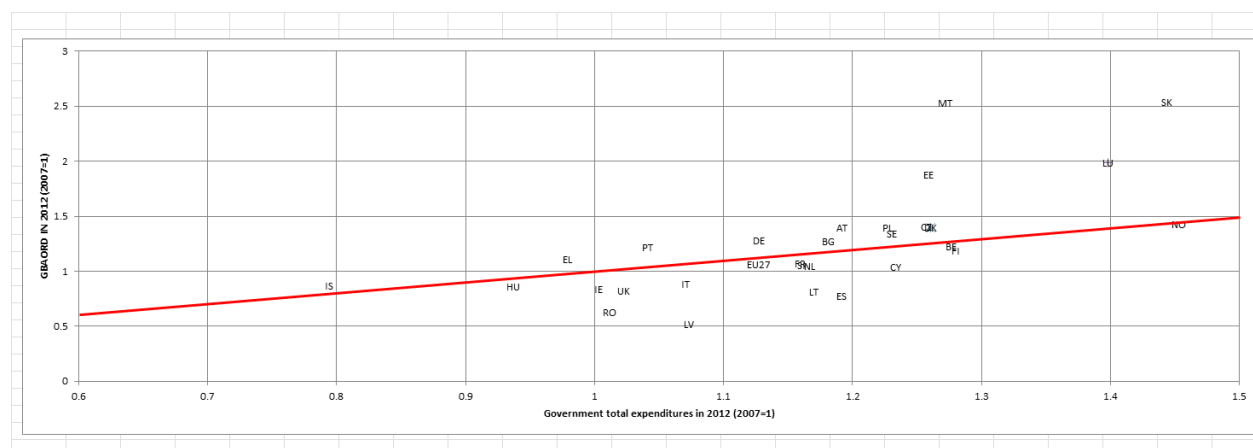
Graph 5: GBAORD per capita, 2012 (in EUR)



Source: DG RTD based on Eurostat

In terms of the evolution of public funding for research, when compared with total government expenditures the situation also varies greatly among countries. Since the crisis (2007), in the graph below it can be observed that countries above the line have increased their GBAORD in 2012 more than total government expenditures demonstrating the high importance given to R&D (see Graph 6). In the others, fiscal consolidation has been carried out at the expense of R&D (BE, IE, ES, FR, IT, CY, LV, LT, HU, NL, RO, SI, FI, UK). It should be recalled that these figures do not include tax incentives for innovation, which in some cases have been increased in the last few years (at least in FR, NL, UK).

Graph 6: Evolution of GBAORD compared with total government expenditures (2007=1)



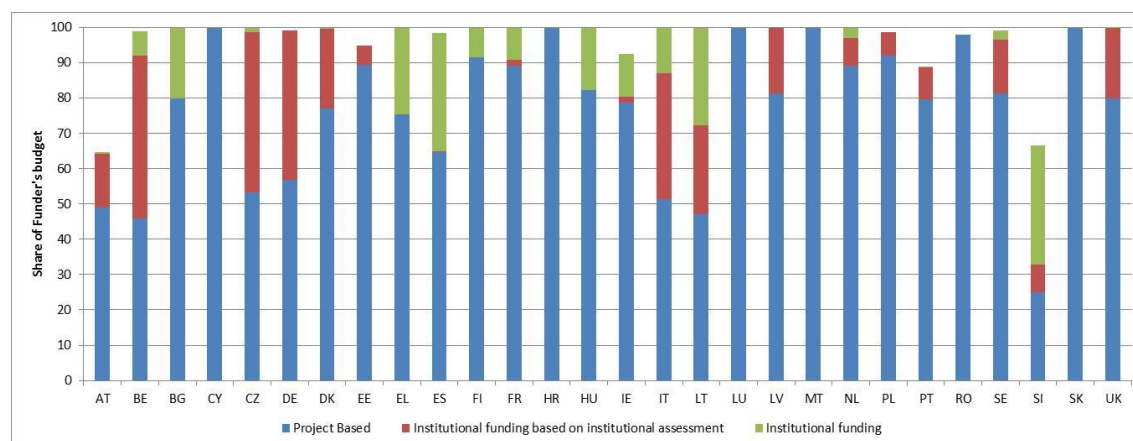
Source: DG RTD based on Eurostat¹²

3.1.2. Competition for public funding

Project based funding is the most important way to induce competition in research. The Commission could identify support to the implementation of project based funding in the national R&I strategies in 21 Member States: AT, BE, BG, CY, CZ, DE, DK, EL, ES, FI, FR, HR, IT, LT, LU, MT, NL, PL, RO, SE, UK.

According to the results of the ERA survey 2014 (see Graph 7), project based is allocated by funders in all Member States, with an average of 64 % of their R&D funding allocated using this modality¹³. Funders in four Member States allocate all their funding using this modality.

Graph 7: Allocation of funding according to different modalities, by funders in Member States, 2013



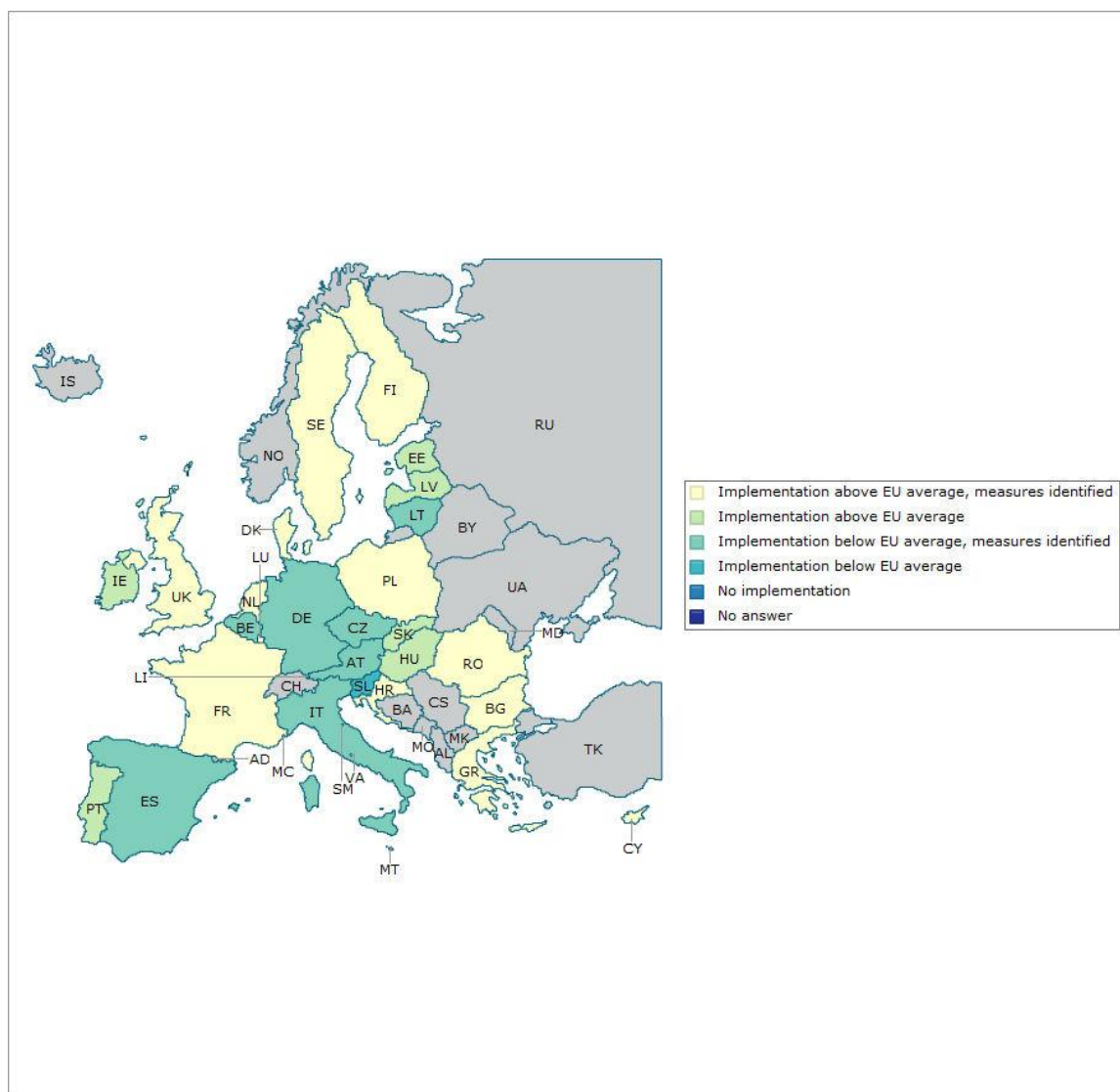
Source: ERA survey 2014

¹² Croatia is not included in the graph as data for this country is only available for 2012.

¹³ It should be noted that these figures concern funders who answered the ERA survey in 2014 which represent 34 % of total EU GBAORD.

In comparative terms (see Map 1), according to survey results funders which answered the ERA survey allocate a higher share of their funding as project based than the EU average in 20 Member States.

Map 1: Classification of EU Member States according to support to project based funding in the R&I strategy and the share of funding allocated as project based by funders, 2013



Among the other Member States where the share is lower than the EU average, the Commission could identify specific measures supporting the implementation of project based funding in AT, BE, CZ, DE, ES, IT and LT, whilst in one country (SI) the Commission could not identify any specific measures.

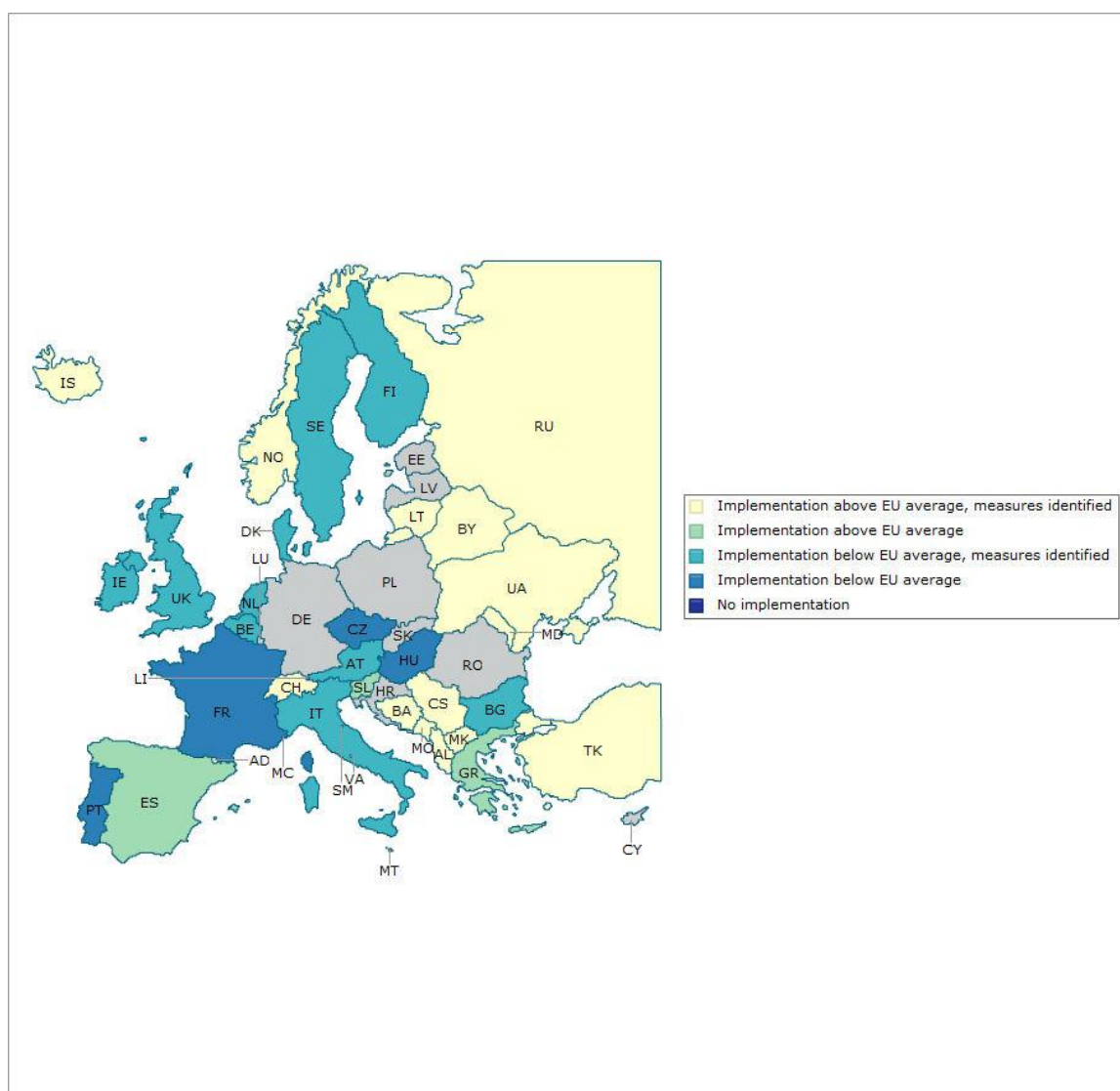
Evaluation mechanisms used for the allocation of project based funding should comply with high standards. The Commission could identify provisions supporting peer review in all Member States. However, these principles vary and are not uniformly used: the Commission identified that in 21 MS the principles are expected to be used in all calls (AT, BE, CZ, DK, EE, EL, FI, FR, HR, IE, IT, LT, LU, MT, NL, PL, RO, SE, SI, SK, UK) while in the rest of the Member States they are expected to be used in some calls (BG, CY, DE, ES, HU, LV, PT).

3.1.3. Institutional funding

Institutional assessment linked with institutional funding is another powerful mechanism to promote competition in research and increase the effectiveness of national expenditures. The Commission could identify measures to support the allocation of institutional funding based on institutional performance in 17 Member States (AT, BE, BG, CY, DE, DK, EE, FI, HR, IE, IT, LT, LU, NL, SE, SK, UK).

In terms of implementation of institutional assessment for institutional funding, according to the ERA survey 2014 results, funding agencies in 18 of the 22 countries which allocate institutional funding base part or all of it on some form of institutional assessment, while in the other four countries they do not (BG, FI, EL, HU) (see Map 2).

Map 2: Classification of EU Member States according to the identification of measures in support of institutional funding allocated on the results of institutional assessment and the share of funding allocated by funders using this modality, 2013



Among the six Member States whose agencies declared that they do not allocate institutional funding, four Member States (CY, HR, LU, SK) have policies in place to address this issue. In the other two, the Commission could not identify any measure (MT,

RO). It should be noted that some funders in some countries did not report their funding modalities.

Almost 70 % of researchers in the ERA survey 2014 belong to institutions whose institutional funding is linked to institutional assessment. Of them, 88 % are in the ERA compliant cluster.

3.2. In terms of pan-European cooperation and competition

3.2.1. Transnational cooperation

- *The relevance given to transnational cooperation is increasing at strategic level in most countries*
- *Differences in share of budget allocated to transnational cooperation are important (1:21)*
- *Several large initiatives (ERA-Nets, Article 185 initiatives, joint programming initiatives (JPIs)) are continued and/or enhanced in Horizon 2020, increasing the coordination and effectiveness of European research*

Europe is facing a number of societal challenges for which a combined effort on R&I is needed. The Framework Programme Horizon 2020 is a major facilitator of cross-border research based on excellence. However, in some cases this effort may be insufficient and combined actions by several Member States may be required. The Commission could identify willingness to foster transnational cooperation in national R&I strategies in more than half of the Member States (AT, BG, CZ, DE, DK, EL, ES, FR, HU, IT, MT, NL, PL, PT, RO, SE, SI).

The Commission, through its ERA-NET scheme continues to provide financial support from the framework programme by co-funding calls and other joint activities related to the coordination of national/regional R&D programmes. For example, ERA-NET Cofund E-Rare action now coordinates, in combination with Horizon 2020 activities, 40 % of all research in the field within ERA. National ministries and their funding agencies appreciate it as a powerful tool, creating joint transnational calls between national programmes with an almost constant total volume of EUR 400 - 500 million per year. They have also used the scheme to launch a broad variety of additional activities that strongly support the realisation of ERA.

In May 2014 Parliament and Council adopted the four Article 185 initiatives, which are research programmes undertaken jointly by several Member States, proposed by the Commission as part of the Innovation Investment Package (IIP), based on Article 185 TFEU. In total, the Commission will invest EUR 1.5 billion from Horizon 2020 in the four initiatives. These activities contribute to the coordination of national research programmes. For example, the Article 185 initiative on Metrology now coordinates 50 % of the European research and is considered the leading metrology research programme in the world. Further initiatives might follow after the mid-term review of Horizon 2020.

Joint programming initiatives aim to pool national research efforts to tackle common European challenges more effectively in a few key areas (10 since 2010). For example, the JPI on Neurodegenerative diseases contributed to an increase in overall investment to

tackle the major societal challenges (from less than EUR 100 million to EUR 350 million), it increased coordination of research in ERA (from less than 5 % to 10 % of all ERA research in the field), attracted 'Foreign Direct Investment' from Canada and will eventually contribute to more effective research in Europe. They are led by Member States and have only received EU support for their set-up phase. Most JPIs have now adopted joint strategic research agendas setting their priorities and some have multi-annual implementation plans. In total their joint activities up to the end of 2013 amounted to more than 20 joint calls and joint actions for a total of more than EUR 200 million. However, this amount is still of a limited size considering that at European level¹⁴, with the exclusion of the Framework programme and the European Funding Agency funding, less than 1 % of national public R&D funding is spent on transnational research.

Finally, a specific focus has been developed within the Smart Specialisation Platform (S3 Platform) on trans-national co-operation, through the establishment of permanent liaisons with two EU macro-regional strategies (those for the Baltic Sea Region and the Danube Region). The contribution has been methodologically targeted to the identification of concrete issues through the decisive involvement of stakeholders. The Danube region stakeholders focused on financial support of trans-national R&I projects, while the Baltic Sea Regions stakeholders focused on the priority-setting process and the subsequent identification of concrete joint projects.

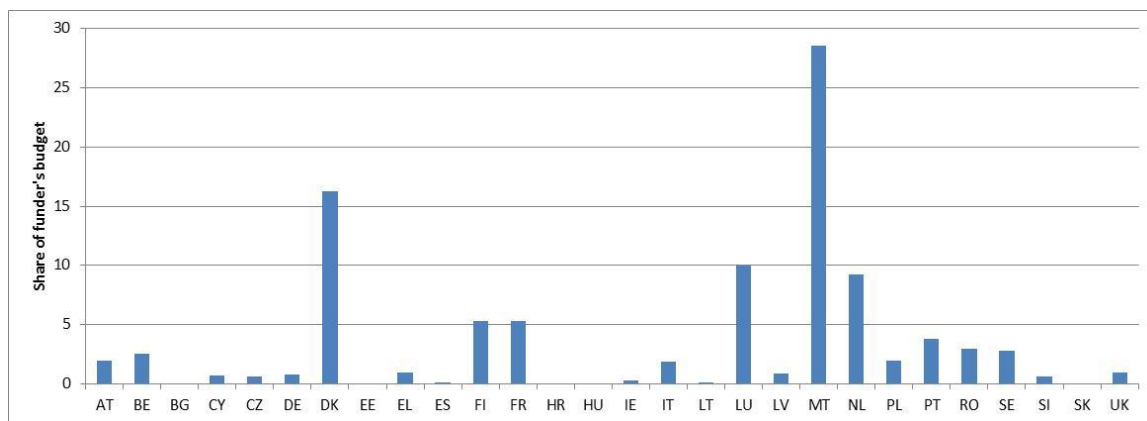
According to the results of the ERA survey 2014, the average share of funding dedicated to joint research agendas¹⁵ among the funders which answered the survey is 1.42 % of their R&D budgets¹⁶ (see Graph 8). The 'intensity' of support for the implementation of joint research agendas varies from very low shares to a maximum of almost 30 % in the case of Malta. In the latter case, the high figure may reflect a specific project and not a regular thrust.

Graph 8: Share of funder's R&D budget dedicated to joint defined research agendas with non-national funders, 2013

¹⁴ This represents 0.2 % of total GBAORD for 2012.

¹⁵ Research funding organisations were asked to indicate their approximate percentage of the organisation's overall R&D budget dedicated to joint research agendas with EU countries in 2013. Joint research agendas were defined as "annual or multiannual research agendas for a joint programme between EU Member States outside the framework of the EU Framework Programme. Joint research agendas include activities such as JPIs and ERA-Net+ where the bulk of funding does not come from EU sources."

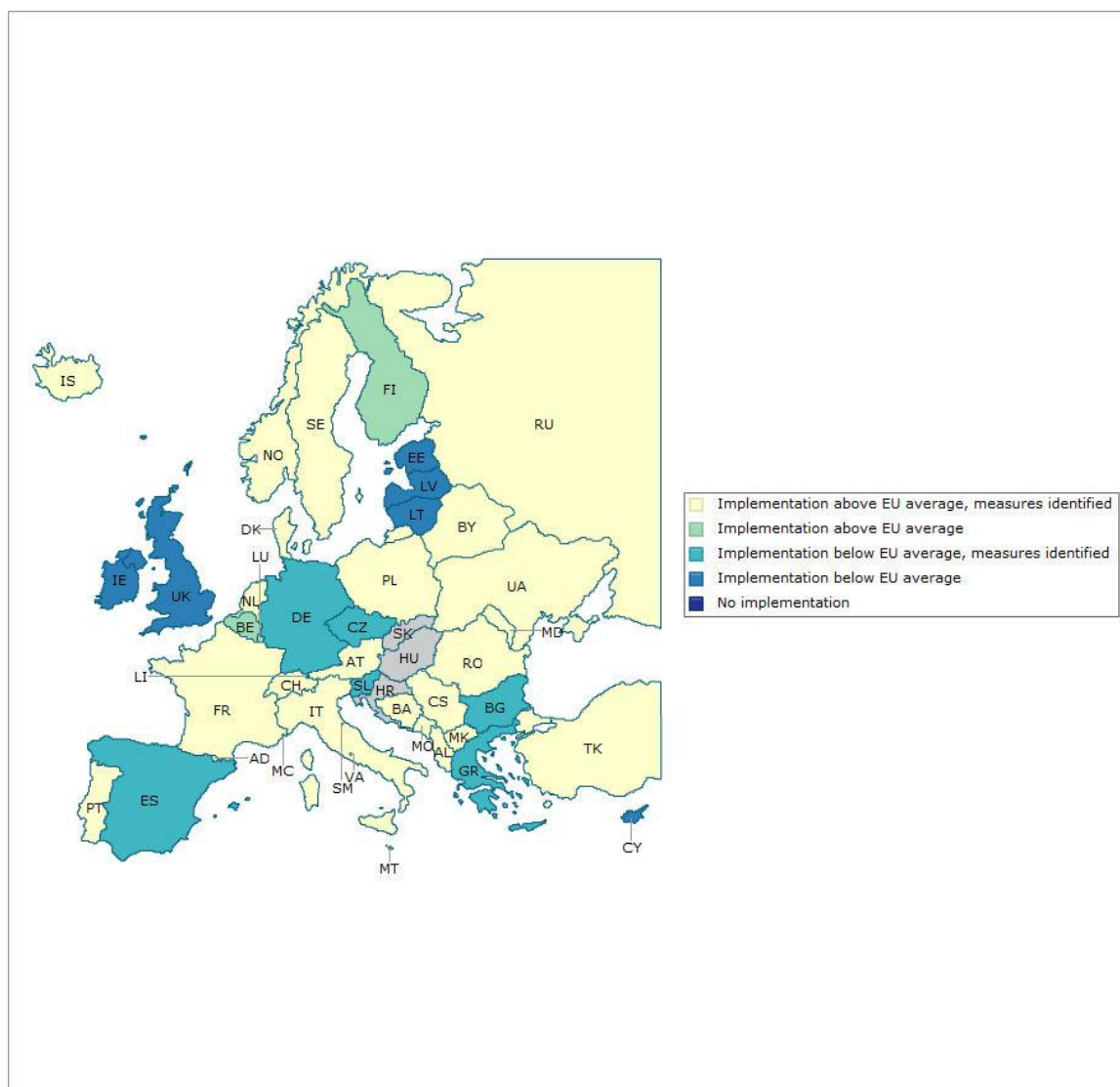
¹⁶ It should also be noted that these figures concern funders which answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.



Source: ERA survey 2014

In comparative terms (see Map 3), according to the ERA survey funders in almost half (13) of Member States funders dedicate a higher share of funding to joint R&D agendas with other EU countries than the EU average.

Map 3: Classification of EU Member States according to the measures in support of the implementation of joint research agendas and financial support provided by funders, 2013



In the other 15 Member States the share of funder's budget dedicated to these issues is below the EU average or non-existent. Among them, in six cases (BG, CZ, DE, EL, ES, SI), the Commission could identify support for the implementation of joint research whilst in other countries (CY, EE, IE, LT, LV, UK), the Commission could not identify any explicit measure or strategy. In three cases, the funders did not report any support (HR, HU, SK).

Given the importance of the societal challenges that Europe is facing in addition to R&D budgetary evolutions presented above, Member States may consider the possibility of further coordinating their research efforts whilst allocating more resources to their implementation.

3.2.2. *International cooperation*

- *Member States are increasingly open to international cooperation*
- *Horizon 2020 is open to the participation of legal entities from across the world. The Commission will seek to enhance international cooperation through:*
 - *horizontal activities*
 - *targeted activities across the societal challenges*
 - *enabling and industrial technologies*
 - *other relevant parts of Horizon 2020*

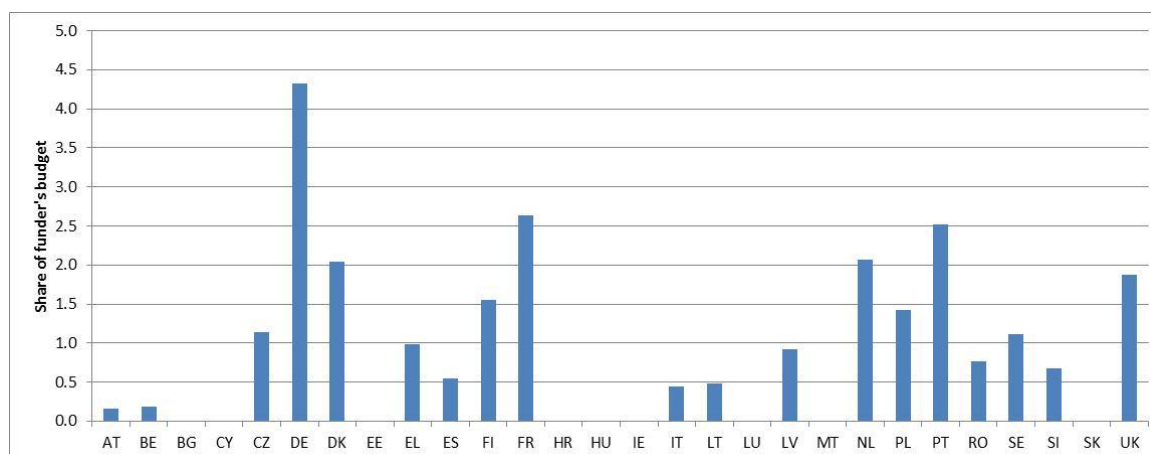
Openness of ERA to the rest of the world is an important factor for knowledge generation both in Europe and abroad. The Commission has been able to identify specific support in 12 Member States: AT, CZ, DE, DK, FR, IT, NL, RO, SE, SI, SK and the, UK. In three of these countries, new measures were proposed/adopted in 2014.

Regarding international cooperation, 85 % of the National Rectors' Conferences (NRCs) surveyed by EUA in 2013 indicated the existence of international research collaborations at national level. Results also showed that EU Countries partner with other EU Countries, Associated Countries and third countries on an equal basis (point validated by 90 % of the respondent NRCs). In particular, regarding bilateral agreements with third countries, NRCs indicated the existence of agreements with the United States of America, Canada, Japan, China, Brazil, and Russia. Other countries, such as India or South Africa, were also mentioned, although less frequently.

According to the ERA survey 2014 results, funders in more than half (17) of Member States allocate an average of 0.7 % of their budget to collaboration programmes with third countries, ranging up to almost 4.3 % in Germany¹⁷ (see Graph 9).

¹⁷ It should be mentioned that these figures concern funders which answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.

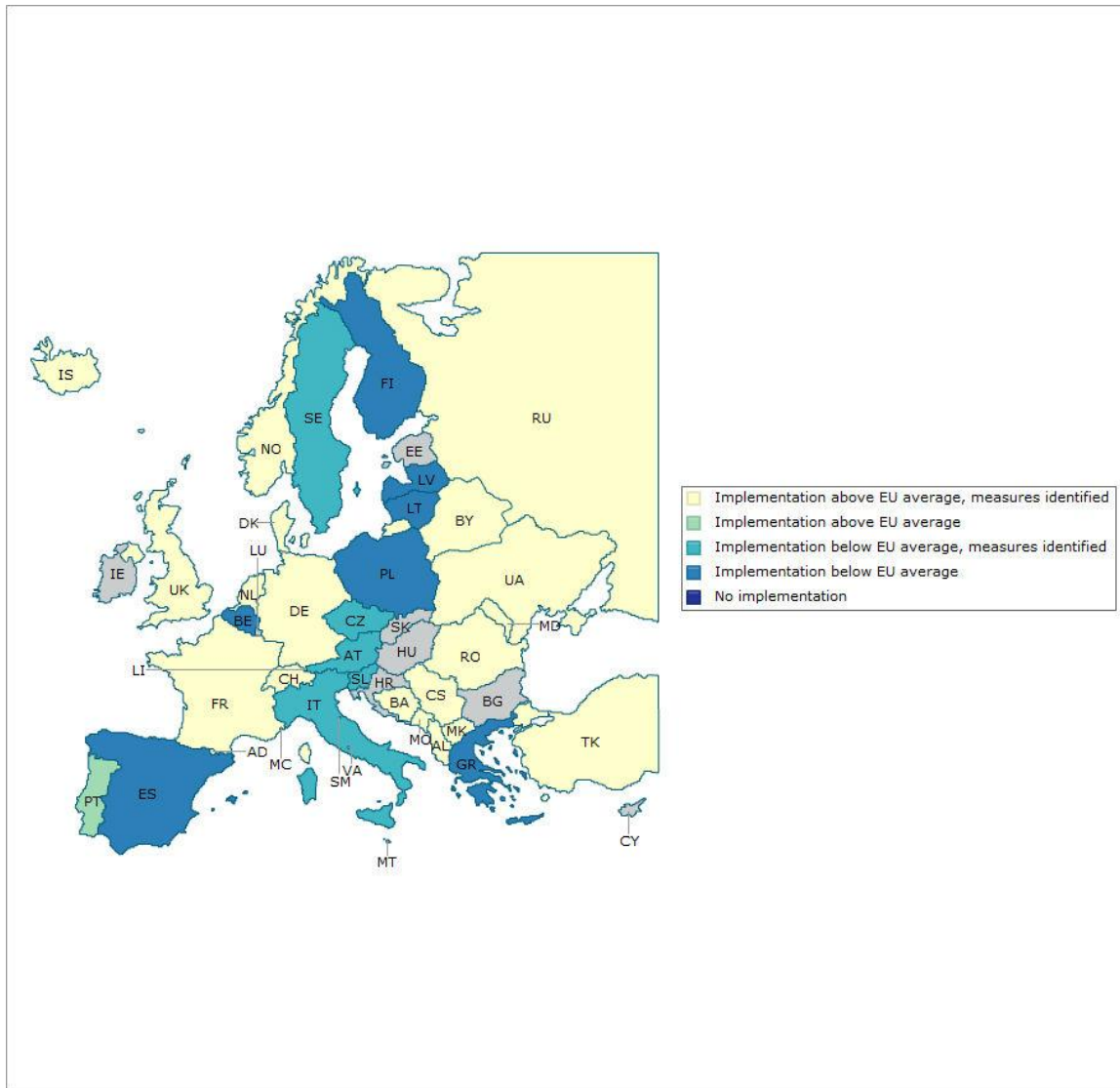
Graph 9: Share of R&D budget allocated to collaboration programmes carried out with third countries, 2013



Source: ERA survey 2014

In comparative terms (see Map 4), according to survey results among the funders in the 19 countries which indicated that they dedicate funding to international cooperation, in six of them funders dedicate a higher share of funding than the EU average (more than 2.4 % of their funding). Among them, in five countries (DE, DK, FR, NL, UK) the Commission could identify policy support. Funders declared that there is no budget allocated to these activities in BG, CY, EE, HR, HU, IE, LU, MT and SK.

Map 4: Classification of EU Member States according to the measures in support of collaboration with third countries and the share of funding allocated by funders to this type of activity, 2013



In the other 13 Member States there are two situations. In six countries (AT, CZ, IT, RO, SE, SI), the Commission could identify measures in support of international cooperation whilst in three others (BE, EL, ES, FI, LT, LV, PL), the Commission could not identify any explicit measure or strategy.

In order to step up the intensity of international cooperation in R&D, in September 2012 the Commission adopted a Communication entitled "Enhancing and focusing EU international cooperation in R&D: a strategic approach"¹⁸. With this Communication, the Commission called for making better informed, and therefore more strategic, choices as regards the areas selected for cooperation and the international partners with whom to engage, in particular with a view to preparing for the implementation of Horizon 2020.

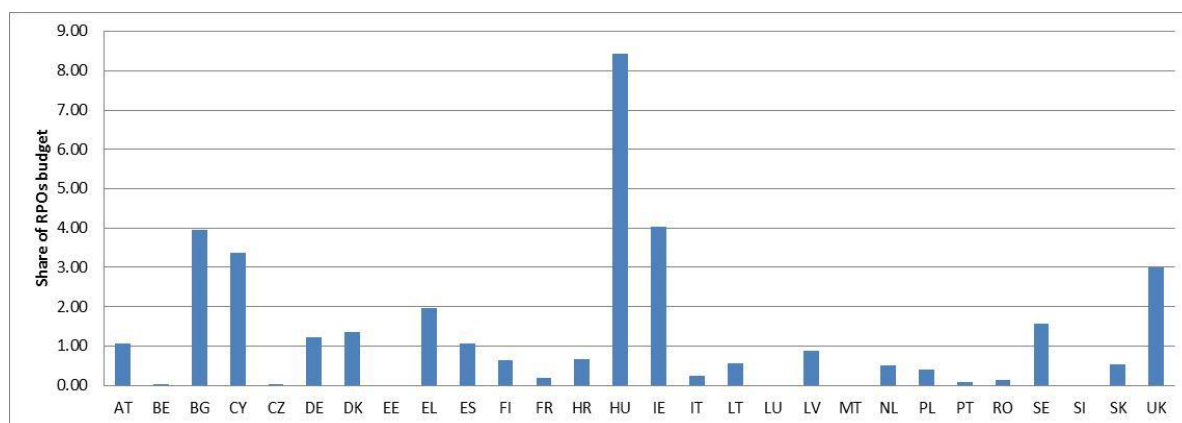
In line with the aim of the new strategy, the Commission's ambition is to increase the participation of legal entities from international partner countries in Horizon 2020 projects and, more generally, to enhance international cooperation activities supported or catalysed through Horizon 2020. Integrating international cooperation into the first Horizon 2020 work programmes, strengthening communication on the openness of Horizon 2020 to the participation of international partners and enhancing cooperation

¹⁸ COM(2012) 497

with the external funding instruments and overall EU external policies have been major points of attention during the two years of implementation of the Commission's new international cooperation strategy.

Another important factor linked with international cooperation is that RPOs may attract funding from third countries, both from the public and the private sector. The degree of funding received may reflect the attractiveness of the RPO in the country. According to the results of the ERA survey 2014¹⁹, research performers in 24 Member States receive part of their funding from third countries, ranging from very low shares up to almost 9 % in the case of Hungary (see Graph 10).

Graph 10: Share of organisations' R&D budget originating from third countries, 2013



Source: ERA survey 2014

3.2.3. Interoperability

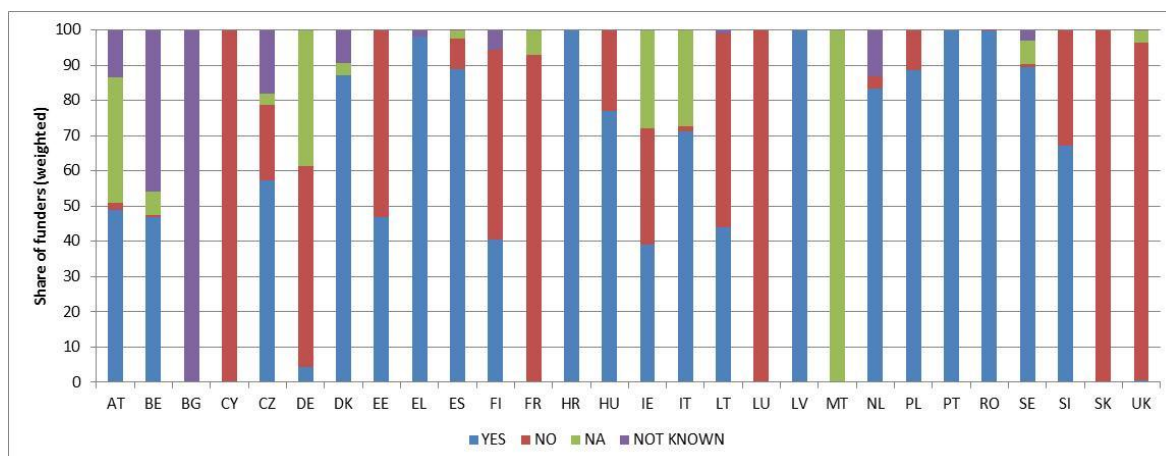
– *Mutual recognition of evaluation results is linked with funding allocation, opening the way for more interoperability*

Cross border cooperation and implementation of joint research agendas will be facilitated by the adoption of common procedures and standards, but also by delegating some of the task to other actors beyond the national borders. This is the case, for example, when funding agencies in one country fund their constituency on the basis of results of an evaluation carried out by a stakeholder in another country.

According to the ERA survey 2014, funders in 24 Member States can base their project based funding on evaluation results from non-national funders (see Graph 11), even if the proportion of funders which can do so varies significantly between countries. It should be recalled that these figures concern funders who answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.

Graph 11: Share of funders which can base their project based R&D decisions on peer reviews carried out by non-national funders, 2013

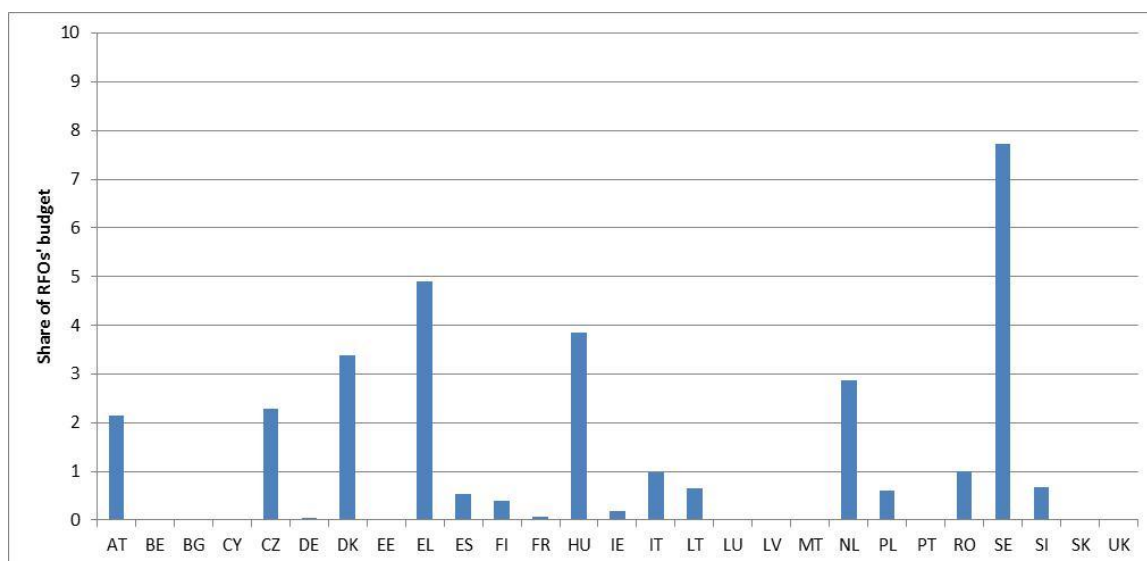
¹⁹ It should be recalled that these figures concern research performing organisations which answered the ERA survey in 2014, which employ 515,000 researchers (around 20 % of total EU researchers).



Source: ERA survey 2014

Also, according to the ERA survey 2014 results the proportion of funding allocated using this modality by funders which answered the survey varies greatly (see Graph 12).

Graph 12: Share of project based R&D budget allocated through peer review carried out by funders outside the country, 2013



Source: ERA survey 2014

NB: funders in Croatia which answered the ERA survey indicated that 100 % of their project based funding is allocated using this modality. It was not included in the graph to facilitate the presentation of the results for the other countries.

To facilitate interoperability, the Commission prepared and held a workshop on “Why and how to facilitate cross-border research operations in ERA?” in February 2013, addressing the issue of the potential ERA-Mark, proposed in the ERA Communication of July 2012, as a voluntary label for attesting that national research programmes possess criteria that would facilitate trans-national collaboration with other programmes. Key conclusions were that it is an interesting concept and that the ERA Mark could provide more action and evidence at EU-level. However, it was also concluded that it will need to be periodically renewed, opened to international partners and that a wide range of

stakeholders need to be involved in the development of the concept to make the ERA Mark happen (RPOs, the European Network of Innovation Agencies (TAFTIE), structural funds experts, etc.)

In addition, to test the feasibility of synchronised calls in Horizon 2020, in 2014 the Commission launched an open call (CSA) in order to fund the process. However, the Commission did not receive any proposals.

3.2.4. Financial commitments for the construction and operation of European Strategy Forum on Research Infrastructures (ESFRI), national, regional research infrastructures (RIs) of pan-European interest

- *The commitment to have completed or launched the construction of at least 60 % of the ESFRI roadmap projects by 2015 is in reach*
- *Member States should regularly report their financial contribution to the development of the RIs included in the ESFRI roadmap*
- *The development of the Charter of Access for Research Infrastructures is well advanced*

ESFRI is a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach. As confirmed by the Council on 26 May 2014, Member States commit to focus their available national resources on the respective prioritised projects in which they are financially participating.

The commitment under the Innovation Union of the Member States and the Commission to have completed or launched the construction of at least 60 % of the ESFRI roadmap projects by 2015 is in reach. The prioritisation of the ESFRI roadmap projects confirmed by Council in May 2014 will allow Member States and the Commission to give additional support for reaching this objective. Progress can also be seen from the report that is to be presented by the Commission to Council and Parliament, concerning the application of the European Research Infrastructure Consortium Regulation (ERIC) in which it is stated that although the take up of the new legal instrument was relatively slow, with the establishment of seven ERICs and the prospect of reaching about 15 ERICs in 2015, momentum seems to have been reached by Member States using this instrument which will lead to a further fulfilment of the ERA.

Most Member States (22) have national roadmaps for the development of RIs (AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, NL, PL, RO, SE, SI, SK, UK, soon HR)²⁰. Among these countries, the intention to contribute to the development of ESFRI in national roadmaps in 21 cases (AT, BE, BG, CZ, DE, DK, EE, ES, FI, FR, HU, IE, IT, LT, NL, PL, RO, SE, SI, SK, UK). Upon the Commission's request for the purpose of the current report, only two Member States (SE, UK) were able to report its financial contribution to the development of the RIs included in the ERA roadmap, while financial indications are present in several national roadmaps for RIs.

²⁰ In five cases, new developments have been observed since 2013 (DE, EE, NL, HR and BE).

Member States should enhance their efforts in identifying and reporting the actual financial contributions from the Member States to the development of the RIs included in the ESFRI roadmap.

3.2.5. Access to RIs of pan-European interest

The competitive and open access to high quality RIs supports and benchmarks the quality of the activities of European scientists and attracts the best researchers from around the world.

Under the Commission initiative, progress has been made in the development of a Charter of Access for Research Infrastructures which is to be published at the beginning of 2015 and would allow for a more efficient use of these European infrastructures by users from across Europe.

In addition, the Commission could identify the existence of a strategy to support the competitive and open access to RIs in 12 Member States (BG, EL, FI, FR, HU, IT, LT, NL, PL, RO, SK, UK) and specific supporting measures in AT, DE, EL, ES, HU, IE, LT, NL, PT and the UK.

3.3. An open labour market for researchers

An open and attractive labour market for researchers is an essential component of the ERA. Significant progress has been made in removing or alleviating some of the obstacles to mobility, improving doctoral training and making research careers more attractive, albeit to varying degrees across countries.

Across the EU, Member States and/or institutions have introduced a range of measures, programmes, strategies and legislative acts. This includes, for example, measures to make research a more attractive career option through the implementation of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. Work has also centred on enhancing the quality of doctoral training, in particular to prepare doctoral candidates for a career outside academia, and on measures to improve researchers' career development opportunities through, for example, life-long learning.

For its part, the Commission has focused efforts on a series of policy initiatives which have contributed to the overall progress. This includes further development of the EURAXESS network, in particular a large increase in the publication of research job vacancies, the revised "Scientific Visa Directive", the Human Resources Strategy for Researchers based on the Charter and Code, the European Principles of Innovative Doctoral Training and support for a new pan-European supplementary pension fund for researchers. Marie Skłodowska-Curie actions have also had a pronounced structuring impact on ERA by setting standards for research training, attractive employment conditions and open recruitment for all EU-researchers, and by aligning national resources as well as influencing regional or national programmes through the Co-fund mechanism.

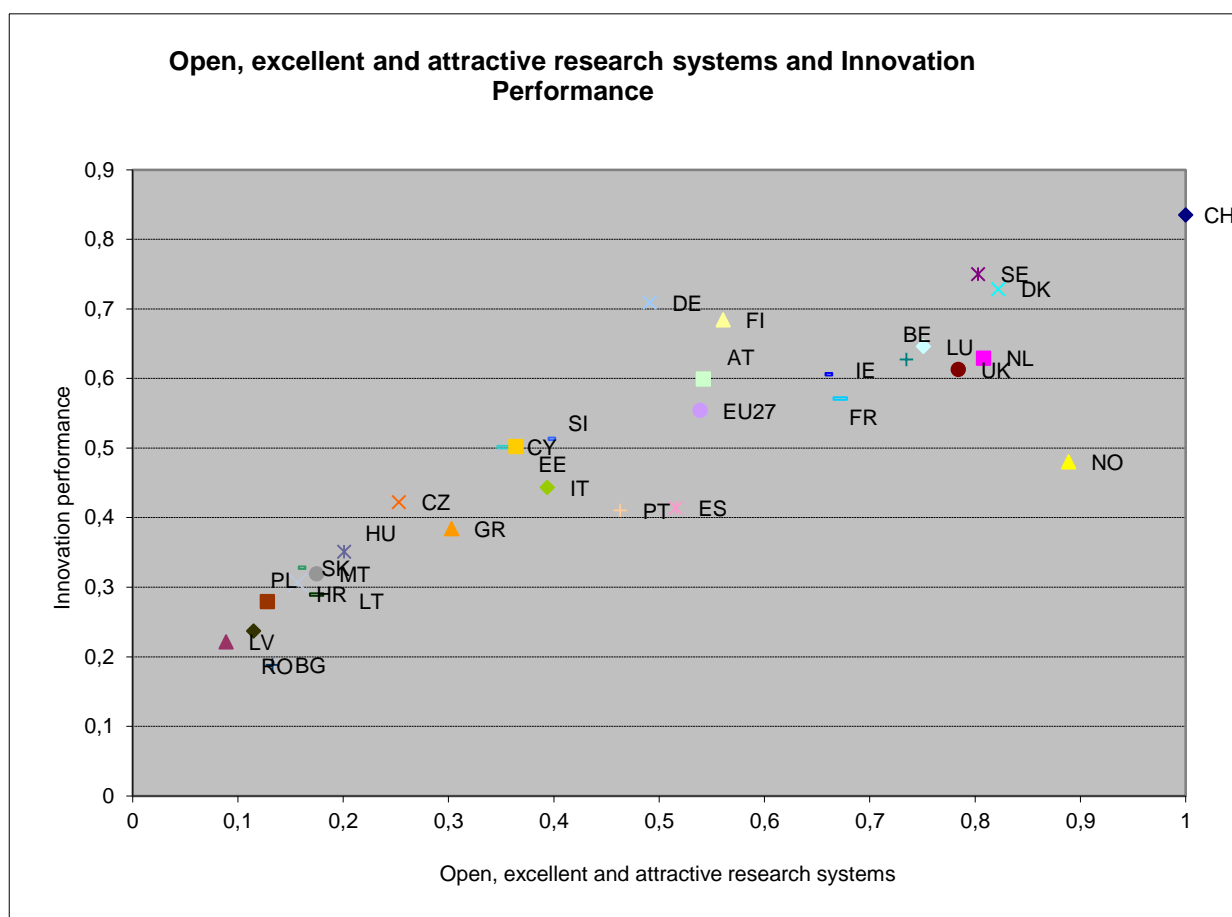
Progress has nevertheless been uneven and a number of challenges remain, in particular in a number of Member States where the lack of open, transparent and merit-based recruitment gives cause for concern, where intersectoral mobility is relatively low or where working conditions and career opportunities are rather limited. A concerted and

coordinated effort is needed from the Member States and institutions together with the Commission.

3.3.1. *Open, transparent and merit based recruitment of researchers*

Evidence shows that countries with open and attractive research systems are strong performers in terms of research excellence and innovation (see Graph 13). While several factors play a role in determining whether a system is open and attractive, it is clear that open, transparent and merit-based (OTM) recruitment is a prerequisite. Open competition enables hiring of the best researchers, at all career stages and fosters effective geographical mobility. This is important because recent research by the OECD²¹ shows that 'on average, the research impact of scientists who change affiliations across national boundaries is nearly 20 % higher than that of those who never move abroad.' OTM recruitment also has the potential to match supply and demand across Europe and can have a positive impact on equal opportunities for men and women.

Graph 13: Open, excellent and attractive research systems and innovation performance (2014)

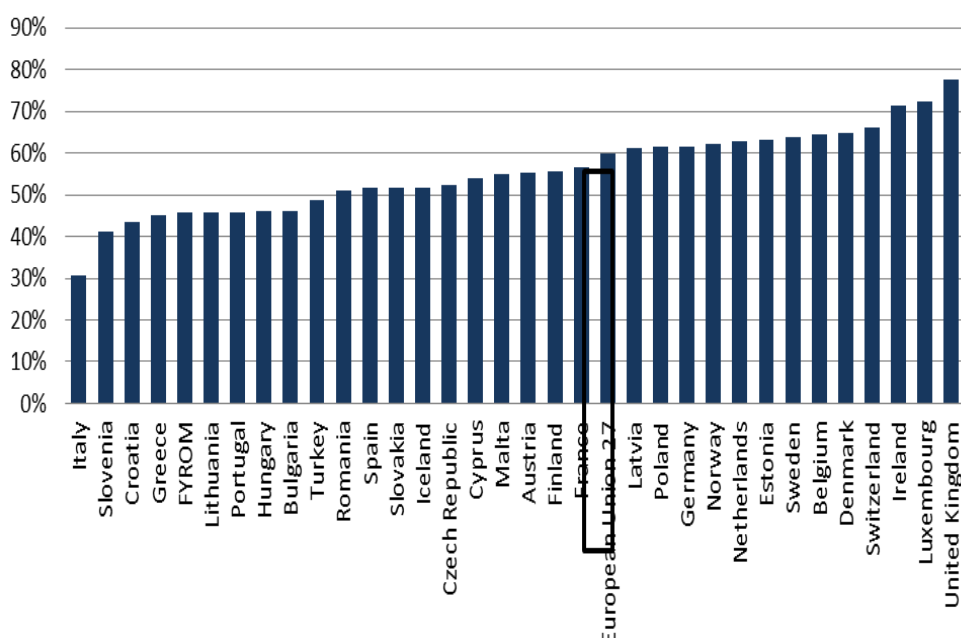


Source: DG Research and Innovation calculations based on Innovation Union Scoreboard 2014

²¹ OECD Science, Technology and Industry Scoreboard 2013 Innovation for Growth

While policymakers generally understand the recruitment systems in place to be OTM, a substantial share of researchers do not perceive OTM as such, which potentially acts as a major disincentive to start or remain in a research career. The results from the MORE2 survey demonstrate strong country specificity in levels of satisfaction with open recruitment. Additionally those in the early career researcher stages are most dissatisfied with the openness and transparency of their recruitment and female researchers show lower levels of satisfaction than males: data shows that around 40 % of researchers associated to European universities were 'dissatisfied' with the extent to which research job vacancies are publicly advertised and made known by their institution. This average masks significant differences between countries, e.g., while 22 % of researchers in the UK were not satisfied, the figures increased to 54 % in Portugal, 55 % in Greece and 69 % in Italy (see Graph 14).

Graph 14: Share of university-based researchers satisfied with the extent to which research job vacancies are publicly advertised and made known by their institution, Europe (2012) (%)



Source: MORE2 Study

The European Code of Conduct for the recruitment of researchers has had a positive but limited impact, due to its voluntary nature, on OTM recruitment procedures. Moreover, the majority of individual institutions which have received the Human Resources for Researchers Excellence logo have reviewed, or are in the process of reviewing, their recruitment processes. As part of Horizon 2020, there is now an obligation on beneficiaries (Article 32 of the Grant Agreement) to take all necessary measures to implement the Code of Conduct.

One prerequisite for OTM recruitment is to ensure publication of the vacancy. In this regard, following concerted efforts by the Commission, several Member States and institutions, the number of research vacancies posted on EURAXESS Jobs continues to grow from 7,500 in 2010 to over 40,000 in 2013. This excellent progress, which is helping to match demand and supply across borders, has been boosted by national legislation to make it mandatory for publicly funded institutions to advertise their

positions on EURAXESS (e.g. Poland, Croatia, Italy) or at least internationally (Austria). An increasing share of universities and other employers are also publishing vacancies. NordForsk has renewed its grant agreement for Nordic Centres of Excellence (NCoE) which includes a mandatory requirement, stating that any new positions funded by the NCoE grant shall be announced internationally in open competition and according to OTM recruitment procedures. Similarly, a survey carried out by the League of European Research Universities (LERU) in 2013 showed a high degree of compliance with OTM recruitment among its members.

In line with a recommendation by the European Research Area and Innovation Committee (ERAC) mutual learning workshop held in March 2014, the Commission intends to work closely with Member States and stakeholders to produce an OTM recruitment toolkit/practitioner's guide during 2015, including good-practice examples, templates, and other material useful for HR practitioners/employers of researchers.

3.3.2. Researchers' careers

Member States continue to support the implementation of the Charter and Code (C&C)²² which aims to improve researchers' working conditions. More than 480 organisations from 35 countries in Europe and beyond have explicitly endorsed the principles underlying the C&C. Many of them are membership or umbrella organisations.

The Commission's Human Resources Strategy for Researchers (HRS4R) supports institutions and funders in the implementation of the C&C principles in their policies and practices. Award of the 'HR Excellence in Research' logo recognises institutional progress in this process and helps institutions to promote themselves to prospective research talent as providers of a favourable work environment. Currently, more than 240 organisations are members of a Strategy Group. As of May 2014, more than 180 organisations have received the logo. A significant proportion of the awarded logos are within the UK which reflects the strong enabling framework provided by Vitae. Moreover, thirty stakeholder organisations in the UK have developed the 'Researcher Development Framework', a strategic agenda to train and support researchers and further improve their skills. In contrast, a number of other Member States²³ are underrepresented or absent altogether from the HRS4R.

A feasibility study on a possible certification mechanism for human resource management found little support among stakeholders. Nevertheless, the results showed strong support to continue with the HRS4R and to strengthen the procedure. A series of seminars with stakeholders is therefore being organised in 2014-2015 to see which areas of the C&C can be strengthened in the process. SHO partners in the ERA platform have encouraged their members to engage in the HRS4R process by organising working groups, high level discussions and workshops, launching surveys, and improving guidelines.

3.3.3. Support structured innovative doctoral training programmes

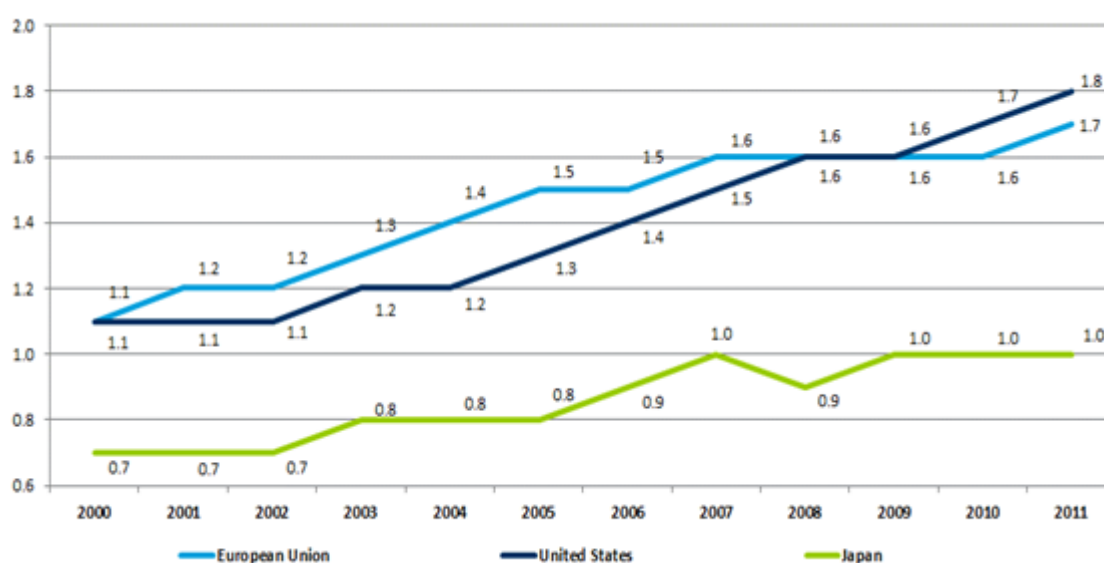
Europe has relatively few researchers employed in the private sector. They make up only 45 % of total researchers compared with 78 % in the US, 74 % in Japan and 62 % in

²² <http://ec.europa.eu/euraxess/index.cfm/rights/europeanCharter>

²³ <http://ec.europa.eu/euraxess/index.cfm/rights/strategy4ResearcherOrgs>

China. At the same time Europe continues to train an increasing number of PhDs (from around 72,000 graduates in 2000 to 115,000 in 2011), at a rate similar to the US and well above Japan (see Graph 15). Although the majority of PhD graduates will embark on careers outside of academia (evidence shows that in France, Germany and the UK over 50 % of all PhD degree holders now take up jobs outside academia), early stage researchers are often inadequately informed about career paths outside of academia and are not equipped with the necessary skills to work in industry and other relevant employment sectors.

Graph 15: New doctoral graduates per thousand population aged 25-34, EU-27, US and Japan, 2000-2011



Source: Eurostat Education Statistics

The seven Principles for Innovative Doctoral Training (IDTP), endorsed by the Council in 2011, aim to foster excellence and a critical mind-set and provide young researchers with transferable skills and exposure to industry and other employment sectors. Their wider uptake has been explored through a study²⁴ on the implementation of the principles in 2013 (with on-site visits to 20 universities in 16 countries) and Marie Skłodowska-Curie actions support. The study concluded that the principles are well-accepted, subscribed to by all target groups at institutional, doctoral, policy and non-academic levels and are considered as a 'guiding tool'. They are, however, 'not commonly known in the documented form. Similar ideas or principles, often worded differently, form the basis of doctoral training across Europe', although the understanding and implementation of the principles varies. Research excellence seems to be the 'leading' principle, based on quality assurance and attractiveness of the research/institutional environment.

Progress can be observed in several Member States although the challenge remains in the wider roll-out in terms of reach, financing and sustainability and the engagement of industry in PhD training. Examples of good practice include the German Research

²⁴ [http://ec.europa.eu/euraxess/pdf/research_policies/IDT %20Final %20Report %20FINAL.pdf](http://ec.europa.eu/euraxess/pdf/research_policies/IDT%20Final%20Report%20FINAL.pdf)

Foundation which has set up programmes such as research training groups (Graduiertenkolleg) or the graduate schools in the Excellence Initiative to increase the quality of doctoral training. Here the projects have to adhere to principles similar to the IDTP to receive the funding. Quality assurance is actively pursued in the Vienna Biocenter where a new position, the Scientific Coordinator, has recently been created to ensure the quality of the programme. The coordinator will also initiate changes to the programme e.g. regarding the curriculum (for example, integrating transferable skills training into the curricula in the context of an introductory training course), internal communication and information provision. Interdisciplinarity is at the heart of doctoral education at the University of Ljubljana. In doctoral training the teaching as well as the research is interdisciplinary. Promoting interdisciplinarity has contributed to an increase of intra- and inter-institutional cooperation and some efficiency gains have also been reported. At the Tallinn University of Technology (Estonia), doctorate holders are encouraged to go abroad for a post-doc period and indeed need to do so in order to apply for funding.

The Marie Skłodowska-Curie actions will enable around 25,000 doctoral candidates to be recruited by 2020 to high-quality programmes in Europe. These will provide experience outside academia, hence developing increased employability skills amongst PhD holders.

The European University Association (EUA)'s Council of Doctoral Education (EUA-CDE) has been a strong advocate and promoter of doctoral education and training reforms through its 'Salzburg Principles', 'Salzburg II Recommendations' and has contributed to the development of the 'Principles for Innovative Doctoral Training'.

3.3.4. *Removing the barriers to international mobility*

The researcher population is highly mobile internationally. Around 31 % of EU post-PhD researchers have worked abroad (EU or worldwide) as researchers for more than three months at least once during the last ten years.²⁵ In terms of impact, the perception among the majority of researchers is that the mobility experience is largely positive. For example, 80 % of internationally mobile researchers felt that the mobility had a positive impact on developing their research skills. More than 60 % believed that mobility had (strongly) increased their 'research output' (quality of output, citation impact, patents, number of co-authored publications, etc.). And 55 % of researchers thought that career progression had increased as a result of their mobility. It is important to note, however, that a significant proportion (40 %) of mobile researchers perceived their mobility experience as having had a negative effect on two particular aspects, namely their 'job options' and 'progression in their remuneration'. The reasons behind this are as yet unclear but include issues such as a lack of recognition of mobility and 'forced' mobility.

EU-wide, 68 % of doctoral candidates are nationals studying in their own country.²⁶ A further 8 % are EU nationals studying in another EU country. The remaining 24 % are from outside the EU. France (35 %) and the UK (31 %) have relatively high proportions of non-EU doctoral candidates as a percentage of all doctoral candidates in their respective countries. The highest number of non-EU doctoral candidates enrolled in the EU came from China (7,523) followed by Brazil (3,400), the United States (3,243), Mexico (3, 206) and India (2,903). Numbers from China and India have increased significantly in recent years.

²⁵ MORE2 Study on mobility and career paths of researchers

²⁶ Eurostat Education Statistics

The Commission, in cooperation with Member States, has initiated a wide range of initiatives to facilitate researchers' mobility and increase the attractiveness of Europe as a destination for leading researchers. These include measures to facilitate access to information on mobility via EURAXESS, the 'Scientific Visa' package facilitating administrative procedures for third country researchers entering the European Community as well as Marie Skłodowska-Curie actions and Destination Europe Events.

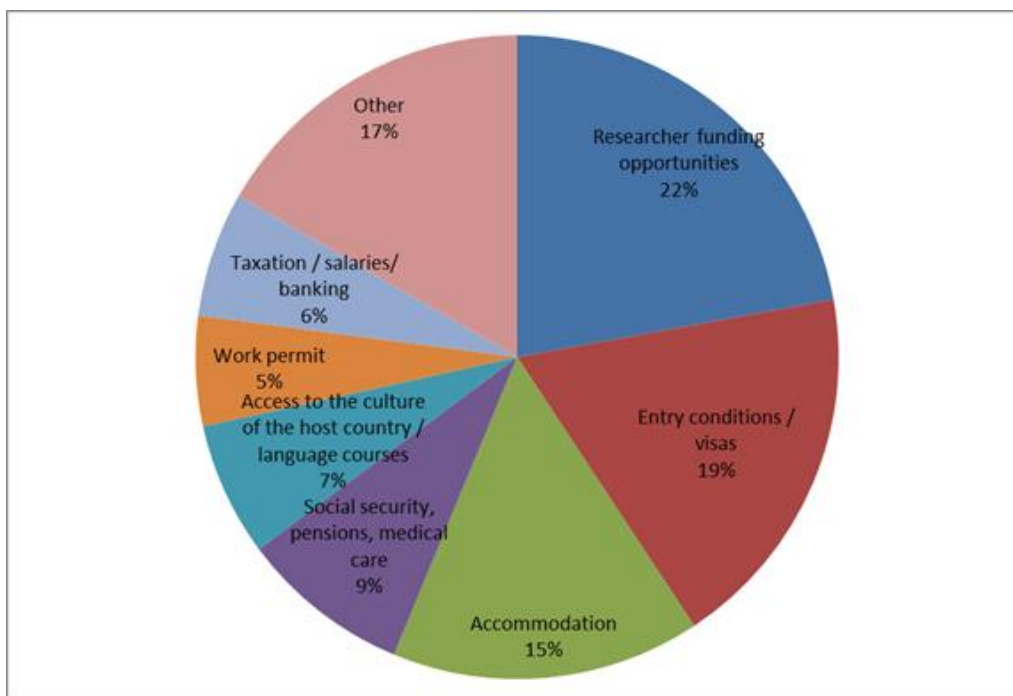
In addition, many Member States have introduced national mobility schemes to boost different types of researcher mobility (inward, outward and cross-sectoral). Many of these schemes promote inward mobility from both EU and non-EU countries providing financial incentives for early stage researchers. The KOLUMB Programme (Poland), for example, awards fellowships to the best young scholars to enable them to stay (from 6-12 months) at the world's leading research centres. Non-financial incentives include measures promoting 'dual careers', such as the Dual Career Network (France, Germany and Switzerland). Some countries provide tax incentives to facilitate researchers' mobility in Europe while others such as Ireland offer special visas to attract researchers to engage in research.

3.3.4.1. EURAXESS

EURAXESS continues to play a key role for researchers wishing to pursue their careers in Europe. More than 200 EURAXESS Service Centres in 40 European countries are responding to the increasing demand for information and assistance with more than 900,000 queries in the past six years. In 2013, EURAXESS Ireland launched a new Industry User Interface for business users. Companies can advertise vacancies, search an online database of researchers' CVs, access the fast track research visas system and search for funding support opportunities. The Commission is exploring the possibility of rolling this out to other countries so that business users across Europe will have a tailored interface.

EURAXESS Links continue to support European researchers in the US, Japan, China, India, ASEAN region and, as of 2013, Brazil and Canada. Its mandate has been extended to also support non-European researchers wishing to move to Europe. For example, EURAXESS Links information officers act as intermediates between the non-EU country and a EURAXESS Service Centre, thus speeding up the provision of information.

Graph 16: Types of queries received by EURAXESS Service Centres 2010-2013



Source: DG RTD - EURAXESS statistics

3.3.4.2. Visa procedures

Fast-track immigration is an important consideration for internationally mobile researchers and is thus an important factor in helping attract the best global talent to Europe. In March 2013, the Commission proposed a recast of the Scientific Visa Directive that will set clearer time limits for national authorities to decide on applications; provide researchers with greater opportunities to access the labour market during and after their stay, and facilitate mobility within the EU. The proposed Directive is under negotiation by the European Parliament and Council.

3.3.4.3. Social security obstacles for mobile researchers

Mobile researchers face obstacles related to social security, in particular with regard to their pensions. To respond to this need, the Commission is committed to supporting stakeholders in setting up pan-European supplementary pension fund(s) for researchers. A Task Force was created in 2013 to prepare a proposal on the establishment of a pan-European Retirement Savings Vehicle (RESAVER) for professionals employed by research organisations. The Commission has foreseen funding under Horizon 2020 to sponsor the set-up of notably the Institutions or Occupational Retirement Provision (IORP), the insurance scheme as well as the functional administration, including the selection of provider(s). The fund should become operational in early 2015.

3.3.4.4. Cross-border access to and portability of national grants

In January 2014, Science Europe published a 'Practical Guide to Three Approaches to Cross-border Collaboration'. This guide provides Science Europe Member Organisations and other research organisations with information and advice on three optional models of collaboration: Money follows Researcher (MfR), Money follows Co-operation Line and Lead Agency Procedure.

Related to the above, Science Europe Member Organisations have been invited to sign a new ‘Letter of Intent’ to indicate their intention to implement MfR, where relevant. This is an agreement that can allow a researcher to take the remainder of a grant with them when moving to a new country, and is therefore a model of grant portability. Signatories commit to providing publicly-available information on how this is organised in their institution, thus improving the transparency and visibility of MfR. The Science Europe website will list participating institutions.

3.3.5. Support mobility between private and public sector

Member States have put in place various measures to boost partnerships between universities, research institutions and private companies and to better align the skills acquired with the skills needed. These include the implementation of joint projects, commercialisation programmes, research traineeships in companies, inter-sectoral mobility programmes and industrial PhD programmes. For example, the Danish Industrial PhD Programme aims to offer doctoral training in cooperation with the industry sector. It is a three-year research project and research training programme with an industrial focus conducted jointly by a private company, an industrial PhD candidate and a university. It inspired the European Parliament to fund the kick-start of the MSCA European Industrial Doctorates. The Fraunhofer Society in Germany offers doctoral candidates the possibility of pursuing a PhD in applied research in close collaboration with industry. In addition, in order to be appointed to a professorship in engineering at a university, or a professorship in any subject at a university of applied sciences, applicants need to have gained professional experience outside of academia. The University of Porto has – in cooperation with other Portuguese universities and companies – a PhD programme that is funded by a new scheme of the national funding agency to intensify university-industry collaboration.

It is important to note however that, in terms of intersectoral mobility, only 4 % of PhD candidates have experience of working in private industry during their PhD²⁷. The extent of moving out of public sector research into the private sector for a short period during doctoral studies or thereafter is still very much the exception, even though it is perceived as potentially beneficial for a researcher’s career, access to funding and the exploitation of research results. The topic was addressed at an ERAC Mutual Learning Workshop on Human Resources and Mobility in March 2014 which put forward a series of recommendations.²⁸

The European University Association (EUA) has conducted extensive work on the doctoral level, including through the DOC-CAREERS II project which looked solely at how universities work with their regional partners in doctoral education across Europe. The regional focus of the action allowed EUA to identify examples of university collaboration with local SMEs, large R&D enterprises, RTD performers, NGO’s and other sectors (health care, cultural, etc.).

²⁷ MORE2 study

²⁸ [http://ec.europa.eu/euraxess/pdf/research_policies/ERAC %20Final %20Report.pdf](http://ec.europa.eu/euraxess/pdf/research_policies/ERAC%20Final%20Report.pdf)

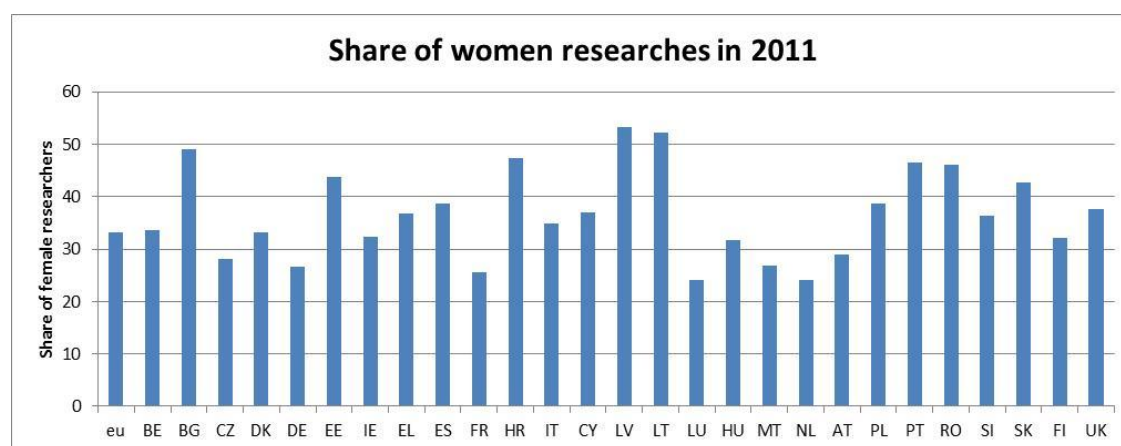
3.4. In terms of gender equality and gender content in research

3.4.1. Gender equality in research

- *Specific national policies on gender equality in public research have been adopted in 17 countries.*
- *A high share of respondent RPOs implement Gender Equality Plans (GEP) and/or recruitment/promotion policies for female researchers in countries where national laws or strategies for gender equality in public research have been set up. A similar trend/situation cannot be found in the responses of the funders.*
- *There are still big differences among Member States, funders and RPOs concerning gender balance in decision-making bodies.*
- *Although the inclusion of the gender dimension in research content and programmes is mentioned by more countries than in 2013, the level of implementation remains insufficiently supported.*
- *Gender equality and gender dimension in research content has been reinforced in Horizon 2020.*

Gender equality in research is essential not only because it is fair, but notably because it helps cope with current and future deficits in skilled labour within the EU. However, in 2011 disparities remained (see 19).

Graph 17: Share of women researchers, 2011 (headcount)



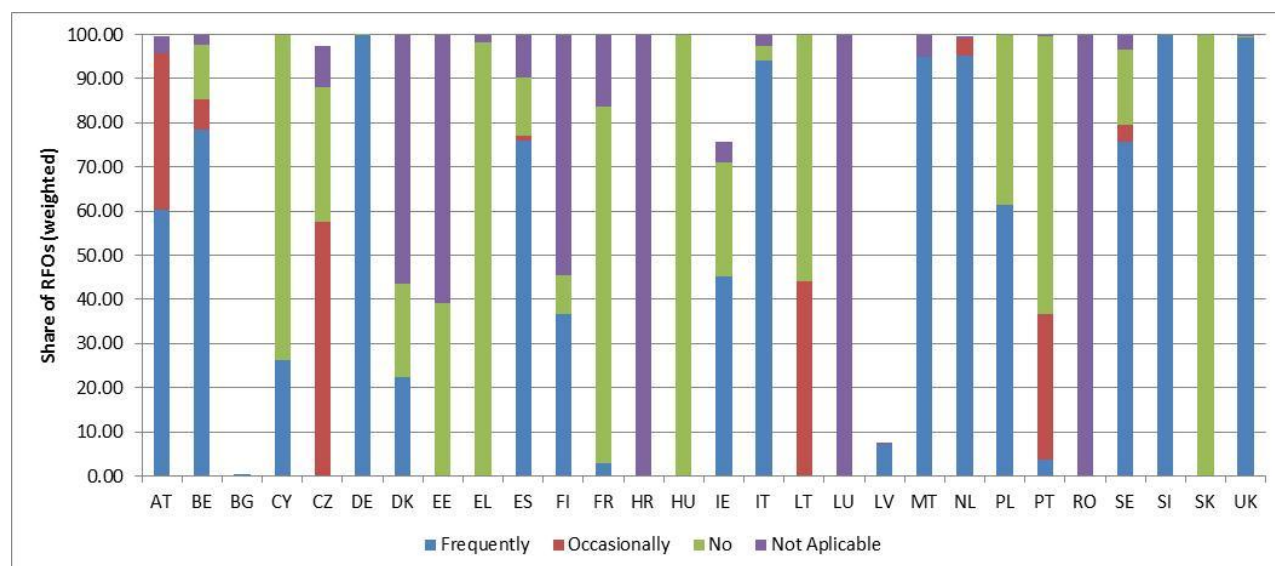
Source: Eurostat

The Commission could identify that 17 Member States have developed gender equality strategies in public research to various degrees (AT, BE, BG, CZ, DE, DK, EE, EL, ES, FI, FR, HR, LT, NL, SE, SI, UK), among which eight countries have specific laws/acts regulating gender equality in public research (AT, BE, EL, ES, FI, FR, HR, PL).

According to the ERA survey 2014 results, the share of respondent funders which support gender equality frequently in their research programmes and/or projects was

higher in six Member States than the EU average (82.2 %) ²⁹. Among these, in four cases the Commission could identify measures or strategies at national level to improve gender equality in public research (DE, NL, SI, UK) (see Graph 18).

Graph 18: Share of funders frequently supporting gender equality in research and the inclusion of gender dimension in research content, 2013



Source: ERA survey 2014

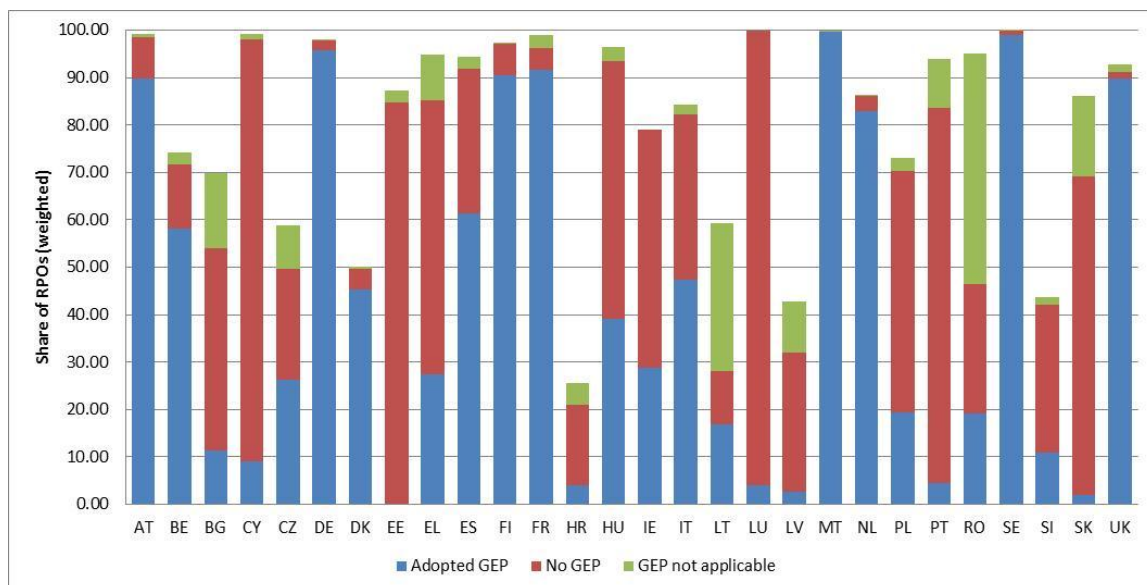
In 22 Member States the share of funders which frequently support gender equality is below the EU or non-existent. Among these, in nine cases (AT, BE, BG, CZ, DK, ES, FI, FR, SE) the Commission could identify measures or strategies to improve gender balance in public research institutions.

In order to reinforce gender equality, the RPOs can adopt and implement Gender Equality Plans (GEPs). According to the results of the ERA survey 2014, 64 % of the respondent organisations implement such a plan ³⁰ (see Graph 19). It should be noted that a large share of organisations in some countries (up to more than 70 % in the case of Croatia) did not provide an answer to this question. In addition there are big differences across countries.

Graph 19: Share of RPOs which have adopted GEPs, 2013

²⁹ It should also be mentioned that these figures concern funders which answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.

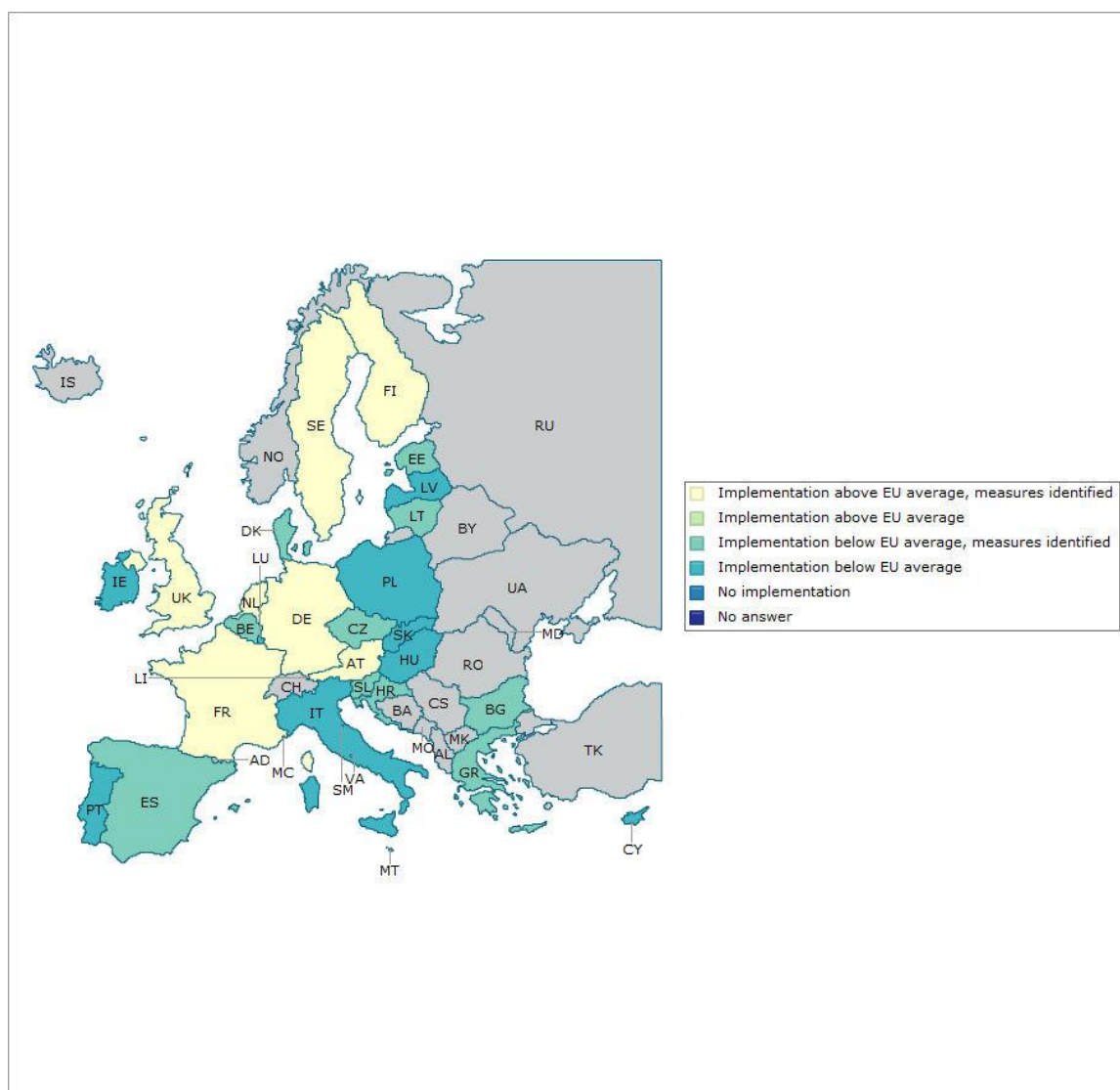
³⁰ It should be noted that these figures concern RPOs which answered the ERA survey in 2014, which employ 515,000 researchers (around 20 % of total EU researchers).



Source: ERA survey 2014

In comparative terms (see Map 5), according to survey results the share of RPOs which have adopted GEPs is above the EU average in eight Member States (AT, DE, FI, FR, MT, NL, SE, UK). Among these, in seven cases the Commission could identify measures or strategies to improve gender equality in public research (AT, DE, FI, FR, NL, SE, UK).

Map 5: Classification of EU Member States according to measures supporting gender equality and the adoption of GEPs, 2013



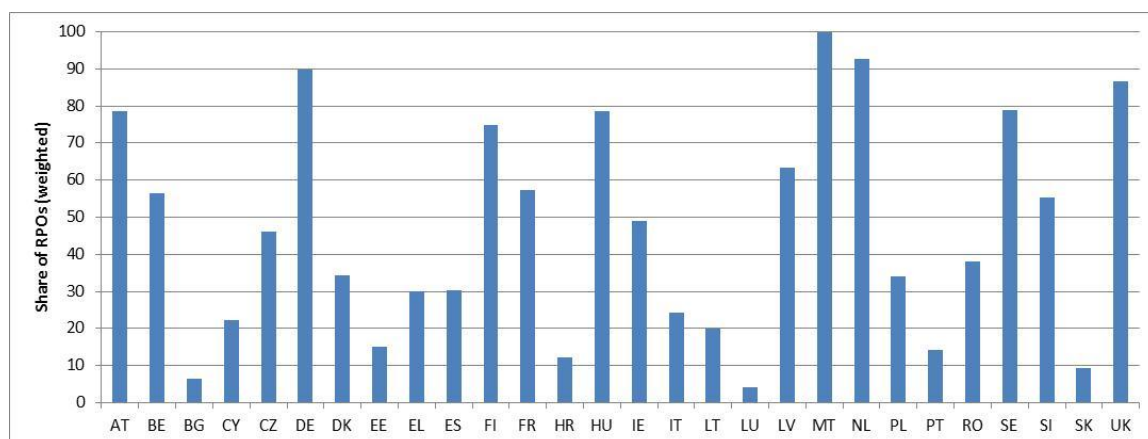
Among the other 20 countries, in ten cases the Commission could identify supporting provisions (BE, BG, CZ, DK, EE, EL, ES, HR, LT, SI). In ten other countries (CY, HU, IE, IT, LU, LV, PL, PT, RO, SK) the Commission could not identify any provision.

In terms of recruitment of female researchers in public research, the Commission could identify specific support in the following Member States: AT, BE, DE, DK, EL, ES, HR, NL, SE, UK. The latter has recently (May 2014) announced a call to action to boost women's participation in technology and engineering.

In terms of implementation of recruitment and promotion policies for female researchers, according to the ERA survey 2014 results, an average of 59 % of respondent RPOs are implementing recruitment and promotion policies³¹. However, the share of institutions implementing them varies significantly among countries (see Graph 20).

³¹ It should also be mentioned that these figures concern RPOs which answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

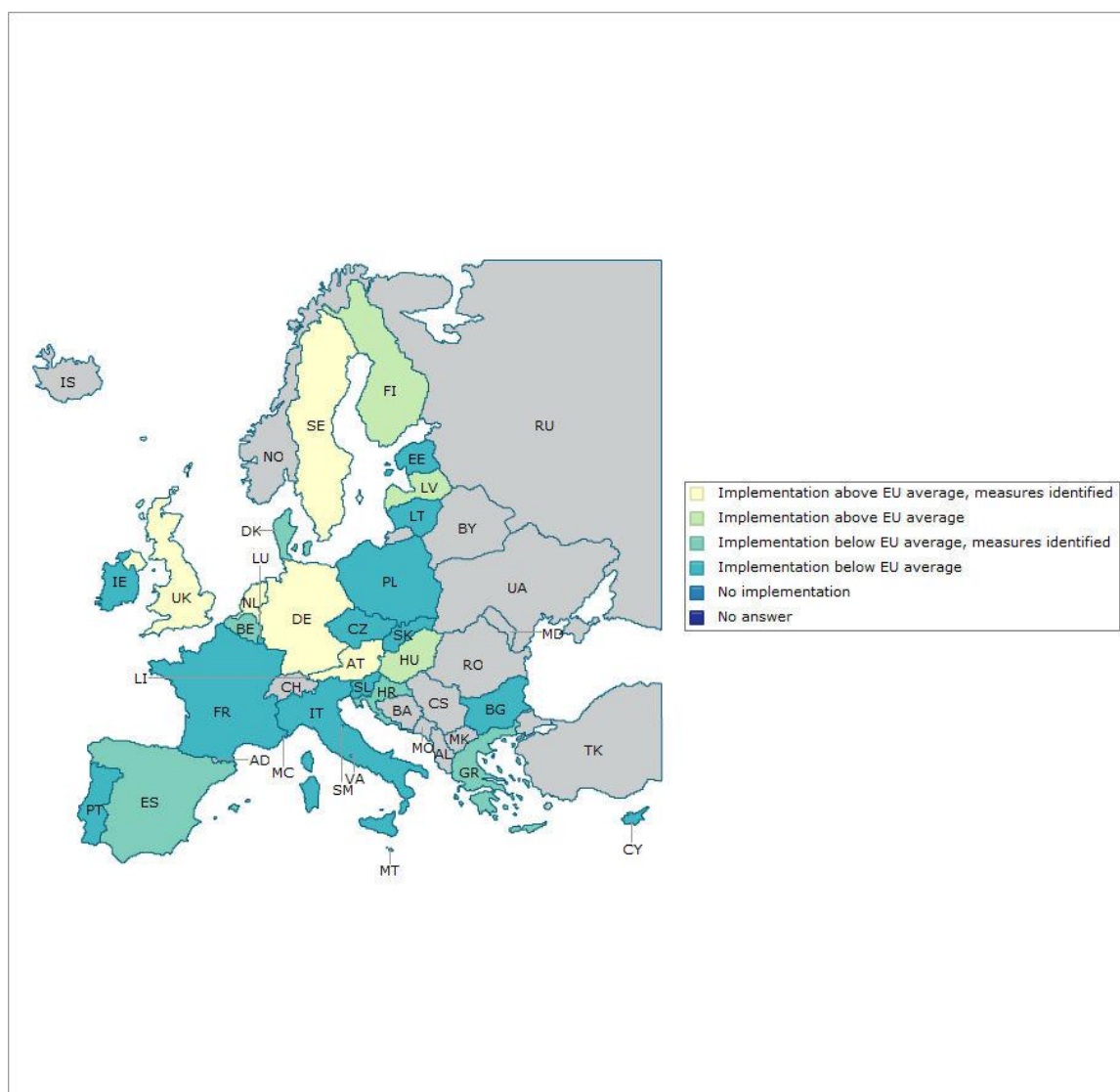
Graph 20: Share of RPOs implementing recruitment and promotion policies for female researchers, 2013



Source: ERA survey 2014

In comparative terms (see Map 6), according to the ERA survey 2014 results, the share of respondent RPOs which implement recruitment and promotion measures for female researchers is above the EU average in nine Member States. Among these, in five cases the Commission could identify specific policies for recruitment of female researchers at national level (AT, DE, NL, SE, UK).

Map 6: Classification of EU Member States according to the measures in support of recruitment and their implementation by RPOs, 2013



Among the other 19 Member States, where the share of respondent RPOs supporting the implementation is below the average, the Commission could identify that in five of them (BE, DK, EL, ES, HR) the authorities have specific policies for recruiting women researchers. In BG, CY, CZ, EE, FR, IE, IT, LT, LU, PL, PT, RO, SI and SK, the Commission could not identify any measures.

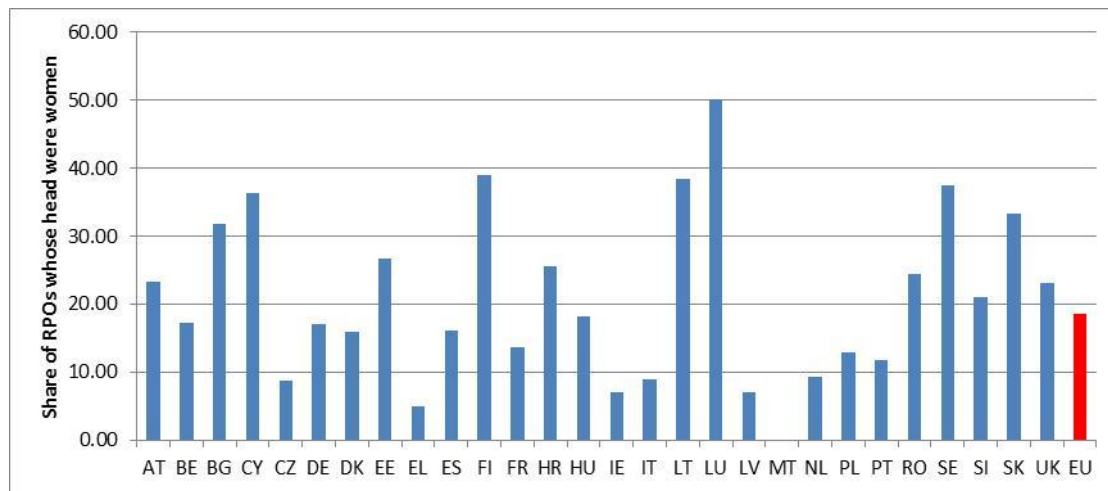
3.4.2. Gender balance in decision making process

At the level of decision making in public research institutions, the Commission could identify national initiatives to improve gender balance in senior positions (AT, BE, DE, DK, HR, NL), quotas (AT, BE, EL, ES, FR, LU), targets (AT, DE, DK, EL, ES, FR, HR, IT, SE, SI) and/or awards (AT, BG, CZ, DE, DK, FR, HR, HU, IE, IT, NL, PL, PT, RO, SE, SI).

According to the results of the ERA survey 2014 the proportion of organisations whose heads were women is 18 % on average, with strong variations among countries, ranging from 5 % in EL to 50 % in LU^{32 33} (see Graph 21).

³² In Malta, the heads of the three organisations who answered the survey are men.

Graph 21: Share of RPOs whose heads were women, 2013

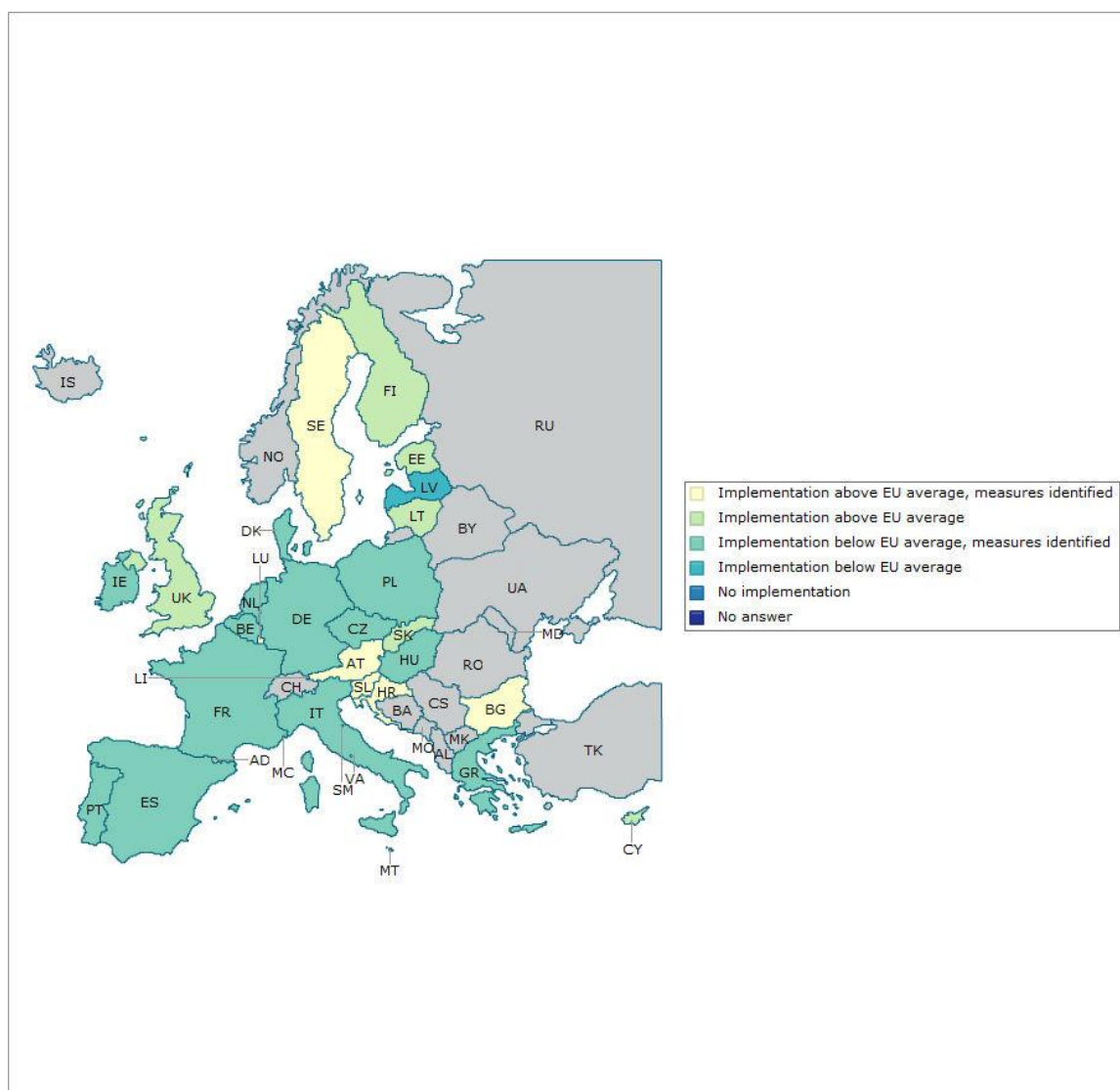


Source: ERA survey 2014

In comparative terms (see Map 7), according to survey results the share of organisations with women heads of institutions is above the EU average in almost half (13) of Member States.

Map 7: Classification of EU Member States according to the support to improve gender balance in the decision making process and the share of women who are heads of RPOs, 2013

³³ It should also be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

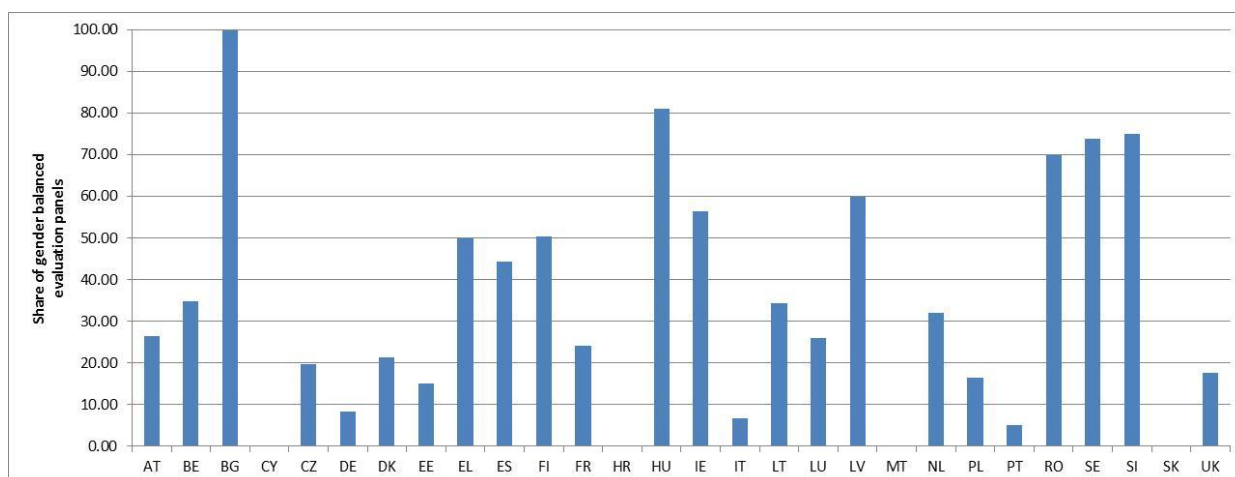


Among the countries where the share of institutions headed by a woman is below the EU average, the Commission could identify national initiatives for the access of female researchers to senior positions in BE, DE, DK and NL, but no initiatives in CZ, EL, ES, FR, HU, IE, IT, LV, PL and PT.

Another important issue is the participation of the underrepresented sex in evaluation and recruitment panels. A target of a minimum of 40 % for all panels has been agreed. According to the results of the ERA survey 2014, 35.8 % of research evaluation panels include at least the 40 % target of the underrepresented sex in their composition³⁴. The share varies significantly among the responding funders (see Graph 22).

Graph 22: Share of gender-balanced research evaluation panels in funders, 2013

³⁴ It should be recalled that these figures concern funders who answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.

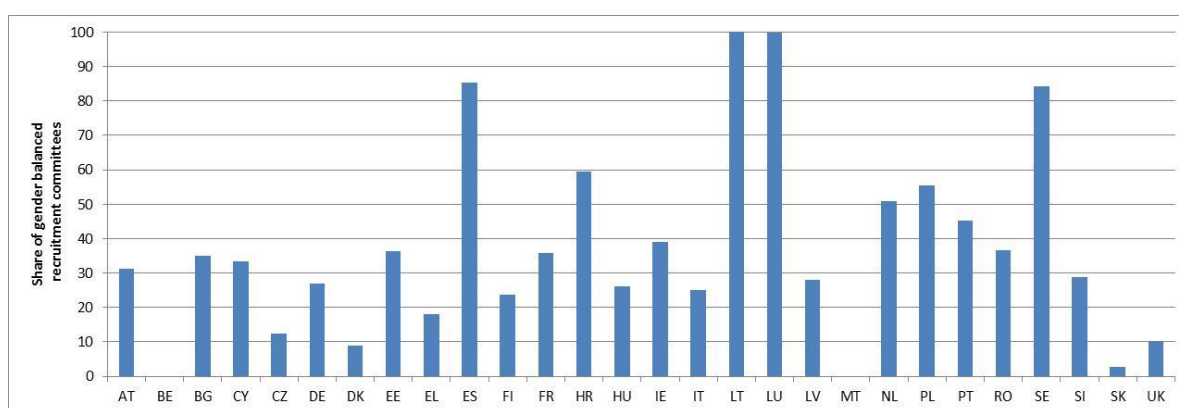


Source: ERA survey 2014

In comparative terms, the share of gender balanced evaluation panels in funding is above the EU average in ten Member States. Respondent funders in three countries (CY, MT, SK) did not identify any gender balanced evaluation panel, and one Member State (HR) did not provide information on this issue.

According to the results of the ERA survey 2014, on average 36.6 % of recruitment committees of RPOs in the EU respect the 40 % target of under-represented balance in their composition (see Graph 23). It should be recalled that these figures concern RPOs who answered the ERA survey in 2014, which employ 515,000 researchers (around 20 % of total EU researchers).

Graph 23: Share of gender-balanced recruitment committees for leading researchers in RPOs, 2013



Source: ERA survey 2014

In comparative terms, gender balanced recruitment committees are above the EU average in nine Countries (ES, HR, IE, LU, NL, PL, PT, RO, SE).

The Commission continues to enforce the target of 40 % of the under-represented sex which is set in evaluation panels and expert groups. For advisory groups, the target is

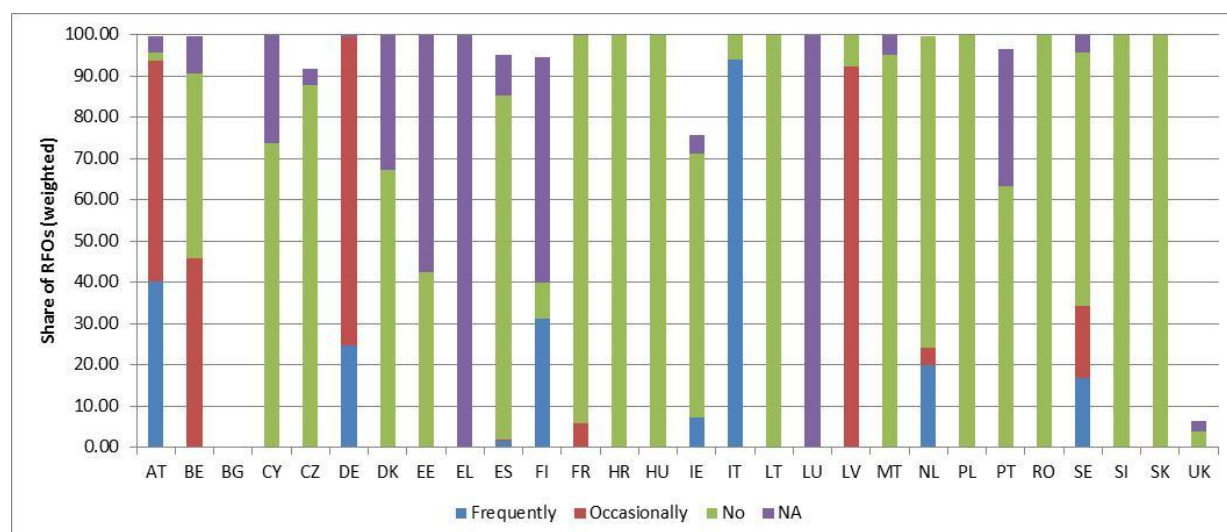
raised to 50 % and each advisory group includes at least one expert with gender expertise.

3.4.3. Gender dimension in research content/programmes

The consideration of the gender dimension contributes to improve excellence and pertinence of research. The Commission could identify that provisions for the inclusion of the gender dimension in research contents/programmes are in place in ten Member States (AT, DE, DK, ES, FR, IE, IT, NL, SE, SK).

According to the ERA survey 2014 results, funders in only a few countries support the inclusion of the gender dimension in research content/programmes. In eight countries respondent funders answered that the gender dimension is **frequently** integrated in research content³⁵ (see Graph 24). The share is very high in the case of IT, which influences the EU average strongly.

Graph 24: Share of funders supporting gender equality in research and the inclusion of the gender dimension in research content, 2013

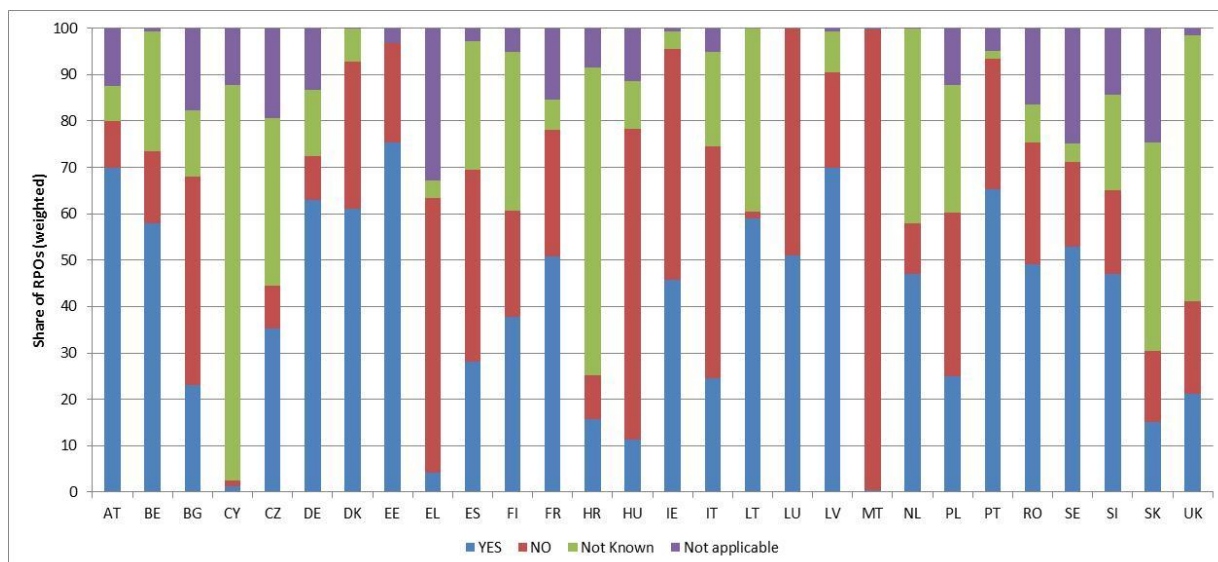


Source: ERA survey 2014

In comparative terms (see Map 8), according to survey results the share of respondent funders supporting the frequent inclusion of gender dimension in research content/programmes is above the EU average in one Member State.

Map 8: Classification of EU Member States according to the support to the inclusion of gender content in research programmes and frequent support provided by funders, 2013

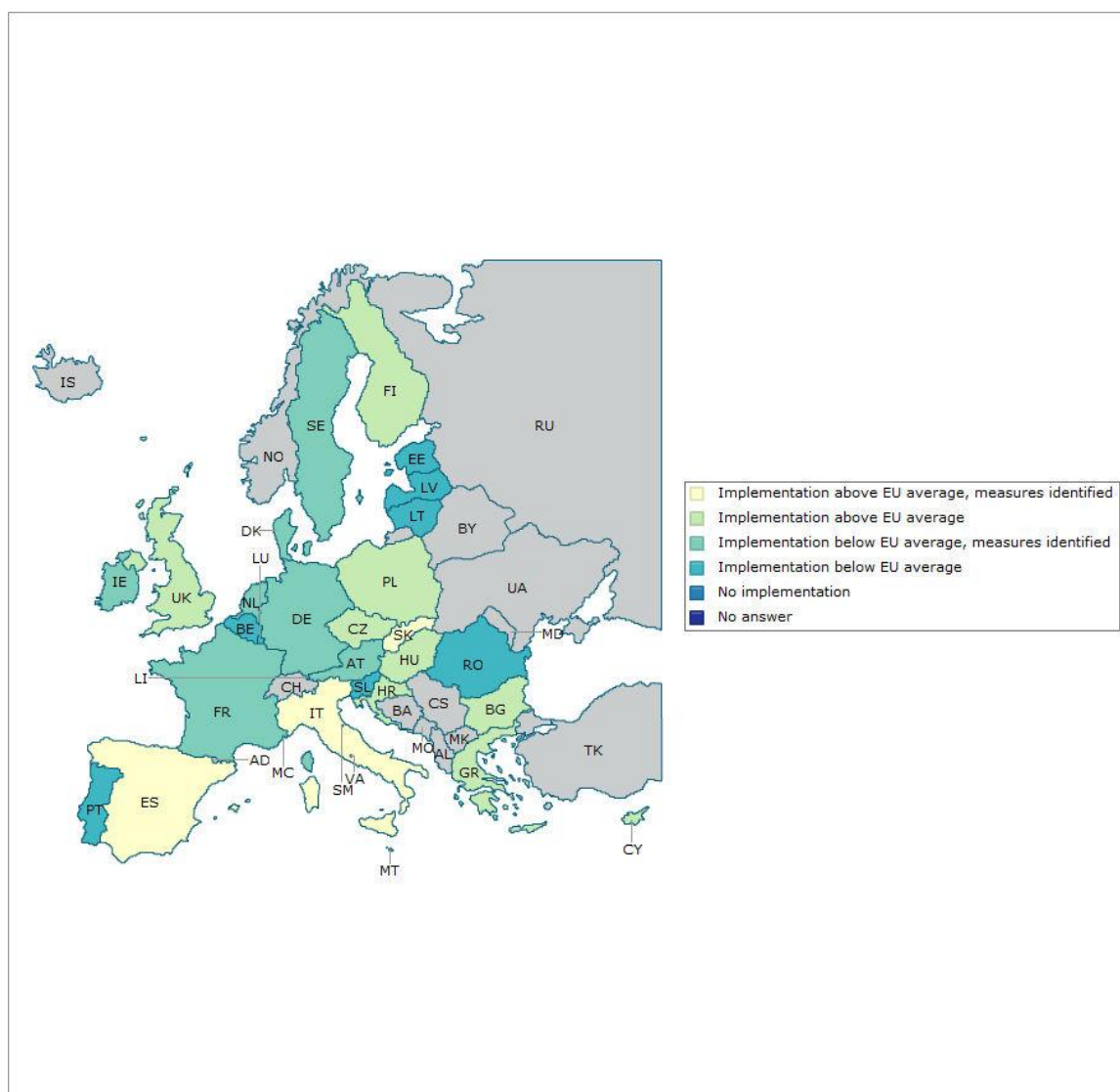
³⁵ It should be noted that these figures concern funders which answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.



Source: ERA survey 2014

In comparative terms (see Map 9), according to survey results in almost half (13) of Member States the share of research performing organisations including the gender dimension in research content is above the EU average.

Map 9: Classification of EU Member States according to the support to the inclusion of gender contents in research programmes and the implementation by research performing organisations, 2013



Among the other countries, where the share of organisations is below the EU average, eight countries have measures in this area (AT, DE, DK, IE, FR, IE, NL, SE).

3.4.4. Gender equality at EU level

Gender equality has been reinforced in Horizon 2020. The Commission is pursuing an effective application of the new gender equality provisions of Horizon 2020. This means integrating gender equality issues at each stage of the research cycle, from programming through implementation, monitoring and programme evaluation. To stimulate applicants' engagement at proposal level, gender balance in research teams is one of the ranking factors to prioritise proposals with the same scores. In Horizon 2020, applicants are invited to describe, where relevant, how sex and/or gender analysis (i.e. the gender dimension) is taken into account in their project's content. The gender dimension is explicitly integrated in more than a hundred topics across all sections of the Horizon 2020 Work Programmes 2014-2015. Topics with an explicit gender dimension are flagged, to facilitate their identification by potential applicants on the H2020 Participant Portal.

The need for institutional change in RPOs and funders, as well as a reinforced coordination at EU level, has been highlighted by the Stakeholder platform (see section 3.6) to overcome differences remaining among Member States concerning gender

equality in public research. To this end, the Commission has organised joint meetings with the doers' network "gender" of the Stakeholder platform. Moreover, the Commission provides financial support to transnational cooperation within the Gender-Net ERA-Net project. Through specific calls on "Gender Equality in Research and Innovation" (GERI) of the "Science With and For Society" programme, the Commission gives financial support to the setting of Gender Equality Plans in RPOs and funders to improve the participation and career paths of women researchers and to integrate the gender dimension in research programmes.

3.5. In terms of circulation of and access to scientific knowledge

3.5.1. Open access

- *Open access for publications resulting from publicly funded research is becoming the standard. In Horizon 2020 open-access to peer-reviewed publications is the default setting*
- *Open access to data may require more frequent financial support from funders - as well as more proactive action by research performers - to increase their importance*

Open access (OA) means unrestricted online access to peer-reviewed scholarly research. Most Member States (23) have a similar understanding of the scope and objectives of open access, in line with the Commission's definition (AT, BE, CZ, DE, DK, EE, EL, ES, FI, FR, HR, IE, IT, LT, LU, MT, NL, PL, PT, RO, SE, SI, UK). The objective of promoting open access is included in national laws in PL, ES, SE, EE, LT and HU.

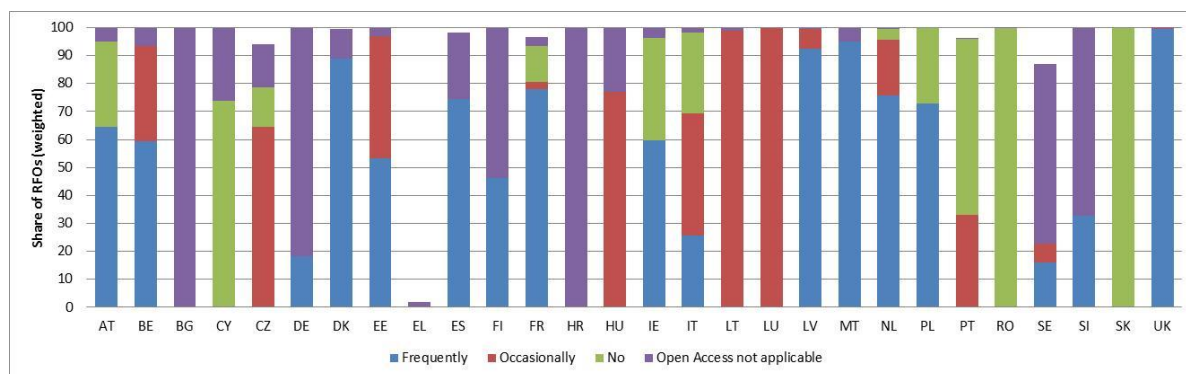
The Commission could identify that open access to publications is supported in AT, BE, BG, CY, DE, DK, EE, EL, ES, FI, IE, IT, LT, MT, NL, PL, PT, RO, SE and the UK, and the implementation is supported by a working group in BE, BG, DE, DK, EL, ES, FI and IT. In terms of modalities, both green and gold open access³⁶ are supported by AT, DK, EE, EL, FR, HR, IT, PL, PT, SE, UK, green open access is the main modality in CY, IE, LT and LU, and gold open access in NL and RO.

The Commission is concerned with open access in its capacities as a policy maker (proposing legislation), a funding agency (the FP7 and Horizon 2020 framework programmes for research and innovation) and a capacity builder (through funding of specific projects for open access infrastructure and policy support actions). The file is shared between the Directorate-General for Research and Innovation and the Directorate-General for Communications Networks, Content and Technology. In Horizon 2020 the Commission has made open access to peer-reviewed scientific publications the default setting.

³⁶ Open access publishing (also referred to as 'gold' open access) means that an article is immediately provided in open access mode as published. In this model, the payment of publication costs is shifted away from readers, paying access via subscriptions. The business model most often encountered is based on one-off payments by authors. These costs (often referred to as Author Processing Charges, APCs) can usually be borne by the university or research institute to which the researcher is affiliated, or to the funding agency supporting the research. In other cases, the costs of open access publishing are covered by subsidies or other funding models. Green open access implies that the acceptance of a time lag before making the article available to potential users.

According to the ERA survey 2014 results, different attitudes by funders in Member States are observed. In those situations where open access is supported, the average share of funders supporting it frequently is 44.6 % (see Graph 26). It should be recalled that these figures concern funders who answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.

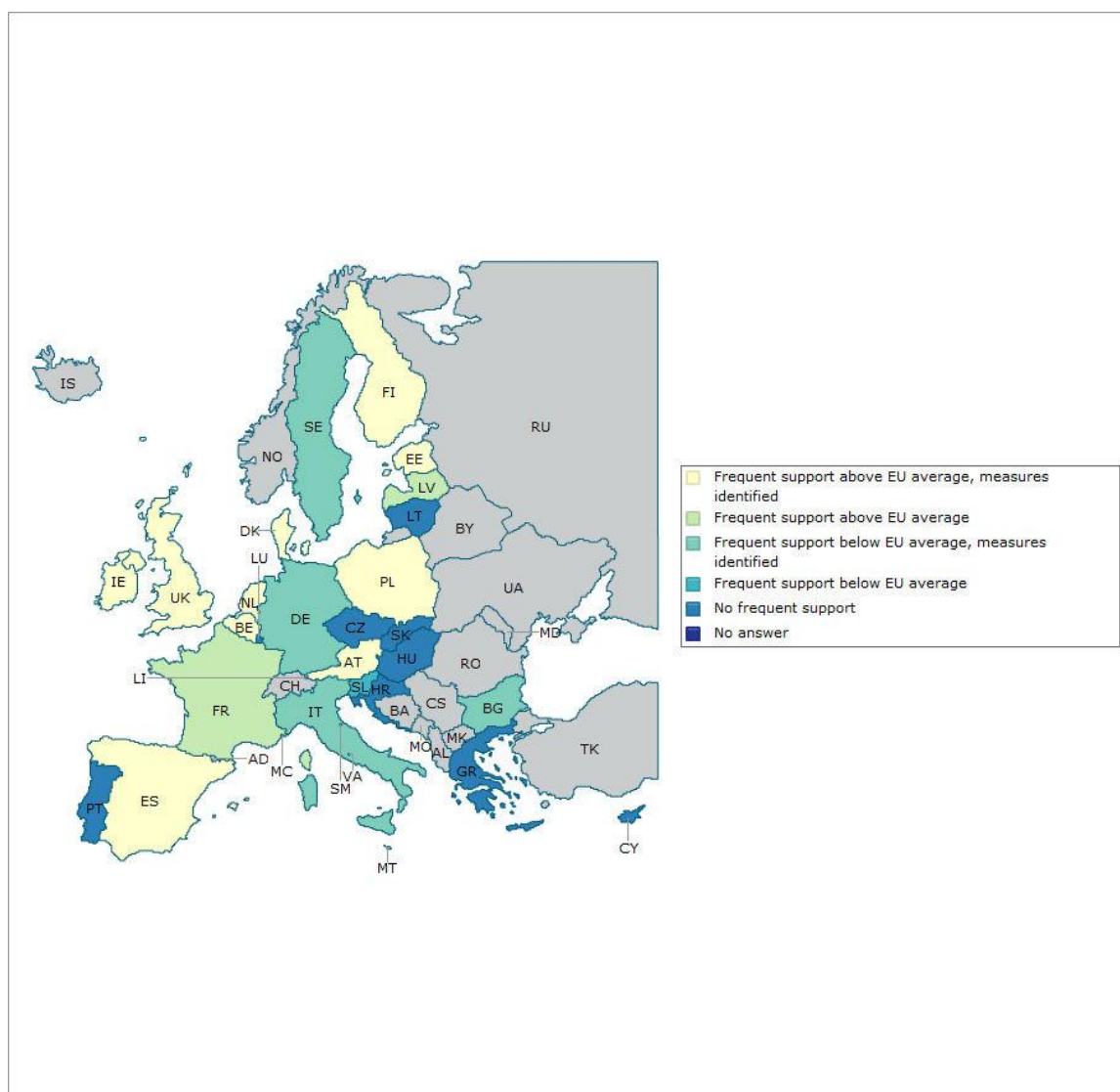
Graph 26: Share of funders funding open access to publications, 2013



Source: ERA survey 2014

In comparative terms (see Map 10), according to survey results in 13 Member States the share of funders **frequently** supporting open access to publications is above the average.

Map 10: Classification of EU Member States according to the support open access to publications and frequent support provided by research funding organisations, 2013



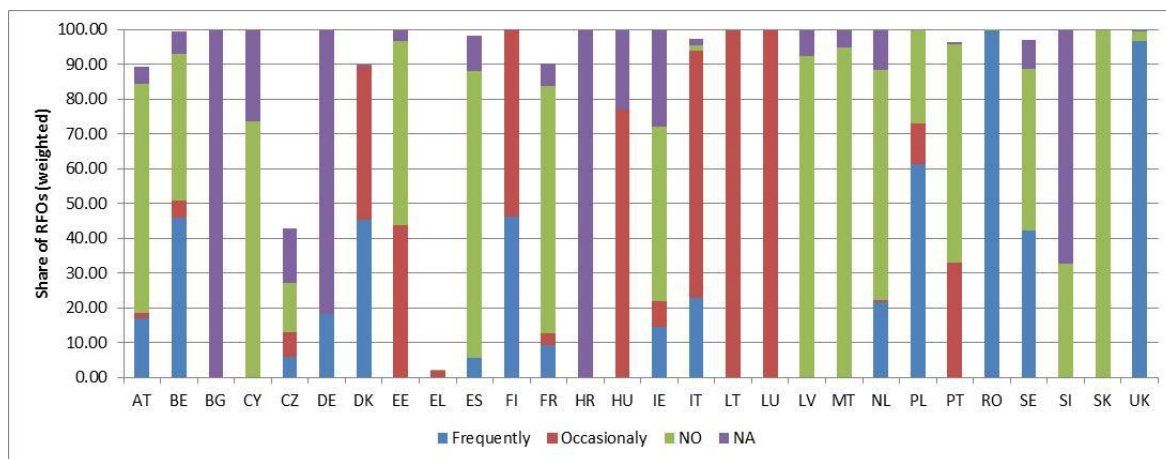
In the other countries the situation varies: in four Member States (BG, DE, IT, SE) the Commission could identify measures in support of open access, in one case (SI) the Commission could not identify policy support. In four cases (CY, HR, RO, SK), the funders which answered the survey did not declare any support to open access.

Concerning open access to data, the Commission could identify support in DE, EL, ES, IE, IT, PL, PT, RO and the UK.

According to the results of the ERA survey 2014, funding open access to data is not a common practice in funding organisations from several Member States³⁷ (see Graph 27). Among those Member States whose funders support it, the average share of funding organisations **frequently** supporting it is 28.1 %.

Graph 27: Share of funders systematically funding open access to data, 2013

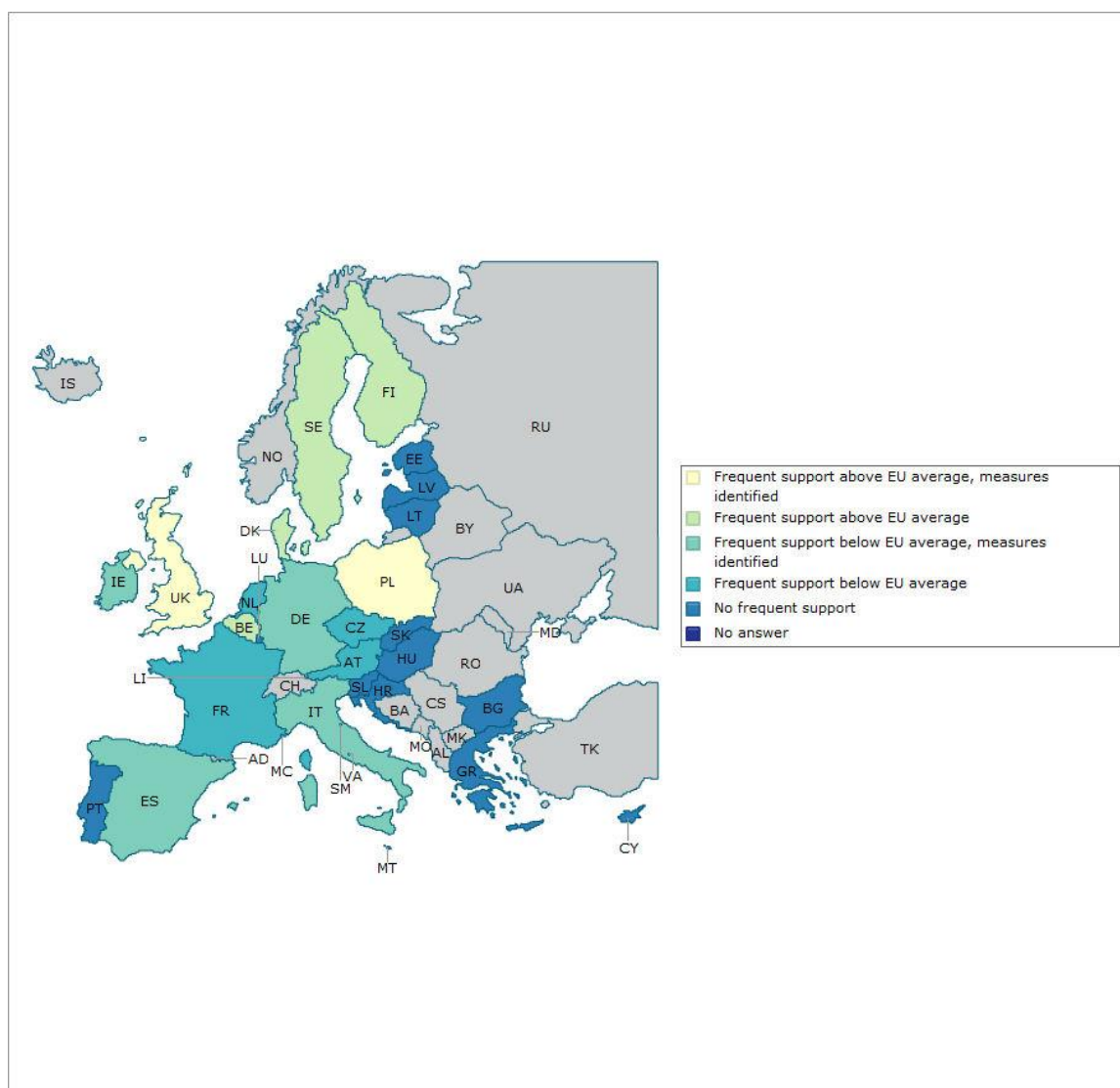
³⁷ It should be mentioned that these figures concern funders who answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.



Source: ERA survey 2014

In comparative terms (see Map 11), according to survey results in seven Member States the share of funders **frequently** supporting open access to data is above the average.

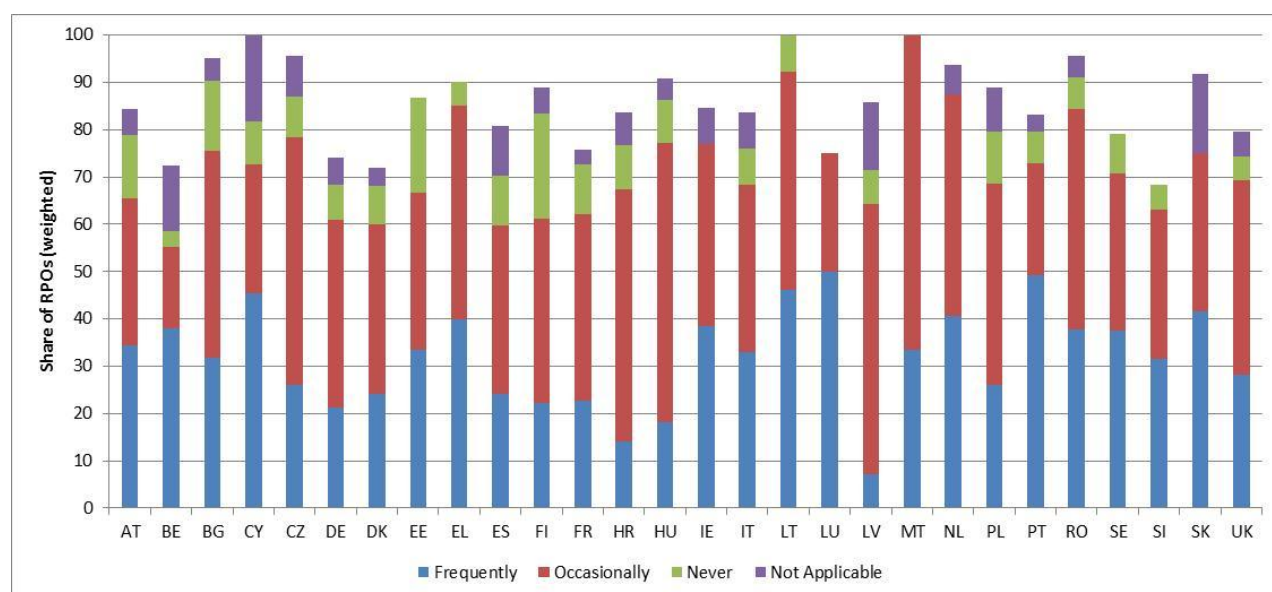
Map 11: Classification of EU Member States according to the support of open access to data and frequent support provided by research funding organisations, 2013



In the other countries where no frequent support is provided, the situation varies: in four Member States (DE, ES, IE, IT) the Commission could identify measures in support of open access to data; in three cases (AT, CZ, FR) the Commission could not identify policy support, and in six cases (CY, HR, LV, MT, SI, SK) funders which responded to the survey declared that they are not providing any support to open access to data.

According to the ERA survey 2014 results RPOs in all Member States declared that they make scientific research data available online and free of charge³⁸ (see Graph 28). The average share of organisations which do this **frequently** is approximately 19.4 %.

Graph 28: Share of research performing organisations systematically making available online and free of charge [publicly funded] scientific research data, 2013

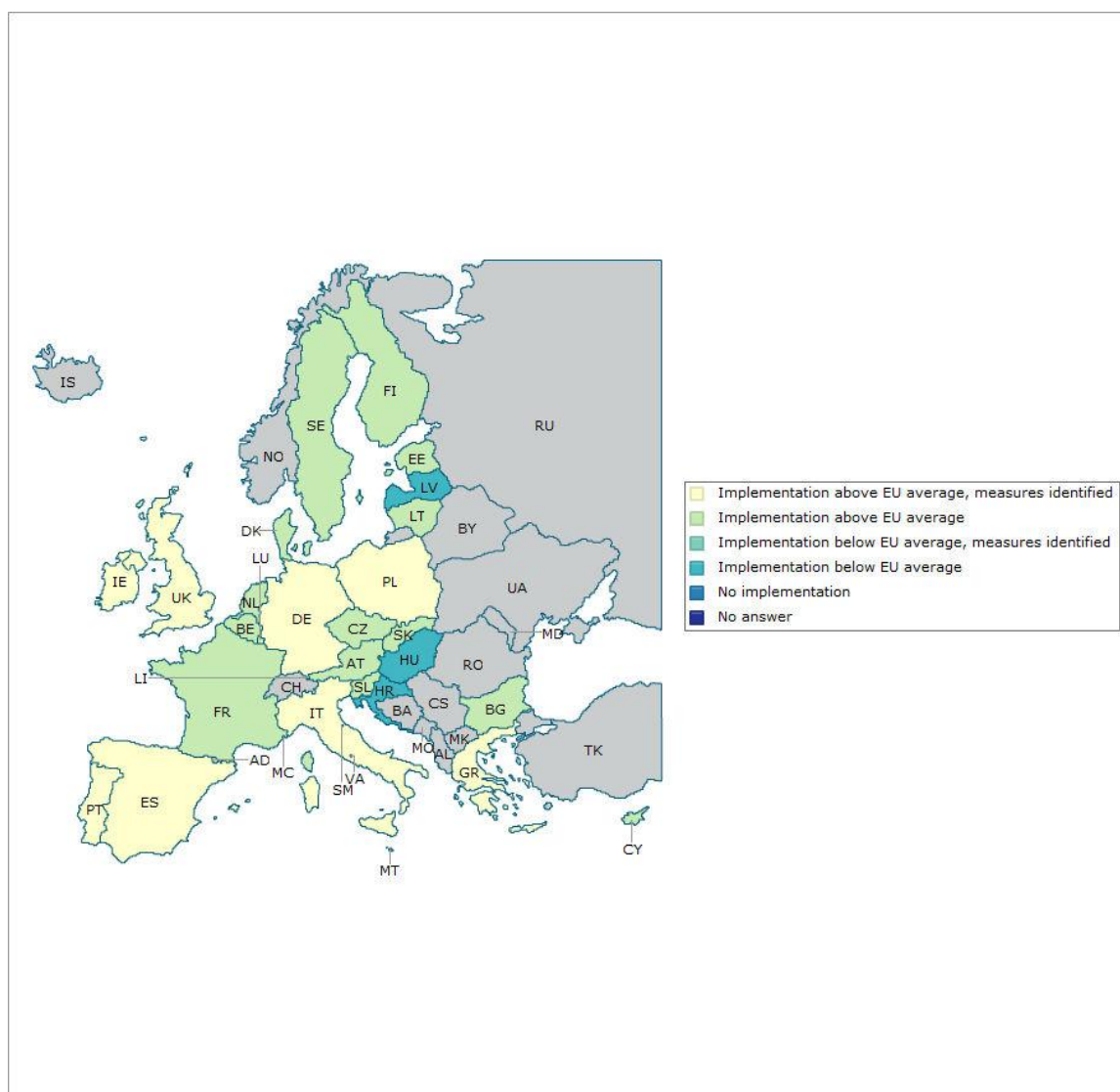


Source: ERA survey 2014

In comparative terms (see Map 12), survey results show that a combination of policies and willingness by research performing organisations has induced that in most Member States the share of organisations making their data available is above the (low) EU share average (19.4 %).

Map 12: Classification of EU Member States according to the support of open access to data and the implementation by research performing organisations, 2013

³⁸ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).



The Commission committed itself to running a pilot on open access to research data in Horizon 2020, taking into account the need to balance openness and protection of scientific information, commercialisation and Intellectual Property Rights (IPR), privacy concerns, security as well as data management and preservation questions. This open access to research data pilot concerns selected areas of Horizon 2020 ('core areas'). Projects not covered by the scope of the pilot can participate on an individual and voluntary project-by-project basis ('opt-in'). Projects may also decide not to participate in the pilot for several specific reasons ('opt-out'). First results of the uptake of the pilot in the proposals submitted in the first calls of Horizon 2020 appear promising.

The Commission also funds several projects to support and provide further insights into open access and related issues, such as RECODE (recommendations on open access to research data), FOSTER (training and awareness raising), PASTEUR4OA (networking OA actors) and of course OpenAIRE (infrastructure and national helpdesks). Specific support for projects participating in the Horizon 2020 pilot on open access to research data is provided through projects funded in the e-Infrastructure calls of the Horizon 2020 Research Infrastructures Work Programme 2014-15.

In terms of repositories for open access, the Commission could identify several modalities in Member States. National repositories are preferred in EE, FI, FR, HU, IT, LT, MT, NL, SI, SK and the UK. The preferred option is institutional repositories in BE,

BG, FI, HR, LT, MT, PL, SI. In two Member States (HR, IT) the regional repositories are preferred.

3.5.1. *Open innovation (OI) and knowledge transfer (KT) between public and private sectors*

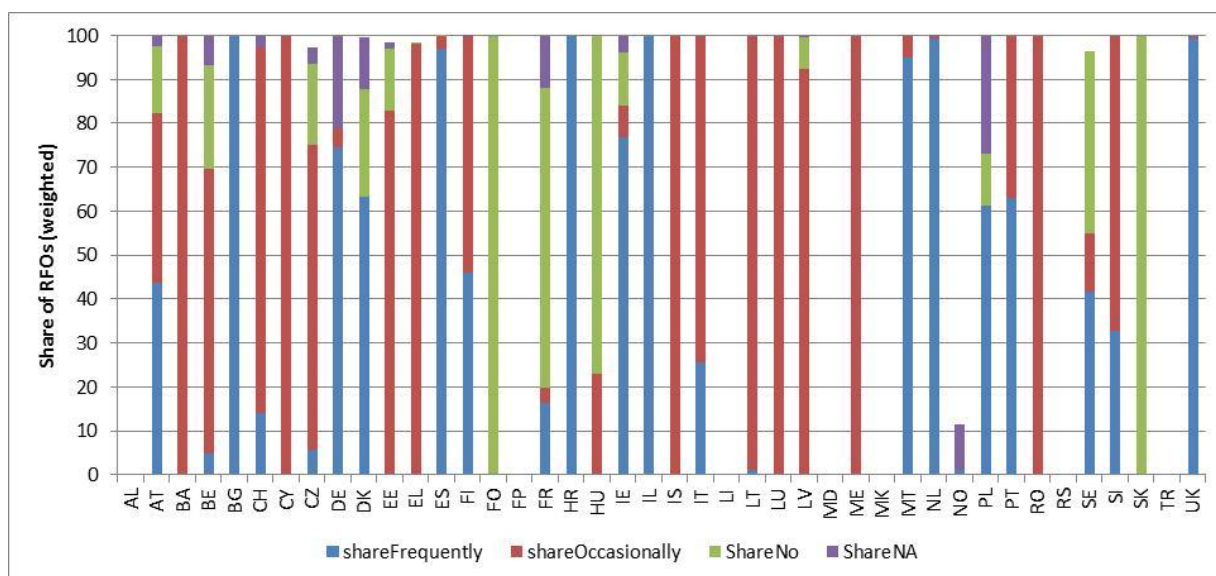
- *Strong policy support (strategies, networking, etc.) in most Member States to Open innovation (OI) and knowledge transfer (KT) but no frequent financial support by funders in half of Member States*
- *Knowledge transfer offices are present in a (weighted) majority of research performing organisations*
- *Most Member States encourage strategic partnership with the private sector. However, the share of funding of public institutions by the private sector is limited*
- *The Commission has committed to developing a comprehensive policy approach on open innovation and knowledge transfer. The Commission is continuously facilitating and supporting the development and cross-border networking of national knowledge transfer office networks and the work of existing pan-European networks*

Knowledge transfer of research results contributes to innovation. This explains that most Member States are supporting knowledge transfer through strategies, incentives, etc. The Commission identified that supporting modalities vary. In 16 Member States a national strategy on knowledge transfer is implemented (AT, BE, BG, CZ, DE, DK, EE, FR, HR, IE, LT, LU, LV, NL, PL, SE). In most cases, the strategy is accompanied by specific funding. A national network of knowledge transfer is in place in AT, LV, NL, PL and UK. The professionalization of knowledge transfer activities is supported by BE, DE, DK, EE, FR, LU, LV, MT, NL, RO and SE.

According to the ERA Survey 2014 results, funders in almost all Member States support the implementation of knowledge transfer in their programmes and/or projects³⁹ (see Graph 29). The average share of funders **frequently** supporting it in the EU is 69.3 %.

Graph 29: Share of funders systematically supporting the implementation of knowledge transfer as part of their institutional and/or project based funding, 2013

³⁹ It should be reminded that these figures concern funders who answered the ERA survey in 2014, which represent 34 % of total EU GBAORD.



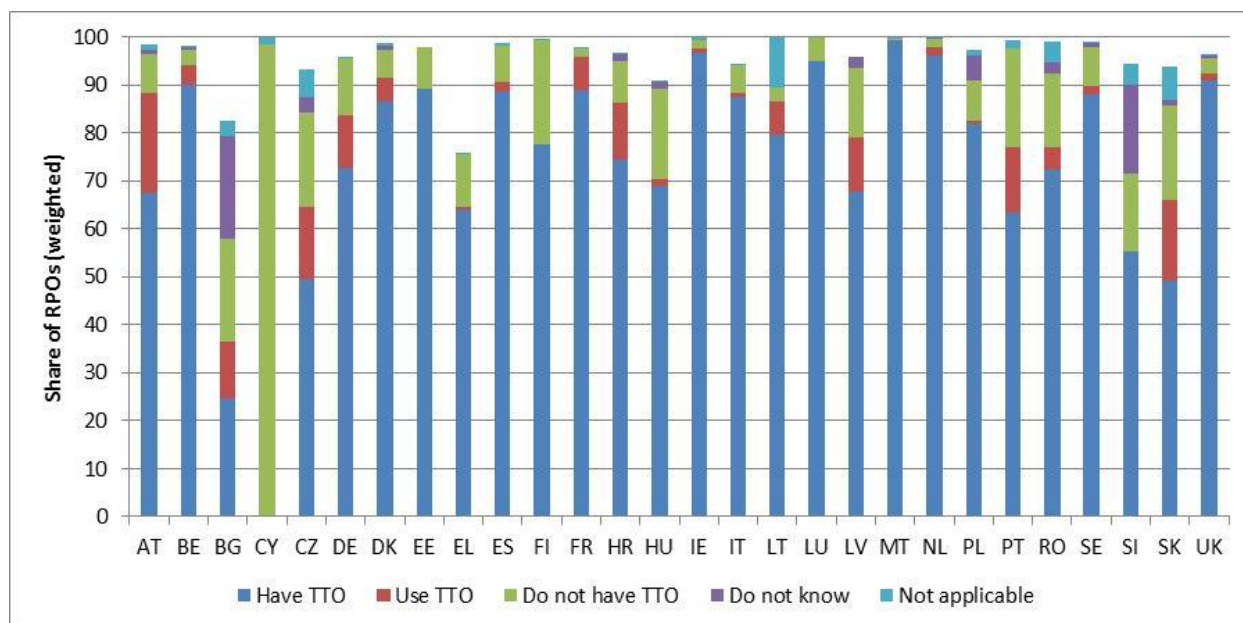
Source: ERA survey 2014

In comparative terms (see Map 13), according to survey results the share of funders frequently supporting knowledge transfer is above the EU average in eight Member States.

Map 13: Classification of EU Member States according to the existence of a knowledge transfer strategy and the support provided by research funding organisations, 2013

An indicator that can be used to assess the degree of attention to knowledge transfer in RPOs is the existence of a knowledge transfer office. According to the results of the ERA survey 2014 most research performing organisations (70 % on average) have a technology transfer office⁴⁰ (see Graph 30).

Graph 30: Share of research performing organisations having or using a structure for knowledge transfer activities, 2013

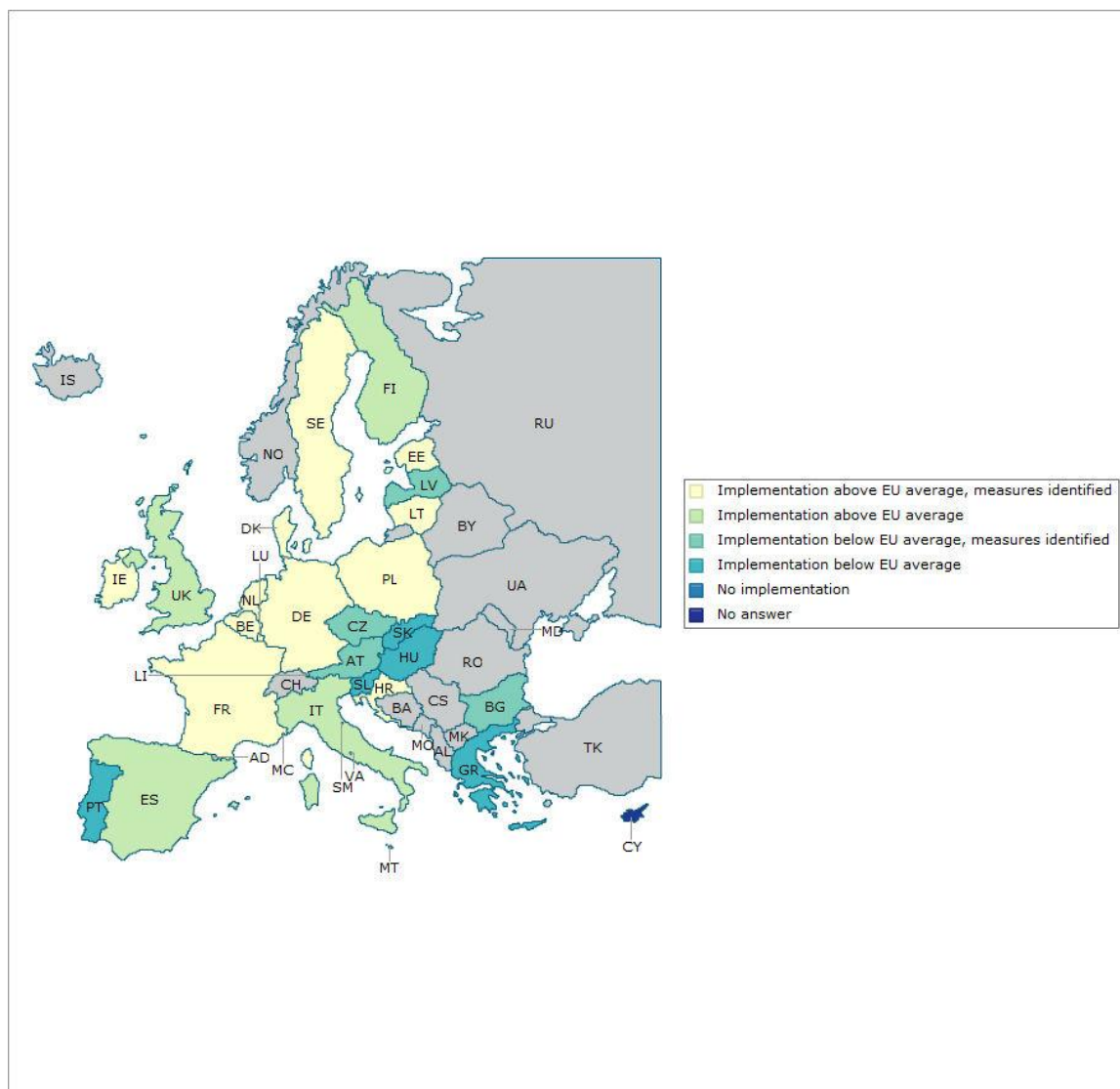


Source: ERA survey 2014

In comparative terms (see Map 14), in eight Member States there is a knowledge transfer strategy and the share of RPOs which have Technology Transfer Offices (TTOs) is above the EU average.

Map 14: Classification of EU Member States according to the existence of a knowledge transfer strategy and the existence of Technology Transfer Offices in research performing organisations, 2013

⁴⁰ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

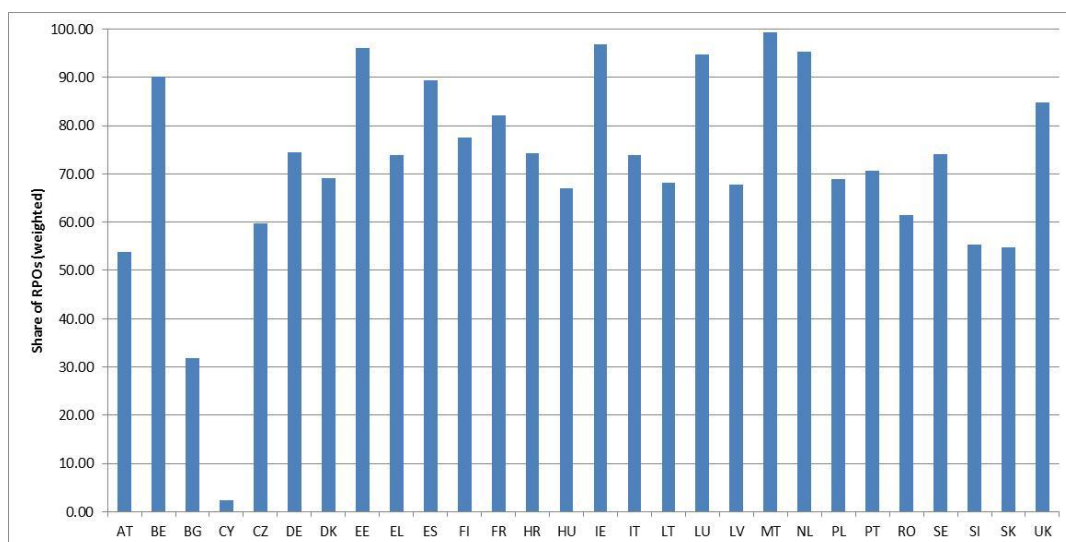


Among the other cases, in eight countries (AT, BE, CZ, DK, FR, LT, PL, SE), the Commission could identify the adoption of a knowledge transfer strategy whilst in FI, IT, PT and SI the Commission could not identify a knowledge transfer strategy.

Another indicator linked with knowledge transfer is the presence of dedicated staff to knowledge transfer RPOs. According to the ERA survey 2014 results, in most Member States more than 50 % of the RPOs have knowledge transfer staff⁴¹ (see Graph 31).

Graph 31: Share of research performing organisations having dedicated staff employed in knowledge transfer activities, 2013

⁴¹ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

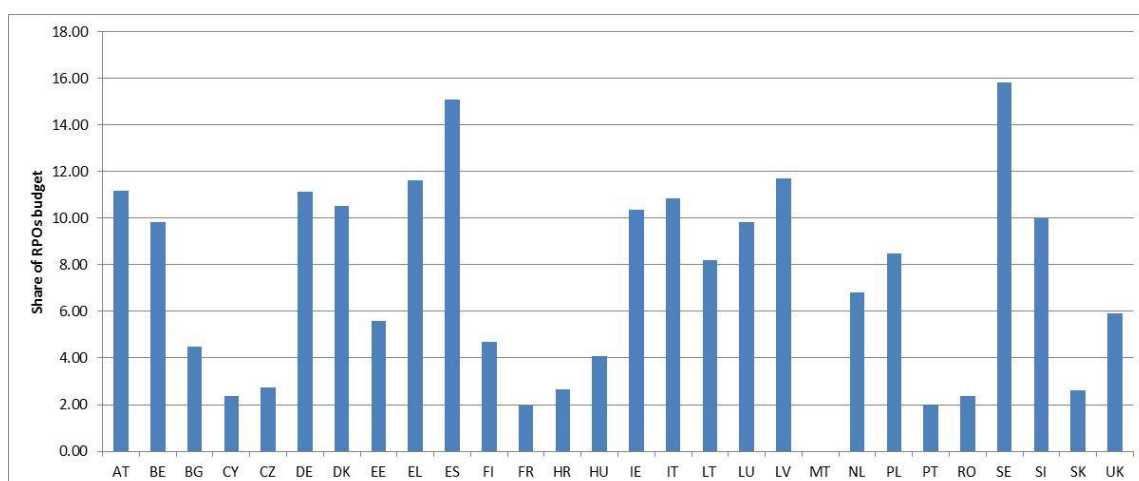


Source: ERA survey 2014

Partnership of academia with the private sector is another important factor which contributes to innovation. In 17 Member States, the Commission could identify specific support to strategic partnership with the private sector (AT, BE, CZ, DE, FI, FR, HR, IT, LT, LU, MT, NL, PL, RO, SI, SK, UK).

A proxy to measure attractiveness of public research organisations is the share of research and development budget financed by the private sector. According to the ERA survey 2014 results, on average, 7.8 % of the budget of RPOs originate in the private sector⁴² (see Graph 32). The variation across countries is quite important; half of Member States are below the average.

Graph 32: Share of research and development budget financed by private sector, 2013

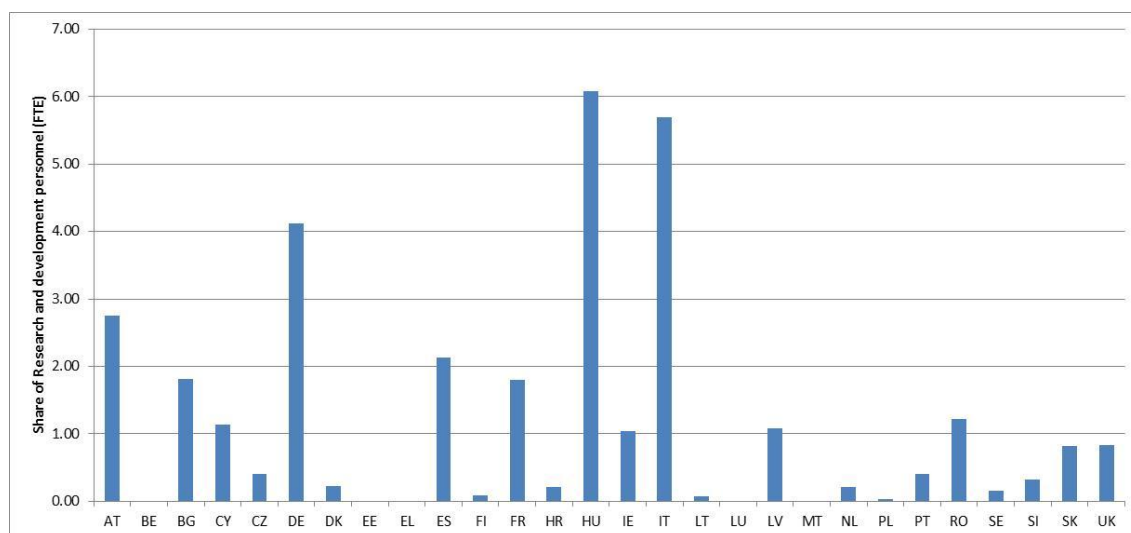


Source: ERA survey 2014

⁴² It should be mentioned that these figures concern research performing organisations which answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

Also, according to the ERA survey 2014 results a strong variation is observed in terms of staff employed by RPOs whose primary occupation is in the private sector⁴³ (see Graph 33). The average share of researchers in this category (in FTE) is 2.1 %.

Graph 33: Share of staff employed by RPOs whose primary occupation is in the private sector (in Full Time Equivalents), 2013



Source: ERA survey 2014

In general the Commission is committed to a modern and efficient IP infrastructure that supports innovation in all its stages. In the case of patents, the implementation of the Unitary Patent System is a clear example in this sense. It will provide innovators and creators – and hence researchers - with access to broader territorial protection at lower costs, trigger a reduction of red tape and make it easier for inventors to access the single market and internationalise their activities. It will foster technological transfer, as it will not be necessary anymore to register a patent transfer in each country in which the transaction needs to have legal effect. In addition, the centralised registration and publication of unitary patents will make it easier to access patent literature.

In order to gather insight on how to address some IP related barriers, the Commission set up two Expert Groups. Expert Group on IP valuation was created to address the difficulty in assessing value and in access to funding. To do this, the group looked at which improvements could be done regarding the evaluation of the economic value of IP in order to foster IP related transactions and IP based finance. In addition, an Expert Group on Patent valorisation was created and will look at how to increase transparency of the IP market, increase awareness of business opportunities around IP and decrease transaction costs linked to IP transactions.

The Commission is continuously working with relevant stakeholder groups to facilitate and support the development and cross-border networking of national knowledge transfer office networks and the work of existing pan-European networks. In addition, Horizon 2020 pilots a Technology Transfer Financing Facility which will co-finance investments

⁴³ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

made by existing technology transfer (TT) funds and vehicles. It will focus on TT undertaken via the creation of new companies and the licensing of intellectual property, and concentrates on the proof-of-concept, development and early commercialisation stages of the TT process. Specific calls are also foreseen in Horizon 2020, for instance on capacity-building on TT encouraging and - where appropriate - incentivising the more established and experienced funds and TT offices (TTOs) to share their expertise and best practices with their less experienced counterparts. The latter will complement Horizon 2020 Technology Transfer Financing Facility pilot.

3.5.2. *Policies for public e-infrastructures and associated digital research services*

- *Strong support by the European Commission to enable world-class science based on High Performance Computing, wifi infrastructure and grid infrastructure, federating national initiatives*
- *More effort is needed to ensure the provision of federated identities*

Europe's National Research and Education Networks are specialised Internet service providers dedicated to supporting the needs of the research and education communities within their own country. The Commission could identify such national networks in 26 Member States: AT, BE, BG, CY, CZ, DE, DK, EE, EL, ES, FR, HR, HU, IE, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK and the UK. These networks facilitate the integration of researchers in the countries in the Digital ERA.

PRACE (Partnership for Advanced Computing in Europe) has been a key enabler for world-class science based on High Performance Computing (HPC), awarding, since 2010, more than 8 billion computing core hours of Tier-0 systems to 303 scientific projects from 38 countries. PRACE has provided training in HPC to 2,700 people in 360 full days through its PATCs (Advanced Training Centres days) and has held more than 180 events for community building in HPC. Finally, PRACE has also allowed access to HPC infrastructures to 20 industries (including SMEs) in the first year of its industrial access programme.

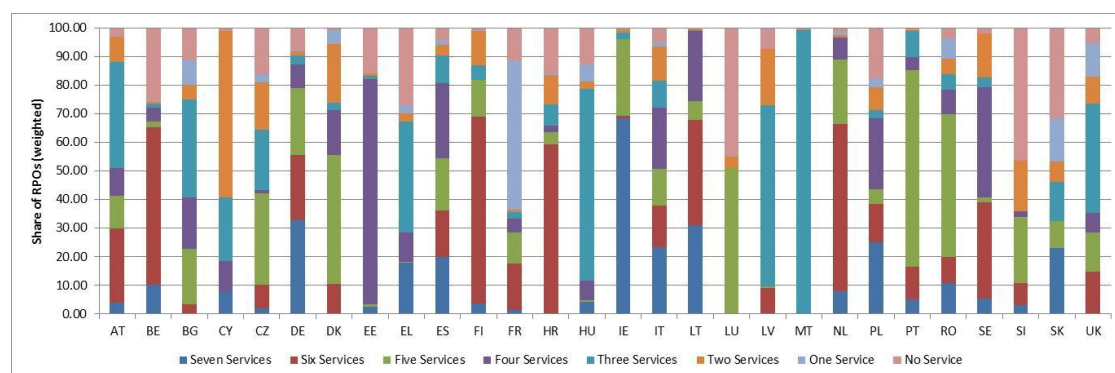
Universities' and research organisation's wifi infrastructure can be accessed through a federated technology called "eduroam" whose development is supported by GÉANT project (funded by the EC). This technology allows students and researchers to seamlessly access their IT infrastructure through wifi using their home organisation's credentials even in situations of mobility. This technology is deployed in all MS and AC with an estimated 200,000 wifi base stations equipped and 21 million accesses per week (100 % growth year/year) including 12 % across border access (as of April 2014). This technology is a key integrator of wifi infrastructures and ensures IT mobility not only between countries but also inside countries and regions.

The European Grid Infrastructure (EGI) is a crucial provider of IT resources for science in Europe. Driven by the needs of the scientific community, it enables sharing of computing power for scientific purposes between Member States. The EGI federates the National Grid Initiatives (NGIs), which operate grid infrastructures at country-level. In 2013 the EGI provided more than 3.7 billion computing core hours (kSI2K) linking 53 countries with more than 300 resource centres and around 430,000 cores.

In terms of provision of digital services for research and education, TERENA, the Trans-European Research and Education Networking Association, has identified three main kinds of services: support to collaboration, cloud services and premium services (these include consultancy services, security audits, etc.). According to TERENA, the degree of provision of Digital services varies among Member States: the three kinds of services are provided by CZ, EE, ES, FR, HU, IE, LT, LU, NL and SI; cloud and collaboration support by EL, Cloud and premium services by BE and PL, Cloud services in LV, collaboration support in SE and finally premium services by: DE, DK and PT.

In the survey, RPOs were requested to indicate the provision of seven types of services. As the combination of possibilities is quite high, the results of the ERA survey are presented according to the number of services provided to researchers. According to the results the share of institutions not providing any digital services is quite high in many cases ("No services" in more than 10 % of the institutions in BE, BG, CZ, EE, EL, FR, HR, HU, LU, PL, SI, SK)⁴⁴ (see Graph 34).

Graph 34: Share of research performing organisations providing digital research services (i.e. cloud services, research collaboration platform, etc.), 2013



Source: ERA survey 2014

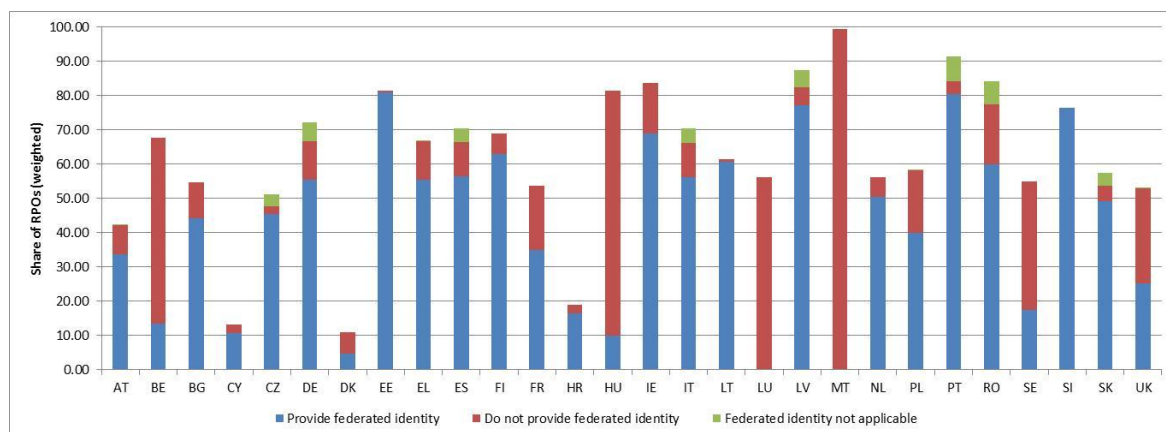
The provision of federated electronic identities facilitates the access to digital services by researchers. The Commission could identify that more than half of Member States are members of an identity federation: AT, BE, BG, CZ, DE, DK, EE, FR, HR, IE, LU, NL, PL, SE, SI and the UK of which BE and LU in 2013 and that 18 countries are members of the eduGAIN service, which is intended to enable the trustworthy exchange of information related to identity, authentication and authorisation between the GÉANT (GN3plus) Partners' federations: AT, BE, CZ, DE, DK, EE, EL, ES, FR, HR, HU, IE, LV, NL, PL, SE, SI and the UK, of which EE and AT in 2013.

According to the ERA survey 2014 results, on average around 43 % of the RPOs provide federated identities to their researchers⁴⁵ (see Graph 35).

⁴⁴ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

⁴⁵ It should be mentioned that these figures concern research performing organisations who answered the ERA survey in 2014, which employ 515 000 researchers (around 20 % of total EU researchers).

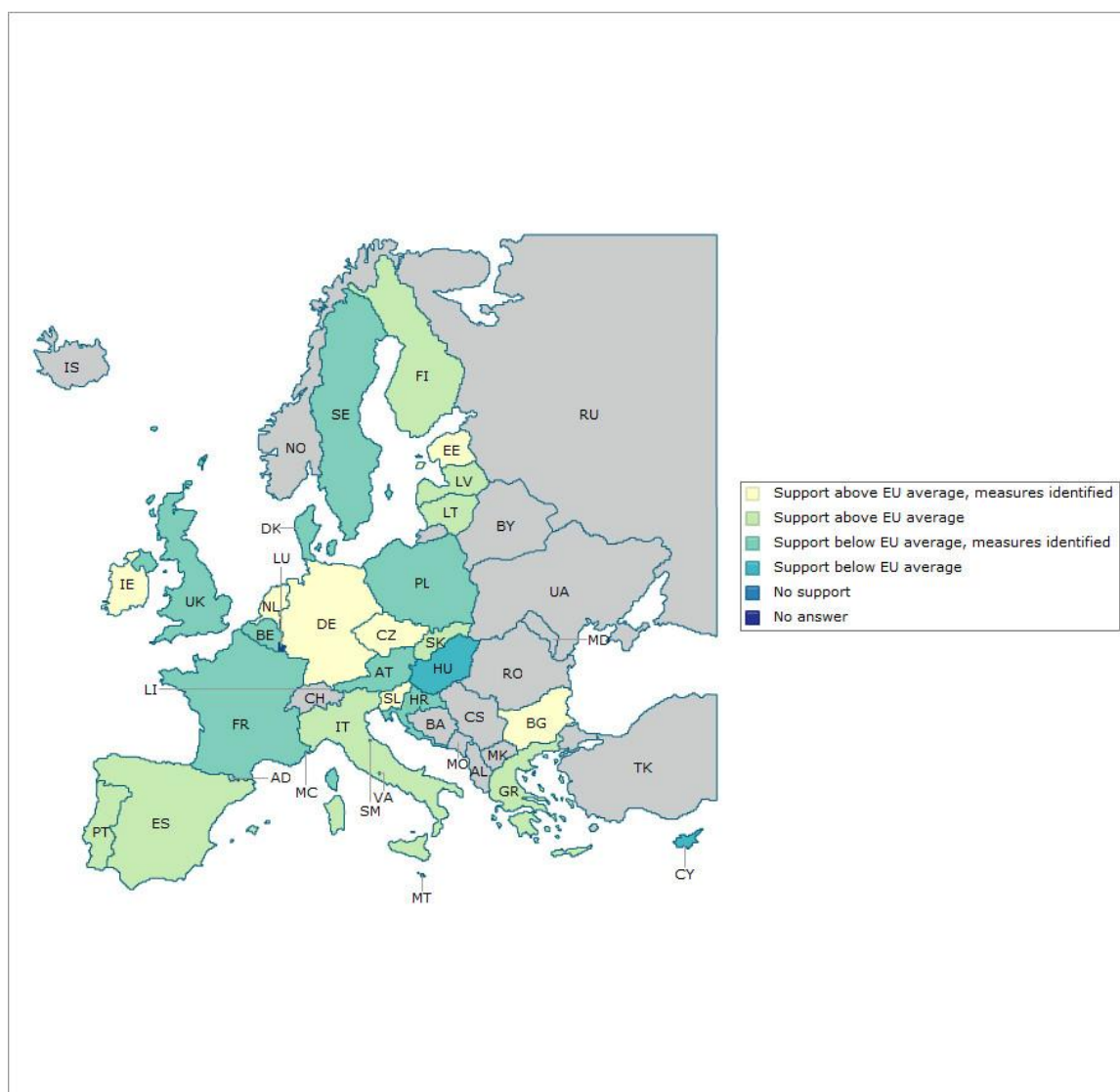
Graph 35: Share of research performing organisations providing federated electronic identities for their researchers, 2013



Source: ERA survey 2014

In comparative terms (see Map 15), according to survey results RPOs in more than half (16) of Member States are providing federated identities above the EU average.

Map 15: Classification of EU Member States according to the support provided to federated identities and their provision by research performing organisations, 2013



Among the rest of the countries, six Member States (CY, HR, HU, LU, MT, RO) are not yet members of an identity federation nor of eduGAIN.

3.6. Actions in support of ERA by the members of the Stakeholder platform

The work of the Stakeholder platform has evolved since the last ERA Progress Report. The meetings with the heads or representatives of the research Stakeholders' Organisations have continued, but several ad hoc “Doers” networks were created to tackle in detail some specific issues related to ERA. The Doers groups concerned gender, communicating ERA, joint programming, monitoring, open access, and research infrastructures. Doers meetings are organised according to the needs and developments of the policy agendas.

A new partner, the Conference of European Schools for Advanced Engineering Education and Research (CESAER), joined the European Association of Research and Technology Organisations (EARTO), the European University Association (EUA), the League of European Research Universities (LERU), NordForsk and Science Europe in the Stakeholder platform in 2013.

The platform has created a new momentum for joint activities between its participants. The research Stakeholders' Organisations jointly organise events (such as two fringe

sessions in the 2014 Innovation Convention) and regularly participate in each others activities when relevant to their mandate.

Besides, all participants in the platform contribute regularly to the ERA newsletter, and they also participate in its dissemination.

Each research Stakeholders' Organisations is also very active in raising ERA awareness amongst their member Organisations, including through strategic discussions around ERA priorities and policy, as well as in relation to the future direction of ERA.

In the following sections, some of the recent activities of each research Stakeholders' Organisation which participate in the Stakeholder platform are presented.

3.6.1. Conference of European Schools for Advanced Engineering Education and Research (CESAER)

Launching of joint working groups with partner associations CLUSTER, EuroTech Universities, IDEA League and Nordic Five Tech on:

- “Innovative Doctoral Training” and
- “Institutional Research Strategies and Management – Professionalisation of Knowledge Transfer”.

Several task forces are in place:

- “Human Resources”, with priorities on Human Resources Strategies for Researchers (HRS4R), recruitment, career development, academic leadership, gender, and performance assessment. Papers on the different issues are in the pipeline. In print: CESAER Comment on “Open Recruitment”, “Leadership and Leadership Development in Academia”.
- “Entrepreneurship”, which is preparing a White Paper on the specialty of entrepreneurship at technical universities.
- “Responsible Research and Innovation (RRI)”, which is working towards the adoption of RRI policies by CESAER and other relevant parties. In September, the Task Force RRI will present comments and recommendations for the Horizon 2020 Work Programme 2016-2017.
- “Open Access – Open Data”, which is preparing a CESAER position on Open Access for mid-2014 and guiding material on Open Access for the end of 2014.
- “Open Education”, which is in the starting phase.

In terms of monitoring:

- Survey on gender equality at CESAER member institutions. The final report will be produced by October 2014; respondents to the survey will be convened for a workshop at Vienna University of Technology on 28-29 November 2014 for discussing the outcomes and possible follow up activities.

- Monitoring of the implementation of Charter and Code for Researchers and Human Resources Strategies for Researchers.
- Monitoring of the participation in the framework programmes and collaborative links between members with a specific focus on “Spreading of excellence and widening participation”.
- In-depth web analysis of structures and activities supporting knowledge circulation at CESAER member institutions.

Organisation of, or participation in, events:

- Set up the ERA Partnership Fringe Session in the frame of the Innovation Convention, 10 March 2014.
- Participation in the ERAC Mutual Learning Seminar “Open Recruitment and Transnational Mobility”, Brussels, 26 March 2014.
- CESAER Conference “Human Resources in Academia”, organised by the Task Force “Human Resources, TU Delft, 21-22 May 2014. Parallel session in the priority areas of the Task Force. The Conference Report is in preparation.
- Participation in the JRC Conference “Scientific Support for the Danube Region”, Vienna, 24-25 June 2014.
- Participation in the “Gender Summit 4 - Europe 2014, From Ideas to Markets”, Brussels, 30 June – 1 July 2014; Speaker: Karel Luyben, President CESAER.
- Participation in HRS4R Mutual Learning Seminar. Tarragona, Spain; 2-3 October 2014
- Workshop “Responsible Research and Innovation”, Tallinn University of Technology, 15 October 2014
- 2014 CESAER Seminar “Widening Participation”, Tallinn University of Technology, 16 October 2014.

Other activities:

- CESAER is a member of the 4th Cohort for the Human Resource Strategy for Researchers (HRS4R) and organises stimulation measures towards the implementation in CESAER member institutions.
- Main academic partner in the pilot edition of the Internship Programme of the European Institute of Technology Foundation (EITF).
- Contribution to the drafting of the 'Charter for Access to Research Infrastructures' in the ERA Monitoring Doers Configuration.

- With a mandate from CESAER, Paul Jankowitsch (Vienna University of technology) chaired the task force set up for the preparation of the Retirement Savings Vehicle for European Research Institutions (RESAVER).

3.6.2. *European Association of Research and Technology Organisations (EARTO)*

EARTO currently has 7 active working groups. Six of them discuss topics related to ERA. They concern: legal aspects (improving state aid RDI Framework, General Block Exemption Regulation (GBER) & Enhanced Programmable Communication Interface (EPCI) schemes to best achieve ERA objectives); SMEs (best practices on how to best work with SMEs and national programmes of technology transfer RTOs-SMEs); H2020 (implementation aspects, including open access and gender balance requirements in H2020 projects); Communication (how to best communicate EARTO members activities on ERA related topics); Human Resources (HR managers discussing topics such as open recruitment, careers and gender balance, pension and doctoral training, mobility of researchers) and Structural Funds (how to best achieve synergies between H2020 and EU Structural Funds).

Publications:

EARTO has published several position papers in relation to ERA objectives since January 2014:

- ERRIN & EARTO Comments to the Commission Staff Working Document "Enabling synergies between European Structural and Investment Funds, H2020 and other research, innovation and competitiveness-related Union programmes".
- The Technology Readiness Level (TRL) Scale as an R&I policy tool - EARTO recommendations.
- EARTO response to the European Commission Public Consultation on State Aid for Important Projects of Common European Interest (IPCEI).
- EARTO response to the European Commission Public Consultation on the GBER.
- EARTO response to the European Commission Public Consultation on the EU State Aid Framework for R&D&I.

Conferences:

EARTO and its members organised and participated in several events on ERA related topics. The key events are:

- EARTO Annual Conference, May 2014, in which 200 participants gathered to discuss RTO-business cooperation, focusing on the topic of 'How can RTOs support the re-industrialisation in Europe'.
- EARTO co-organised and participated in two fringe sessions on ERA topics at the European Commission Innovation Convention 2014: 'The ERA partnership

as a backbone of the European innovation eco-system(s)' and 'how research partnerships are turning on the Innovation Growth Machine in Europe'.

EARTO members were also very active in the Gender Summit Europe which took place in June 2014.

3.6.3. *European University Association (EUA)*

- Organisation of the High-level conference on '*Mobilising Europe's Universities for Smart Specialisation*' convened with the S3 Platform and DG REGIO. The objective was to raise awareness about the importance of universities' contribution in the definition and implementation of RIS3. High-level consultation has been initiated by EUA to engage in the essential dialogue with DG REGIO on how the Seville Report recommendations can be taken forward in the implementation of the European Regional Development Fund and European Social Fund (300 participants).
- Publication of a joint report EUA- DG REGIO/JRC on 'The role of universities in smart specialisation' (EUA Publications, 2014) issuing recommendations to enhance the role of universities in the definition and implementation of Smart Specialisation Strategies.
- Contribution to the drafting of the Charter for Access to RIs within the framework of the MoU Doers Group on Research Infrastructures.
- Preparation with other SHOs of 'high-level' talks with major publishing houses to explore 'do-able' business models that reflect the impact of digital technological developments on the process of producing scientific publishing, as well as operational conditions for open access that meet universities' needs.
- Publication in April 2014 of a statement on the proposal for a general Data Protection Regulation, highlighting the potential threat to research.
- Active promotion of best practices of university participation in international agreements to foster peer-learning and synergy across these international activities through the activities of EUA's Council for Doctoral Education (CDE). In particular, promotion of doctoral education/training reforms through its 'Salzburg Principles' based on best practice (2005) and revised in 2010. These principles form the core of the 'Principles of Innovative Doctoral Training' taken up by the European Commission.
- Organisation of the Annual Meeting of CDE as a stocktaking exercise of reforms in doctoral education in June 2013 (over 200 participants).
- Organisation of the upcoming 2nd EUA Funding Forum (October 2014) bringing together higher education and research stakeholders to discuss funding models and the impact of EU funds on university management.

In terms of monitoring and analysis, the following activities amongst others, can be mentioned:

- Monitoring of trends in public funding to the university sector via the EUA Public Funding Observatory (yearly release and online tool including data for more than 20 European countries).
- EUA 2013 Memorandum of Understanding (MoU) questionnaire to universities on development and implementation on policies addressing doctoral training, research careers, mobility and gender equality. This resulted in an awareness map, the implementation of human resources policy awareness and the implementation of 224 European Universities.
- EUA 2013 questionnaire to 34 National Rectors' Conferences (NRCs) on policies at national level regarding doctoral education and training, mobility and international cooperation.
- Publication of a joint report EUA- DG REGIO/JRC on 'The role of universities in Smart Specialisation' issuing recommendations to enhance the role of universities in the definition and implementation of Smart Specialisation Strategies based on the outcome of the workshop.
- Monitoring of national developments in open access, particularly regarding implementation of open access requirements for H2020 through dialogue with the EUA 34 NRCs.
- EUA has started analysing data on the gender composition of university management based on the database of EUA membership (4,250 individual university managers).
- Organisation of the Strategic Global Forum for Doctoral Education in March 2013 with 30 leaders in doctoral education from across the globe, producing a common statement on the need for a balanced global research community.

Participation in EU funded projects:

- Study on ways to enhance European universities' financial sustainability (EUDIS project: European Universities Diversifying Income Streams), awareness-raising and capacity-building activities (EUIMA-Full Costing): Sharing Innovative Practices in University Modernisation). Through the ongoing DEFINE project (Designing Strategies for Efficient Funding of Higher Education in Europe) EUA is conducting research and stock-taking exercises in order to provide recommendations to policy makers and universities to improve the efficiency of the funding to the university sector. More than 200 universities contributed to these projects.
- Study on collaborative research between universities and companies involving all stakeholders (EUIMA-Collaborative Research) to identify main factors of success to establish and sustain long-term university-business cooperation. On supporting

mobility between private and public sector, the DOC-CAREERS II project (Promoting Collaborative Doctoral Education for Enhanced Career Opportunities), explores how universities work with their regional industry and authorities across Europe. More than 100 universities contributed to these projects.

- 'Cooperation on Doctoral Education between Africa, Asia, Latin America and Europe' project (CODOC; 2010-2012) and 'Framework for the Internationalisation of Doctoral Education' project (FRINDOC) which monitor developments regarding global collaborations in doctoral education through the Erasmus Mundus projects. These projects mobilised more than 100 universities.
- Further information on EUA's activities in 2013 and 2014 within the framework of the MoU can be found here:
http://www.eua.be/Libraries/Publication/2014_EUA_MoU_report.sflb.ashx.

3.6.4. *League of European Research Universities (LERU)*

Publication of several papers/statements related to ERA. Among them:

- Briefing paper for the next EU legislature entitled '[An ERA of Change](#)';
- Briefing paper '[LERU takes concrete steps towards ERA](#)';
- Advice paper entitled '[LERU roadmap for research data](#)';
- '[LERU – Open for business](#)' brochure;
- Advice paper '[Good practice elements in doctoral training](#)';
- Advice paper '[Online learning at research-intensive universities](#)';
- Support for an exception for TDM in the response to the copyright consultation and support given to the report of the TDM Expert Group. [Open letter](#) calling on Elsevier to withdraw its current TDM policy;
- Statement expressing disappointment about the EC's attempts, during the WIPO's negotiations, to block future discussions of copyright law to aid libraries and archives to fulfil their missions in the digital environment.

Organisation or participation in several meetings:

- Fringe sessions on 'How research partnerships are turning on the innovation growth machine in Europe' and 'The ERA partnership as the backbone of the European innovation ecosystem' at the EC's 2014 Innovation Convention;
- Organisation of a seminar on 'Open scholarship';
- Participation in the EUA seminar on smart specialisation;

- Participation in the focus group meeting organised by VERA (Forward Vision on the ERA project) to discuss possible future scenarios and strategies for ERA;
- Participation in the Working Group IDT Principles under the Steering Group for Human Resources and Mobility;
- Organisation of the LERU Doctoral Summer School on research integrity in Helsinki;
- Participation in the ERA SHO platform meetings, in the group developing a European Charter for access to RIs and, as an observer, in the Task Force meetings.

Contribution to the ERA Newsletter

Monitoring:

- Several surveys of LERU members. Among them, the survey on ERA priorities in 2013, a survey on the development of tenure-track systems, a survey on the classification of researchers and a survey on the impact of gender measures in 2014.

Other activities:

- Since 2013, collaboration with the EIT Foundation programme to place graduate students and recent PhDs for internships in industry since 2013;
- LERU universities were encouraged to publish their vacancies in the Euraxess Jobs Portal. Creation of a LERU Community of Vice-Rectors for Enterprise and Innovation in 2013;
- Creation of the LERU legal portal to give access to all the legal publications from LERU members which are available in open access;

3.6.5. *NordForsk*

- Launching of transnational and jointly funded research programmes in fields and topics that are highly relevant to society. These programmes are based on open calls, peer review and a common-pot principle.
- Adoption of a renewed grant agreement for Nordic Centres of Excellence (NCoE), requesting that project results are made public as soon as possible and in accordance with the projects' publication and dissemination plan. In addition, the new grant agreement emphasizes open recruitment and open advertisement of vacancies.
- Emphasis on open access to research data in its funding and support to broaden cooperation within all its programmes.

Independent evaluations:

- NordForsk's cross-border cooperation based on common-pot funding: results demonstrate the importance and added value of the NCoE funding scheme.

- The Top-level Research Initiative on Climate, Energy and the Environment (TRI): preliminary results demonstrate that a Nordic platform for successful future cooperation has been created.
- Researcher mobility: results provide a basis for understanding patterns and trends of researcher mobility across the Nordic region, different types of incentives and obstacles promoting and inhibiting such mobility.

Monitoring:

- Monitoring the progress in connection with ERA priorities by conducting a survey of the NCoEs funded by the TRI in 2013.

Facilitation activities:

- Creation of a joint research agenda on Arctic research in the Nordic countries in 2013.
- Discussion and debate at a global level on topics highly relevant to societies.
- Division of tasks and labour in the Nordic countries by executing the first call of the Joint Programming Initiative, JPI Climate, together with the French agency ANR.
- Discussions on priorities and joint Nordic actions by offering a platform for research infrastructure cooperation since 2013.
- Assessment of Nordic Universities' performance by bibliometric analysis.

3.6.6. *Science Europe*

- Adoption of the Science Europe Roadmap in December 2013. The roadmap sets out Science Europe's strategic priorities on a number of key ERA-related topics. The roadmap provides Science Europe with a plan and methodology to make evidence-based contributions to the strengthening of European research systems.
- Launch of nine Science Europe working groups: Cross-border Collaboration; Open Access to Research Publications; Research Data; Research Careers; Research Infrastructures; Research Integrity; Research Policy and Programme Evaluation; Gender and Diversity; and H2020. Work plans have been, or are being, developed, and work is already underway. Priority areas for 2014 include, but are not limited to: safe havens for data; inter-sectoral mobility; post-doctoral instruments; strategic priority setting for RIs; research integrity policies and awareness raising tools. These activities are complemented by the work of the six Scientific Committees, for example work by the Medical Sciences Committee on 'big data', and the Humanities Committee Opinion Paper, 'Open Access Opportunities for the Humanities'.
- Organisation of the sixth high-level ERA workshop, which took place in February 2014. This brought together Heads of Science Europe Member Organisations, ministerial representatives and EU institutions, as well as representatives of stakeholder partner organisations. This event provided an important platform for

high-level dialogue on ERA-related topics and will continue to take place annually.

- Co-ordination, together with ANR, the French National Research Agency, of the European regional input into the 2014 meeting of the Global Research Council (GRC). This led to a state of play report on Open Access and a ‘Statement of Principles for Shaping the Future: Supporting the Next Generation of Researchers’, which was endorsed by the GRC.
- Publication of the ‘Practical Guide to Three Approaches to Cross-border Collaboration’. This guide provides information and advice on three optional models of collaboration: MfR; Money follows Co-operation Line and Lead Agency Procedure. It is intended to support Member Organisations which wish to implement these models.
- Production, in collaboration with Elsevier’s SciVal Analytics, of the report ‘Comparative Benchmarking of European and US Research Collaboration and Researcher Mobility’. The report looks at the impact of international research collaboration in Europe and the US. It shows that – measured in co-authorship – cross-border research collaboration levels in Europe are comparable to collaboration levels across US state borders. It also shows that there is a big advantage to be gained for European researchers who collaborate with non-European colleagues. The report was published in September 2013 and contributes to the evidence base on the topic of cross-border collaboration.
- Invitation to Science Europe Member Organisations to sign a new ‘Letter of Intent’ to indicate their intention to implement MfR (a model of grant portability), if this is relevant to them. All institutions signing up to this commit to providing publicly-available information on how this is organised in their institution, thus improving the transparency and visibility of MfR.
- Facilitation of Member Organisations’ input into the consultation on the EU Copyright Directive. Also, continuation of advocacy of Science Europe’s position on the European Data Protection Regulation. Science Europe is also working, in collaboration with partners where appropriate, on the related topics of data and text mining, licensing and copyright and data protection. On the last of these, SE released a Position Statement in May 2013 on the proposed European Data Protection Regulation, calling on the EU to safeguard the needs of the scientific community. This was complemented by an Opinion Paper by the SE Medical Sciences Committee: ‘The Benefits of Personal Data Processing for Medical Sciences in the Context of Protection of Patient Privacy and Safety’, which was followed up by a co-hosted roundtable event in the European Parliament in September 2013.

3.7. Actions in support of ERA by the members of EIROforum

Four of the EIROforum members reported actions in support of the implementation of the ERA actions.

3.7.1. CERN (Conseil Européen pour la Recherche Nucléaire)

During 2013 CERN contributed to the implementation of all five ERA priorities as identified in the 2012 Communication on completing the ERA:

More effective national research systems

- In May 2013 CERN Council adopted the updated European Strategy for Particle Physics, which summarises the priorities for Europe in the next decade and is being used as a reference roadmap for particle physics by national funding agencies and by ESFRI.

Optimal co-operation and effective investment and use of RIs

- Israel became the 21st full member of CERN in January 2014;
- The High-Luminosity Upgrade of the LHC is currently in the implementation phase, with contributions from USA, Russia and Japan;
- CERN provides free access to its research facilities for scientists from more than 80 nations, involved in one or more of the many experiments using the accelerator infrastructure of the Organisation.

Open labour market for researchers

- CERN is working towards obtaining and implementing the EC logo 'HR excellence';
- Vacancy notices for all staff positions at CERN, not just Marie Curie fellows, are published on the EURAXESS job portal;
- CERN has an open and merit based recruitment process (e.g. no national quotas) and a career development system;
- Positions for Marie-Curie fellows (ITN and CO-FUND) are open to candidates from any country in the world;
- CERN fellows with a Marie-Curie CO-FUND fellowship may spend up to one year (out of three) in a research institute, university or industrial company of their choice, which facilitates the transition to the next stage of their careers;
- CERN actively contributes to the Task Force on the establishment of a Pan-European Pension Fund for researchers.

Gender equality and gender mainstreaming in research

- The Management of CERN is encouraging institutional changes through the introduction of a diversity programme and discussions on different levels within the Organisation.

Optimal circulation, access to and transfer of scientific knowledge

- CERN plays a leading role in the ongoing implementation of open access for publications in particle physics through the SCOAP3 Open Access publishing initiative, <http://scoap3.org/>;
- CERN continued the development and transfer of digital library technology, as well as Open Access experience, through the FP7 OpenAIREPlus project, notably with the launch of the flagship Zenodo Open Access and Open Data repository. The Open

Access pilot in FP7, supported by OpenAIRPlus is expected to be expanded in H2020, with CERN expected to continue to provide the baseline digital Open Access technology;

- The Organisation supports the promotion of knowledge and technology transfer, including via open source software and open hardware models.

3.7.2. *EMBL (European Molecular Biology Laboratory)*

More effective national research systems

- In 2013 the Nordic EMBL Partnership for Molecular Medicine, which had until then connected institutes of excellence in Norway, Finland and Sweden, was expanded to Denmark. Thus, the EMBL partnership network now comprises national institutes within nine countries and thereby contributes to more effective national systems in life science research;
- To strengthen research links with institutes in its Member States, in 2013 EMBL entered into several agreements envisaging scientific exchange and collaboration. Recognising the potential for synergism in the field of structural biology, EMBL formalised its scientific links with the Karolinska Institutet, Sweden. Collaboration with the Universitätsklinikum Hamburg-Eppendorf, Germany, aims to address the scientific opportunities and challenges in the application of structural biology to understand certain human diseases. Last but not least, agreement with the Fonds National de la Recherche Luxembourg will support research projects of the highest quality put forward jointly by Luxemburgish and EMBL researchers.

Optimal co-operation and effective investment and use of RIs

- EMBL is contributing towards cooperation and effective investment and use of RIs across the ERA by expanding its membership. In 2013 the EMBL Council endorsed the membership of the Czech Republic. In 2013 Malta also submitted an application to become an EMBL Member State. This will be on the agenda of the EMBL Council in summer 2014;
- In 2013 the EMBL Council adopted a policy on prospect membership to facilitate the integration of the molecular biology community in Europe. The aim of the policy is to attract countries from Central and Eastern Europe to join EMBL and thereby encourage better integration of life science research in Europe. Prospect membership of EMBL is of a transitional character and offers broad access to EMBL facilities and services with no financial cost. This policy was welcomed by several European countries and in February 2014 the Slovak Republic became the first EMBL prospect Member State;
- In 2013 EMBL revised its associate membership scheme to further foster the development of mutually beneficial research cooperation activities with non-European states. As a result, in 2013 the EMBL Council approved an application from Argentina to become an associate Member State. Australia has been an EMBL associate Member State since 2008;
- Progress in coordinating national investment in RIs has also been noticeable in ELIXIR and Euro-BioImaging. In 2013 ELIXIR moved into its implementation phase following the entry into force of the ELIXIR Consortium Agreement, which has since been signed by nine European countries and EMBL. In 2013 Euro-BioImaging presented

a MoU which is a first formal step towards establishing this RI. Thus far the Memorandum has been signed by eleven countries and EMBL.

Open labour market for researchers

- In 2013 EMBL was conferred with the EC's 'Excellence in research' logo in recognition of its progress in implementing the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers. EMBL developed a strategy and an action plan, which incorporates the C&C;
- EMBL has remained committed to advertising vacancies on EURAXESS, implementing a merit based recruitment process, launching career development initiatives etc.

Gender equality and gender mainstreaming in research

- During 2013 EMBL management encouraged institutional change through actions of different working groups and discussions on gender equality at different levels within the organisation. An example of one such action was the guidelines drawn up to ensure applications from suitable female candidates during the recruitment of group leaders.

Optimal circulation, access to and transfer of scientific knowledge

- EMBL continuously implements open access (a case in point are the bioinformatics services), provides digital research services and encourages different initiatives with the industry. In addition, Europe PubMed Central, maintained at EMBL-EBI and supported by more than 20 funding organisations, provides free access to life sciences and biomedical research publication information, to enable innovation through use of literature, including text mining, and to facilitate and provide integration of related research data;
- EMBL encourages knowledge transfer via its own technology transfer company.

3.7.3. ESO (European Southern Observatory)

More effective national research systems

- Continuation of ESO's Scientific Instrumentation devolution policies based on a consortia of national institutes (often in different countries) developing advanced scientific instrumentation for ESO's observational facilities;
- Continual discussions with a number of countries in Europe and beyond with an interest in joining the organisation;
- Providing help (expertise) to non-ESO ESFRI projects;
- Establishment of an ESO Council strategy working group to elaborate ESO's role in the wider astronomy and astrophysics landscape in Europe and beyond, including structural relations with major non-ESO undertakings.

An open labour market for researchers

- Open merit based and transparent recruitment: already in place, a review of the recruitment process and tool took place to facilitate applications of PhD candidates, fellows and researchers;
- Other areas (competence framework, performance evaluation for researchers, career development and specific training) are now integrated into the ESO Fellowship programme, etc. and will be implemented in 2014.

Gender equality and gender mainstreaming in research

- Encouraging institutional change through presentations, working groups and discussions at different levels within the organisation;
- Giving priority to gender equality in the recruitment process, in particular for researchers and engineers;
- Follow-up on gender issues identified in our staff engagement survey;
- Focus on gender issues in our regular review of employment conditions (maternity leave, parental leave, Kinderkrippe/Kindergarden, part time/flexible working time, etc.).

3.7.4. ESRF (The European Synchrotron Radiation Facility)

More effective national research systems

The ESRF is the only international synchrotron in the world. Most of the contracting parties of the ESRF also have their own national synchrotron facilities, complementary to the ESRF, which continually benefit from the experience and expertise of the ESRF via numerous collaborations.

Optimal co-operation and effective investment and use of RIs

In May 2013, South Africa signed a medium-term arrangement with the ESRF becoming the 20th country to join the European synchrotron. In August 2013, Israel renewed its Scientific Association with the ESRF for a further 5 year period (2014-2018) with an increased level of financial contribution.

In 2013, the ESRF published a detailed report on the socio-economic impact of the ESRF – 'Impact of the ESRF and its Upgrade Programme'.⁴⁶

Phase I of the ESRF Upgrade Programme (2009-2015), representing an investment of EU 165 million, paves the way to a new generation of beam lines and the substantial improvement of the reliability, stability and brilliance of the synchrotron source and X-ray instruments. It is now close to completion and is being delivered on time and within budget. The second phase of the ESRF Upgrade Programme (UP Phase II) is

46

http://www.esrf.fr/files/live/sites/www/files/about/upgrade/documentation/BROCHURE%20IMPACT%20OF%20ESRF%20AND%20UPGRADE_ENGLISH%20VERSION_LR.pdf

currently being elaborated with users, external experts and the ESRF funding bodies. ESRF UP Phase II represents EUR 150 million of new investment during 2015-2020 centred on an enhanced X-ray source that reduces the horizontal spread or 'emittance' of the ESRF's beams to unprecedented low values. The implementation of Phase II will allow Europe to maintain leadership in synchrotron research for the foreseeable future by enabling new science and the development of new technologies to the benefit of our society.

An open labour market for researchers

The ESRF advertises its open positions widely and continues to use the EURAXESS portal for this purpose. It accepts applications from candidates of all nationalities.

Gender equality and gender mainstreaming in research

In September 2012 the ESRF Management and Unions signed an agreement on gender equality. This agreement has been fully implemented and provides, for example, and amongst others:

- the yearly production of statistics on gender balance (e.g. ensure that the proportion of male/female new recruits reflects as closely as possible the respective proportion present in the applications received);
- that at least one woman is present on recruitment panels;
- that in the case where a male candidate is preferred for a position for which there were also female candidates, a written argumentation be made in the final recruitment proposal to management, providing the reasons, based on objective and neutral criteria, for the choice of that candidate.

4. FINAL REMARKS

4.1.1. Progress in policy support is constantly observed

The Commission could identify, together with Member States, that a variety of actions have been taken since 2013. Table 2 below summarises the type of overall actions in the EU.

Table 3: Number of initiatives taken by Member States since last year's ERA Progress Report.

Type of initiative	Since 2013	Of which in 2014
Law	33	10
Plans (including Action Plans)	14	5
Programme (incl. funding programme)	49	19

Schemes	11	
Non-legal action	12	1
Strategies	60	25
Other type	44	6

The areas where more measures could be identified are, by order of importance 'knowledge transfer and open innovation', 'open access', 'competitive funding' and 'financial commitments for the construction and operation of ESFRI'. The number of measures identified in 2014 is still low (see Table 4).

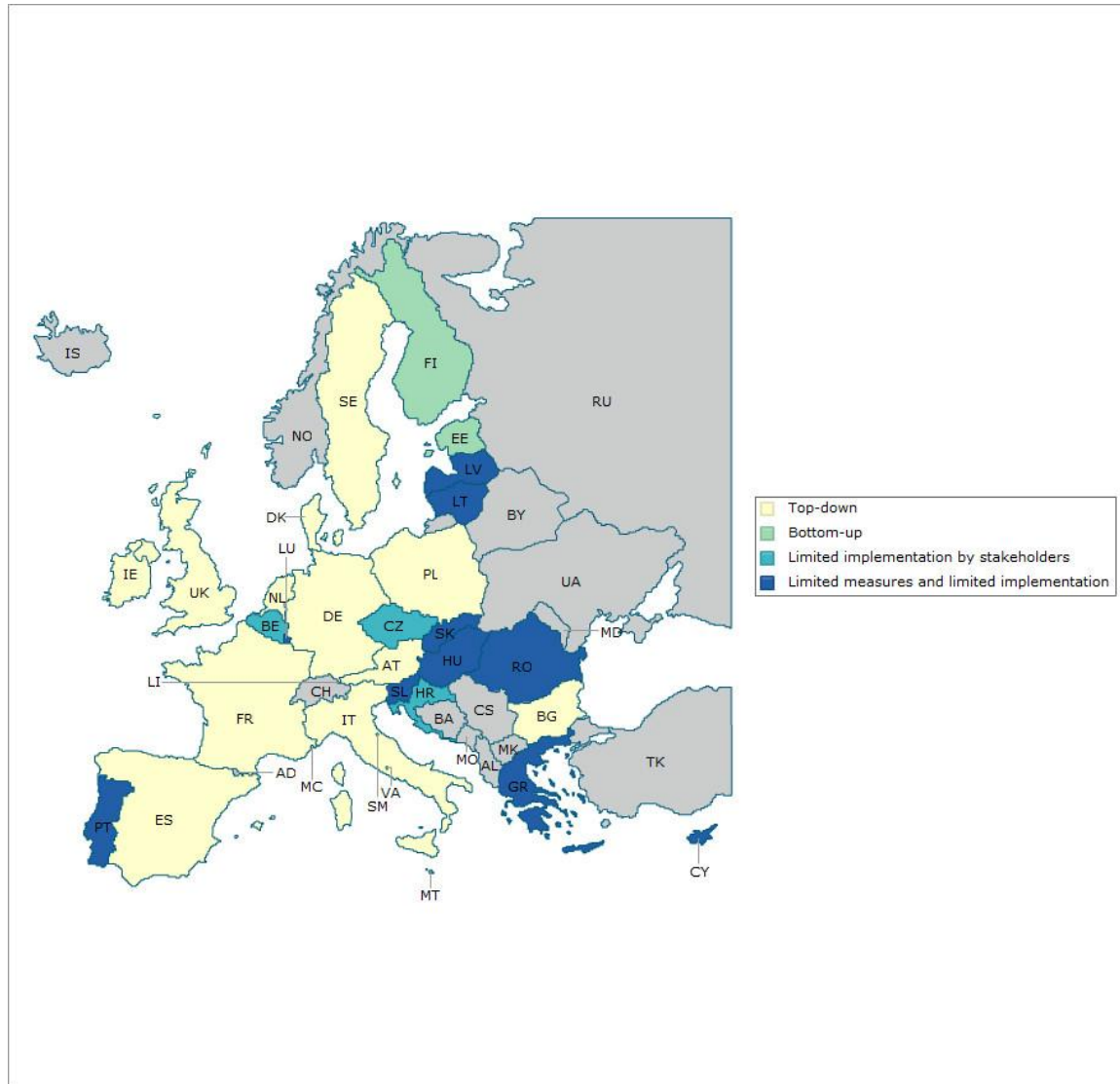
Table 4: Number of measures adopted (or being adopted) by area of intervention

	Since 2013	Of which in 2014
Competitive funding through calls for proposals applying the core principles of international peer review	23	3
Institutional funding based on institutional assessment	18	5
Implement joint research agendas	9	8
Interoperability, mutual recognition of evaluation results and other schemes	9	5
Openness for international cooperation with third countries and regions	2	2
Financial commitments for the construction and operation of ESFRI, national, regional RIs of pan-European interest	23	5
Access to RIs of pan-European interest	4	3
Foster cultural and institutional change on gender	3	
Gender balance in decision making process	19	5
Open access to publications and data resulting from publicly funded research	24	8
Open innovation and knowledge transfer between public and private sectors	48	7
Uptake of federated electronic identities	3	1

4.1.2. ERA national policies lead to ERA implementation

Some of the results⁴⁷ presented in this report are summarised in Map 16⁴⁸. It shows that overall ERA is well implemented.

Map 16: Classification of Member States according to their policies in support of ERA and their implementation



Source: DG RTD

The results also suggest that there is not a single path to ERA. The implementation of ERA above the EU average is in some cases directly driven by funders and RPOs (bottom-up), whilst in some other cases by national and regional policies (top-down). In the cases where in implementation is below the EU average, further efforts seem to be

⁴⁷ The results included concern only some specific aspects related to ERA (they do not include the results on the Open Labour Market for Researchers, which are presented in the corresponding section) , and no weight has been attributed to the different areas, which unbalanced the results: those countries with more actions for example on gender or knowledge transfer will score higher only due to the consideration of more areas in the analysis.

⁴⁸ See annex for a description of the methodology 5.5.

required by RPOs and in some cases also by national and/or regional authorities.
However,

5. ANNEXES

5.1. Assessment of the ERA indicators

Status of the indicators agreed with Member States for the ERA Progress Report 2014							
Priority	Issue	Number	Indicator	Source	Status	Comments	Included in the overall comparison
More effective national systems	Competitive funding through calls for proposals applying the core principles of international peer review	1	Share of national GBAORD allocated as project based funding	EUROSTAT	Partial availability	New indicator EUROSTAT, few countries reported	
		2	Share of funders' budget allocated as project based funding	RFO survey	Estimated		Yes
		3	Share of project based research and development budget allocated through peer review	RFO survey	Not estimated	The question in the survey has to be revised	
	Institutional funding based on institutional assessment	4	Share of institutional funding allocated based on institutional assessment and/or evaluation	RFO survey	Estimated		Yes
Transnational cooperation	Implement joint research agendas	5	National public funding allocated to transnationally coordinated R&D as % of GBAORD	EUROSTAT	Included		
		6	Funders' funding allocated to transnationally coordinated R&D as % of total funding	RFO survey	Estimated		Yes
		7	National public funding allocated to joint research agendas [within transnationally coordinated R&D] as % of GBAORD	RFO survey	Not estimated	Survey responses reflect 34% of total GBAORD	
	Mutual recognition of evaluations that conform to international peer-review standards	8	Share of funders which can base their project based research and development funding decisions on peer reviews carried out by non-national institutions	RFO survey	Estimated		
		9	Share of project based research and development budget allocated through peer review carried out by institutions outside the country	RFO survey	Estimated		Yes
	Common funding principles to make national research programmes compatible, interoperable (cross-border) and simpler for researchers	10	Share of funder's research and development budget dedicated to joint defined research agendas with non-national organisations	RFO survey	Estimated		Yes
		11	Share of funders research and development budget allocated to transnational cooperation through schemes such as Lead-Agency, Money-Follows-Cooperation and Money-Follows-Researchers (differentiating other EU MS from non-EU countries)	RFO survey	Not estimated	The indicator gathers different modalities which are not compatible. It is suggested to identify a new indicator.	
Research infrastructures	Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest	12	Share of cumulated GBAORD committed to the construction and operation of the ESFRI Roadmap	MS/ESFRI	Not estimated	Only one MS provided the information	
		13	Number of Member States which have adopted a detailed roadmap with planned expenditure and related timing with regard to ESFRI	ESFRI/MS	Estimated		Yes
	Access to Research Infrastructures of pan-european interest	14	Share of non-national researchers using RI (separating other EU MS from non-EU countries)	MS	Not estimated	The questions in the survey should be modified. A specific survey of ESFRI and EIROs should be undertaken	Yes

Open labour markets for researchers	Open, transparent and merit based recruitment of researchers	15	Share of organisations which systematically advertise openly first stage researchers vacancies announcements including the job profile, skills and competencies required and eligibility criteria	RPO survey	Not estimated	Alternative source: RTD data on EURAXESS	
		16	Share of organisations which systematically advertise openly other researchers vacancies announcements including the job profile, skills and competencies required and eligibility criteria	RPO survey	Not estimated	Alternative source: RTD data on EURAXESS	
		17	Share of organisations systematically publishing vacancies in Euraxess for first stage researchers	RPO survey	Not estimated	Alternative source: RTD data on EURAXESS	
		18	Share of organisations systematically publishing vacancies in Euraxess for all other researchers	RPO survey	Not estimated	Alternative source: RTD data on EURAXESS	
	Promote researchers careers	19	Share of funders supporting the uptake of Code and Charter principles in line with the HR Strategy	RFO Survey	Not estimated	Alternative source: RTD data on C&C	
		20	Share of institutions implementing the Code and Charter principles in line with the HR strategy where applicable	RPO survey	Not estimated	Alternative source: RTD data on HR Strategy logo	
	Cross-border access to and portability of national grants	21	Share of funders whose grants are systematically accessible to research organisations and researchers located outside the country and not belonging to intergovernmental organisations	RFO Survey	Not estimated	Questions to be reviewed	
		22	Share of funders whose majority of grants are portable abroad	RFO Survey	Not estimated	Questions to be reviewed	
	Support structured innovative doctoral training programmes	23	Share of research performing organisations systematically including schemes or activities to expose PhD students to industry/other relevant employment sector	RPO survey	Not estimated	Data to be reviewed by SGHRM WG Monitoring	
		24	Share of research funding organisations systematically providing support for the implementation of structured doctoral training based on the Principles for Innovative Doctoral Training	RFO Survey	Not estimated	Data to be reviewed by SGHRM WG Monitoring	
	Support mobility between private and public sector	25	Share of research performing organisations systematically implementing programmes and/or actions to support researchers mobility outside academia	RPO survey	Not estimated	Data to be reviewed by SGHRM WG Monitoring	
Gender	Foster cultural and institutional change on gender	26	Share of funders supporting systematically gender equality in research and the inclusion of gender dimension in research content	RFO Survey	Estimated		Yes
		27	Share of research performing organisations implementing recruitment and promotion policies for female researchers	RPO survey	Estimated		Yes
		28	Share of research performing organisations which include the gender dimension in research content	RPO survey	Estimated		Yes
		29	Share of funders including systematically the gender dimension in research content when allocating research and development funding	RFO Survey	Estimated		Yes
		30	Share of research performing organisations which have adopted Gender Equality Plans	RPO survey	Estimated		Yes
	Gender balance in decision making process	31	Share of gender-balanced recruitment committees for leading researchers in research performing organisations	RPO survey	Estimated		Yes
		32	Share of gender-balanced research evaluation panels in research funding organisations	RFO survey	Estimated		Yes

Knowledge circulation	Open access for publications and data resulting from publicly funded research	33	Share of funders funding systematically open access to publications	RFO Survey	Estimated		Yes
		34	Share of funders funding systematically open access to data	RFO Survey	Estimated		Yes
		35	Share of research performing organisations making available on-line and free of charge [publicly funded] scientific research data systematically	RPO survey	Estimated		Yes
	Open innovation (OI) and knowledge transfer (KT) between public and private sectors	36	Share of funders supporting systematically the implementation of knowledge transfer as part of its institutional and/or project based funding	RFO Survey	Estimated		Yes
		37	Share of staff whose primary occupation is in the private sector (in Full Time Equivalents)	RPO survey	Estimated		Yes
		38	Share of research and development budget financed by private sector	RPO survey	Estimated		Yes
		39	Share of research performing organisations having or using a structure for knowledge transfer activities	RPO survey	Estimated		Yes
	Harmonise policies for public e-infrastructures and associated digital research services	40	Share of research performing organisations having dedicated staff employed in knowledge transfer activities	RPO survey	Estimated		Yes
		41	Share of funders R&D budget dedicated to support the development and uptake of digital research services	RFO Survey	Not estimated	The target audience has to be revisited	
	Uptake of federated electronic identities	42	Share of research performing organisations providing digital research services (i.e. cloud services, research collaboration platform, etc.)	RPO survey	Estimated	The type of digital service may need to be revisited (select the most relevant(s))	No, difficult to identify the relevant variable
		43	Share of funders research and development budget dedicated to support the development and uptake of federated electronic identities	RFO Survey	Not estimated	The target audience has to be revisited	
		44	Share of research performing organisations providing federated electronic identities for their researchers	RPO survey	Estimated		Yes
International Dimension	Openness of Member State/Associated Country (MS/AC) for international cooperation	45	Share of organisation's research and development budget originating from third countries	RPO survey	Estimated		Yes
		46	Share of research and development budget allocated to collaboration programmes carried out with third countries	RFO survey	Estimated		Yes

Outputs	47	Publications by researcher	SCOPUS	Included	New indicator	
		Share of scientific publications with authors from different countries (separating EU and non-EU countries)	SCOPUS	Included	Modified to Number of scientific publications with authors from different countries (separating EU and non-Eu countries)	
	48	Share of top 10% scientific publications	SCOPUS	Not estimated	Lack of time	
	49	Share of [publicly funded] scientific publications in OA amongst research performing organisations	RPO survey	Estimated		
	50	Share of researchers who feel that recruitment procedures are open, transparent and merit-based	MORE SURVEY	Included		
	51	Share of non-national researchers (differentiating between other EU MS from non-EU countries)	RPO survey	Estimated		
	52	Share of non-EU students in tertiary education	EUROSTAT	Included		
	53	Share of non-EU doctoral holders	EUROSTAT	Replaced	Share of non-EU doctoral holders candidates	
	54	Share of female PhD graduates	EUROSTAT	Included		
	55	Share of female researchers	EUROSTAT	Included		
	56	Share of female senior researchers (grade A)	She Figures	Included		
	57	Share of females who are head of organisation	RPO survey	Estimated		
	58	Rate of growth of patents held by Research Performing Organisations	RPO survey	Not estimated	Only one observation available	
	59	Rate of growth of licences held by Research Performing Organisations	RPO survey	Not estimated	Only one observation available	
	60	Rate of growth of licence income received by Research Performing Organisations	RPO survey	Not estimated	Only one observation available	
	61	Rate of growth of collaborative agreements with the private sector and/or non-governmental sector	RPO survey	Not estimated	Only one observation available	
		Patents by researcher	RTD analysis	Included	New indicator	
	62	Share of co-patents held with non-national institutions (differentiating between other EU MS from non-EU countries)	RPO survey	Not estimated	Too many missing values among the answers	
	63	Share of co-patents held with the private sector	RPO survey	Not estimated	Too many missing values among the answers	

5.2. Methodology for clustering the RPOs (2014 ERA survey)

This section presents the characteristics of the ERA survey and the methodology used to cluster RPOs according to their ERA compliance.

5.3. The 2014 ERA survey

The second ERA survey is the continuation of the first survey of RPOs in the ERA launched in 2012, to identify the implementation status of the different ERA priorities. Only public research organisations (universities, institutes, hospitals, research agencies, etc.) or organisations under private law with a public mission were concerned.

The 2014 questionnaire was drafted by an Expert Group taking advantage of the experience acquired in the previous exercise as well as contributions from national representatives. The resulting 2014 questionnaire is a simplified version of the previous one and mainly gathers information to estimate indicators agreed with Member States. It also introduces the possibility of answering 'not applicable' to the questions to reflect the fact that sometimes they cannot implement the ERA actions because they do not correspond to their mandate or institutional characteristics. A new organisation category, Research and Technology Organisations (RTOs), with distinctive, mission-oriented R&D objectives, was also included. The questionnaire was administered online through a dedicated webpage created on the European Commission ERA website. Launched on 28 February 2014, it was closed on 9 April 2014. In many cases the organisations were contacted after the closure to validate some of the information provided.

The survey addresses specific issues linked to the ERA priorities: institutional assessment for funding; RIs, open labour market for researchers; gender issues and knowledge circulation. Questions regarding transnational co-operations with EU countries were not considered in the 2014 survey in order to reduce the response burden. Therefore, a quantitative and statistical comparison with the results of the first survey cannot be carried out. However, a qualitative study based on some common items is possible.

The Commission received 1,265 responses by RPOs in 2014 (this number is not far from the 1,374 received in 2013 after removal of duplicates, incomplete, wrong and unreliable records). The representativeness of the data is estimated to be 31.6 % when considering the total number of staff (headcount) of the research organisations at EU level (it was equal to 31.2 % in the 2012 survey). However, only around one third (471) of the RPO responded to both surveys.

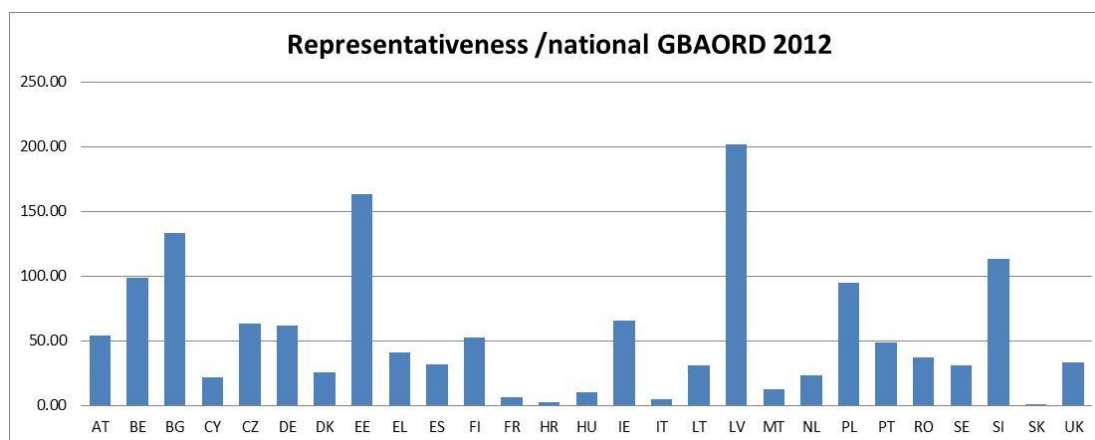
The data was collected in textual or numerical format, transformed and recoded into a numeric format to be analysed with statistical software packages.

In terms of the geographical distribution of RPO respondents in 2014, it appears that some countries participated better than in 2012 (the most notable being Germany, Austria and Estonia) while it was the opposite in the case of Poland, Belgium, Italy. However, for most of the countries, these numbers remain quite stable (although, as mentioned above, they may be not the same organisations). Among the ACs, a high number of responses were received from Turkey.

In terms of representativeness of the answers from funders, their total budget represents around 34 % of total GBAORD in the EU (see Graph 36). However, the analysis by

country shows figures above 100 % of GBAORD. This is explained by the fact that the figures provided also include the budgets dedicated to education.

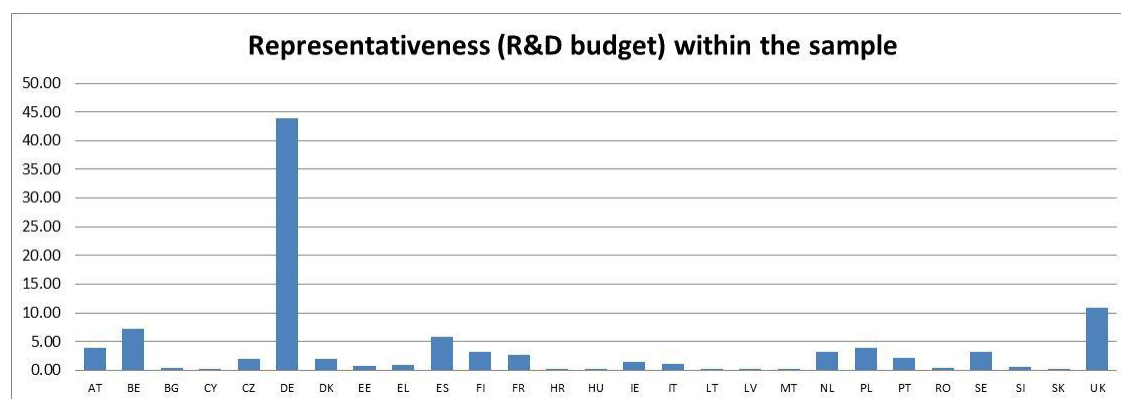
Graph 36: Representativeness of fs when compared with national GBAORD 2012.



Source: Eurostat (GBAORD) and ERA survey 2014 (Research funders budget)

The importance of funding managed by national funders among all funders who responded to the survey is shown in Graph 37. The high level of funding managed by German funders affects the estimation of EU averages. Besides, the table shows the limited participation in the total budget of the four cases which declared budgets above the 100 % of GBOARD.

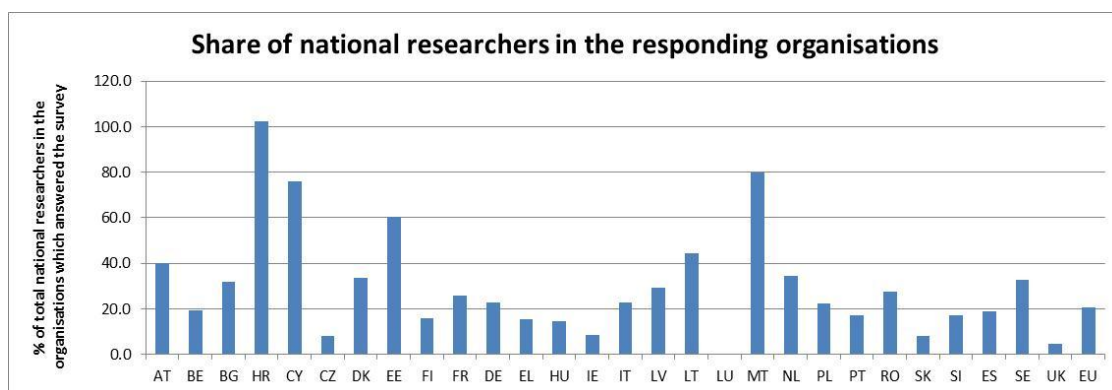
Graph 37: Share of total funding managed by responding funders, by country



It should be noted that the denominators used for the estimation of the EU averages include (very limited) amounts of funding dedicated to education.

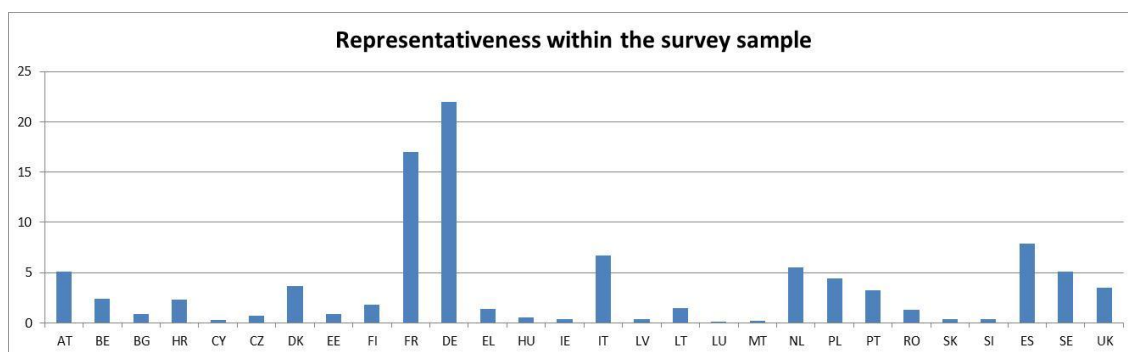
Concerning RPOs, respondents to the survey gather around 20 % of the total research population in the EU. Graph 38 shows the important share of researchers in the case of France and Germany.

Graph 38: Representativeness of RPOs in terms of total researchers in the country



The representativeness of the survey in terms of share of national researchers is important in Germany, France, Spain and Italy, which affects the EU average (notably by the German institutions) (see Graph 39).

Graph 39: Share of country's researchers among the total number of researchers in responding RPOs



5.4. Clustering RPOs according to ERA compliance

The responses to the survey can be used to group the organisations according to their different propensity towards the implementation of ERA actions. One possible methodology is to undertake a multivariate analysis. This type of statistical analysis enables the simultaneous representation of the variables and/or the cases of a dataset in order to synthesize the information (aka, the variance) of the sample (Di Franco 2001, 181). Usually, multivariate analysis requires an adequate number of variables (at least 3, but more than 4 are generally recommended) and cases (many suggest at least 20 cases per variables), otherwise results might not be statistically significant. Considering the objective of the analysis goal and the categorical and ordinal nature of the majority of the variables in the dataset, the 'French way' to conduct multivariate analysis (Benzecri, 1973; Di Franco, 2006; Greenacre & Blasius, 2006; Holmes, 2007), was adopted. The most common procedure of this approach consists of two multivariate techniques applied in sequence: first an MCA (multiple correspondence analysis, similar to a factor analysis, but applied to categorical data) to synthesize many variables into single factors; then a clustering method in order to group the cases according to MCA outcomes.

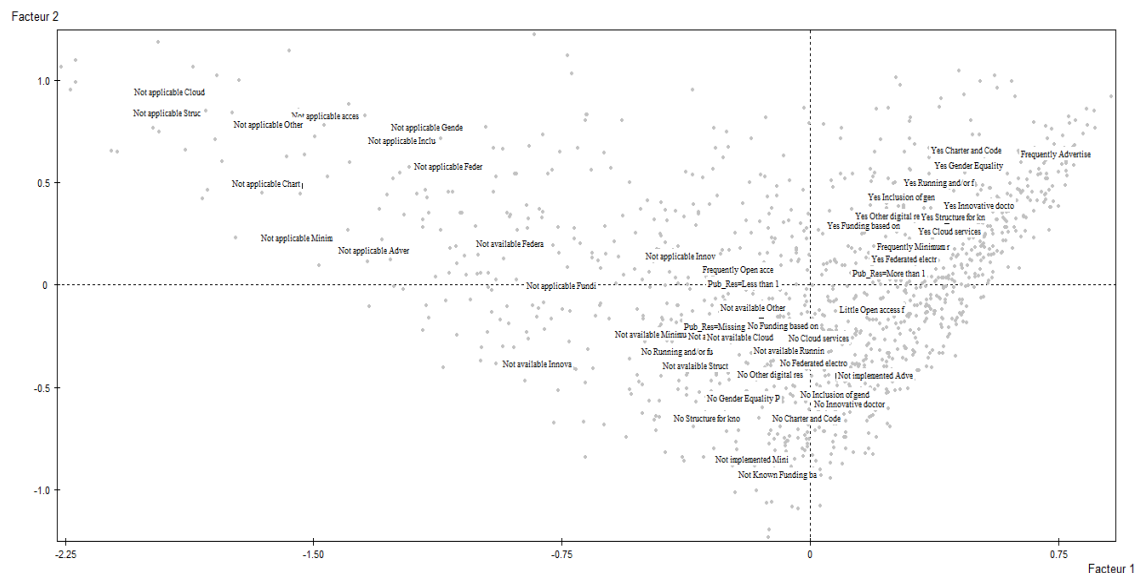
The responses to the survey were used to carry out basic univariate statistics. Variables with too many missing values, too high redundancy or unbalanced distributions were excluded from the analysis. Those remaining were used for a descriptive multidimensional (i.e. multivariate) analysis using factorial and clustering methods to

group the organisations according to their propensity towards the implementation of the ERA actions. The variables retained are: *Funding based on assessment by the funding organisation, Running and/or funding RIs; Research vacancies advertised on Euraxess; Minimum requirements for recruitment included in the vacancies announcement; adoption of the C&C principles; Adoption of innovative doctoral training principles; Adoption of GEP; Inclusion of gender dimension in research content; Open access for data; Presence of a structure for knowledge transfer activities; Provision of federated electronic identity; Provision of cloud services, Provision of other digital research services; Number of publications per researcher.*

The main results of the multivariate analysis are:

- The first factorial plane in Graph 40 shows how the variables (issued from the questions) contribute to the factor formation. The most informative parts in this plane are the lower-half and the right-half regions (the left-half corresponding mainly to organisations replying 'not applicable').

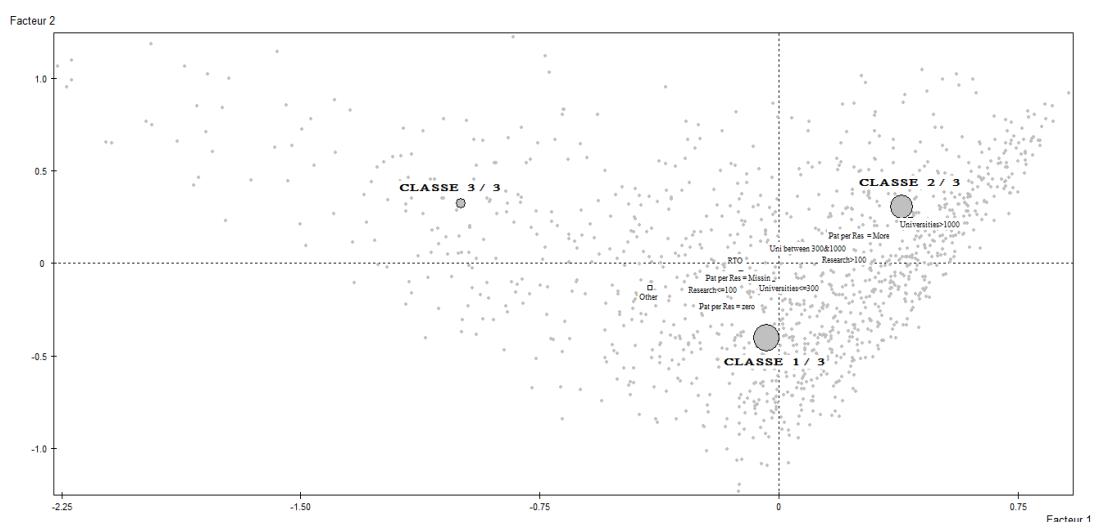
Graph 40: Variables projected onto the first factorial plane F1-F2



NB: Dots represent organisations

- As depicted in the first factorial plane, through clustering techniques three clusters can be identified. They are labelled as: 'Limited compliance to ERA' (Cluster 1, in Graph 41); 'ERA compliance' (cluster 2); 'Not applicable' (cluster 3).

Graph 41: First factorial plane with organisations identified by size and jointly projected with patents.



NB: The circles represent positions of the centres of mass of the clusters. Their sizes are proportional to the cardinals of each cluster.

It should be noted that the inclusion of an organisation in a cluster does not necessarily mean that it fits the 'expected' profile of the cluster perfectly, i.e. if an organisation is included in the 'ERA compliance' cluster, it does not mean that this organisation fully implements all the ERA priorities. Its inclusion in the 'ERA compliance' cluster means that this organisation has a similar pattern of answers to other organisations which show a high propensity towards ERA. The same applies for the other clusters.

Cluster 1, labelled 'Limited compliance to ERA', gathers 565 organisations which show a limited propensity towards the implementation of ERA. Their implementation (occasionally) appears to be confined to few ERA actions. From a statistical point of view, this cluster is characterised by low percentages of organisations implementing some actions such as: occasional implementation of 'advertising on Euraxess' (6.9 % of the organisations belonging to this cluster); 'C&C principles' (9.6 %); 'GEP' and 'inclusion of gender dimension' (about 20 % when averaging the two corresponding scores); a moderately better situation regarding 'funding based on assessment' (36.5 %); 'minimum requirements in vacancy announcements' (44.2 %); 'existence of a structure for knowledge transfer' (30.4 %); 'provision of federated electronic identity'; 'provision of cloud services'. The proportion of 'not available' responses for 'innovative doctoral training' is high (45.3 % of organisations in the cluster).

Cluster 2, called 'ERA compliance', gathers 501 organisations which appear to be more inclined to implement ERA actions. The profile of an 'ERA compliant' organisation is characterised by the implementation (often frequently) of the majority of the variables used for the cluster analysis. From a statistical point of view, this cluster can be described by: a large majority (about or more than 80 %) of organisations replying 'yes' or 'frequently' to the effective implementation on 'minimal requirements for researcher's recruitment', 'structure for knowledge transfer'; a rather high percentage (about 2/3 or higher) for 'funding based on assessment', 'running/funding RIs', 'implementation of the C&C principles', 'adoption of GEP', adoption of innovative doctoral training principles'; a mixed picture for 'vacancies advertised on Euraxess' (50.7 %), 'inclusion of gender dimension in research contents' (47.7 %), 'provision of federated electronic identity'

(55.3 %), 'provision of other digital services' (48.1 %); a modest performance for 'open access for data' (27.5 %) and 'provision of cloud services' (38.9 %).

Cluster 3, called 'ERA not applicable', gathers 199 organisations. This cluster is the most difficult to describe because the organisations which indicated that the implementation of ERA is 'not applicable' according to their mandate. In other words, the organisations belonging to this cluster do not find an appropriate answer to the majority of the questions. The statistical analysis shows that, most often, the answer 'not applicable' represents the higher percentage of responses such as 'advertised on Euraxess', 'minimum requirements included in the vacancy announcement', 'implementation of the C&C principles', 'adoption of GEP'; however, for some questions the 'not available' percentage of responses is the highest, such as 'adoption of innovative doctoral training principles' (59.3 %) and 'provision of federated electronic identity' (44.2 %).

Although the cardinal (i.e. the number of organisations) of the cluster 'Limited compliance to ERA' (565) is slightly higher than the one of 'ERA compliance' (501), the latter represents 80.6 % of the total number of researchers, while the former only 16.5 %. The 'not applicable' cluster gathers the remaining 2.9 %.

The RTOs and 'others' represent respectively 179 and 214 organisations. If the RTOs show a relatively balanced distribution in the two above clusters (keeping the same order of presentation 81 and 65), the 'other' category is mainly concentrated in the 'Limited compliance to ERA' cluster (114) and very few (26) in the 'ERA compliance' cluster. Hospitals, museums, libraries are included in the 'other' category of respondents.

The size of the organisations is an important factor regarding the extent to which they are actively engaged in adopting and implementing ERA actions; larger organisations in the sample appear to be more compliant. High ratios are observed for instance regarding the 'funding based on assessment by the funding organisation' for universities larger than 1000: 97 responding 'yes' in the cluster 'ERA compliance' out of a total of 108. For 'running and/or funding RIs', while the 'yes' is balanced between the two clusters 'Limited compliance to ERA' and 'ERA compliance' (21 and 22 respectively) for research organisations less than 100, these values are very different (respectively 20 against 76) when the size is bigger than 100. The same figures are observed for 'advertised on Euraxess': they are even more pronounced with 99 responses 'frequently' out of a total of 105 for universities larger than 1000.

It should be stressed that the three clusters do not discriminate against organisations according to 'positive' and 'negative' implementation of the ERA actions. There are always organisations that respond negatively or positively in each cluster. For instance, 44.2 % of the organisations in 'Limited compliance to ERA' replied 'frequently' to the question on minimal requirements (to be compared however to the 85.6 % of the 'ERA compliance' cluster). The same observation can be made for innovative doctoral training where implementation is respectively undertaken by 28.7 % and 73.1 % of the organisations. In terms of adoption of a gender equality plan 18.9 % of the organisations in the 'Limited compliance to ERA' cluster answered 'yes' while 75.2 % replied 'no' (62.1 % and 30.5 % respectively in the 'ERA compliance' cluster). In other words, the clusters show a trend more toward ERA implementation than a strict frontier between the two groups. This is also true for the 'not applicable' cluster, although at a much lower level.

Regarding the distribution per country, it appears that the number of organisations in the 'Limited compliance to ERA' surpass the 'ERA compliance' in the majority of countries. Half or almost half of organisations belonging to countries such as Austria, Belgium, Bulgaria, Greece, Hungary, Ireland and Slovakia are clustered in the 'Limited compliance to ERA'. The countries whose majority of organisations belong to the 'ERA compliance' cluster are, amongst others, Italy, The Netherlands, United Kingdom, Norway and Switzerland. The only country where there is a large difference is Germany: 83 organisations out of 127 are classified in the 'ERA compliance' cluster (10 being in the 'Not applicable' cluster). However, the situation changes radically when the analysis is done with respect to the number of researchers in the organisations. In this case, only four countries have a majority of organisations in the 'ERA compliance' cluster.

5.5. Matching ERA policies with ERA implementation

In order to provide a synthetic view of the previous analysis and reflect the overall ERA compliance, policy and implementation indexes were built up. In situations where policy for the ERA priority was identified, the country was given a mark of one, whereas, when policies were not identified, the country was given a mark of zero. In situations where the implementation of the ERA action is above the EU average, the country was given a mark of one, and vice versa, when the implementation was below the EU average, the country was given a mark of zero.

Table 5 presents the ERA areas which were considered in this assessment. The domains related with the open labour market for researchers are not included as the analysis is presented in the relevant section of this report.

For example, a country in which there is a strategy in place to support the implementation of a joint research agenda and the share of funding to joint research agendas is above the EU average, the country received a mark of 1 in terms of policy support and 1 in terms of implementation. In cases where there is no strategy but the share of funding is above the EU average, the country received a mark of 0 and 1, respectively.

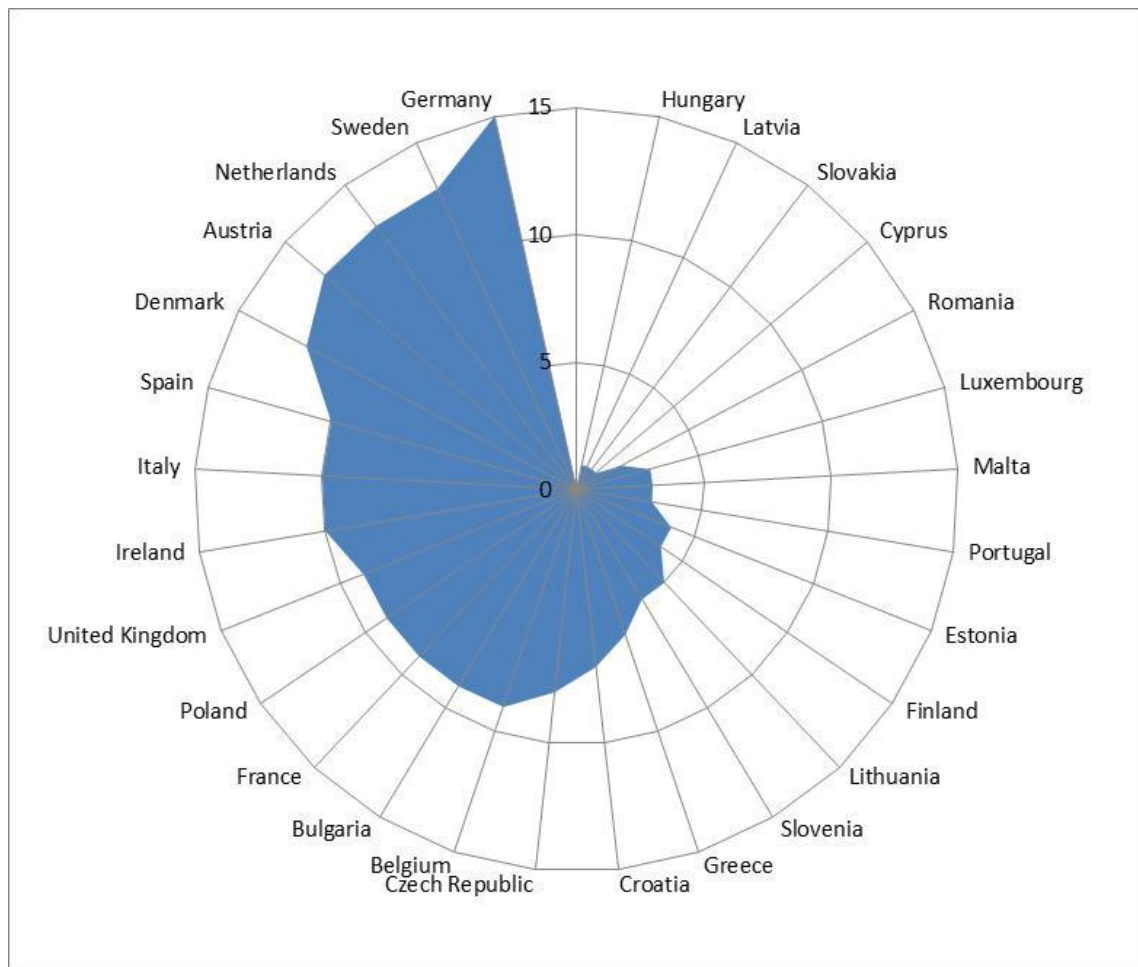
Table 5: Score given for each domain of activity to the policy support and to the implementation by funders or performers

	Policy support		Implementation by funders or	
	Identified	Not identified	Above EU average	Below EU average
Performance based funding	1	0	1	0
Institutional funding based on institutional assessment	1	0	1	0
Funding of joint research agendas	1	0	1	0
Funding of international cooperation	1	0	1	0
Implementation of Gender Action Plans by research performing organisations	1	0	1	0
Support to gender equality by funders	1	0	1	0
Share of head of RPOs which are women	1	0	1	0
Inclusion of the gender dimension in research contents by funders	1	0	1	0
Inclusion of the gender dimension in research contents by performers	1	0	1	0
Support to open access to publications by funders	1	0	1	0
Support to open access to data by funders	1	0	1	0
Provision of open access to data by RPOs	1	0	1	0
Support to knowledge transfer by funders	1	0	1	0
Presence of technology transfer offices	1	0	1	0
Provision of federated identities	1	0	1	0
Maximum score	15		15	

For each country, the total scores are added up, independently of the fact that there is a matching between policy and implementation.

The following graphs compare the situation across Member States. Eight Member States have adopted policies in more than of the 10 areas mentioned above (see Graph 42).

Graph 42: Number of areas in which policy has been adopted in the different Member States.

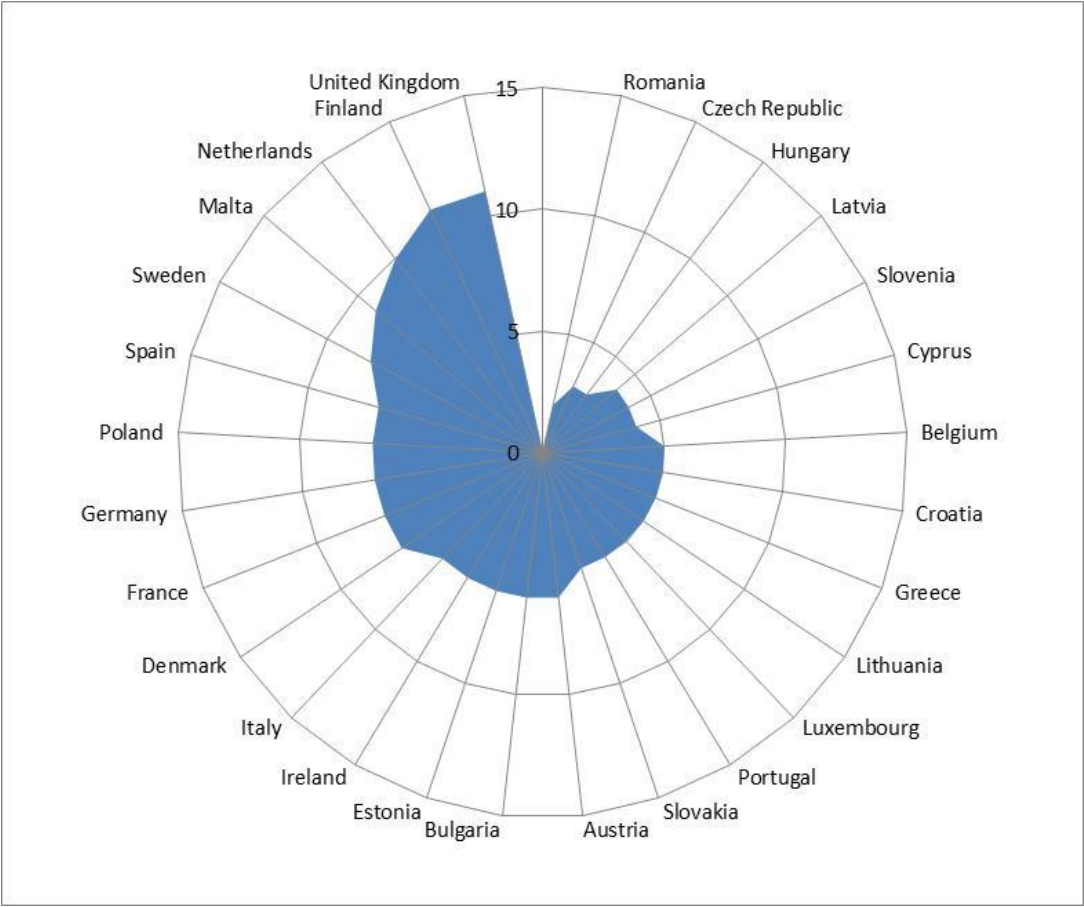


Source: DG RTD, ERA policy reforms unit

Note: Results on the open labour market for researchers are not included in this graph.

The number of areas where implementation is above the EU average is lower than in the previous case. For example, only in three countries (and they are not always the same) it can be observed an implementation above the EU average in ten 10 areas (see Graph 43).

Graph 43: Number of areas in which implementation by Member State is above the EU average.



5.6. How to analyse the results of the survey in the country fiches

Annex 5.1 presents the indicators that were agreed with Member States. Among the list, 35 are being included either in the Country snapshot or in the relevant section in the Country fiches.

The results in the current version are presented in the form of tables with the following headings:

Indicator	Level/ cluster	Value	Year	Source
-----------	-------------------	-------	------	--------

The level/cluster column indicates the following possibilities:

- For the case of funders, there are two values: National (the result observed at national level) and EU (the result observed in the average at EU level).
- For the case of RPOs, there are up to four values: the results observed at national level, presented according to the degree of ERA compliance of RPOs (ERA compliant, Limited Compliance and ERA not applicable) and the result observed at EU level only for the cluster 'ERA compliant' (it can be recognised by the title 'ERA compliant at EU level').

In the publishable version of the report, the results will be presented in a graphic format.

For the snapshots, the following indicators were retained:

Indicator	Rationale
GBAORD	Government budget appropriations or outlays on R&D (GBAORD) are all appropriations allocated to R&D in central government or federal budgets and therefore refer to budget provisions, not to actual expenditure. Provincial or state government should be included when its contribution is significant. GBAORD measures government direct support to R&D activities.
GBAORD per capita	The indicator presents Government Budget Appropriations or Outlays on R&D normalised by population in order to allow for the comparison of spending efforts related to the population of a country.
GBAORD/GDP	The indicator GBAORD as a % of GDP shows how much priority government gives to the public funding of R&D in the economy.
GBAORD as share of total government expenditures	The indicator GBAORD as a % of total government expenditure shows how much priority government places on the public funding of R&D.

Indicator	Rationale
R&D tax incentives (as a share of GBAORD)	Tax incentives for R&D are a form of indirect support for R&D. It is a market-based tool aimed at reducing the marginal cost of R&D activities. It reflects the willingness of a government to give up revenues in the short-term in order to foster R&D in the private sector.
Share of GBAORD allocated as project funding	The indicator presents the share of GBAORD allocated to a group or an individual to perform a R&D activity limited in scope, budget and time, normally on the basis of the submission of a project proposal describing the research activities to be done.
Share of GBAORD allocated as institutional funding	The indicator presents the share of GBAORD which is allocated to institutions with no direct selection of R&D project or programmes to be performed. Under this type of funding, it is the receiving institution that has discretion over the R&D projects that are to be performed, not the funding organisation.
Share of GBAORD allocated to transnationally coordinated R&D	The indicator presents the share of GBAORD which is allocated to transnational cooperation activities. It includes the contributions to transnational public R&D performers; Europe-wide transnational public R&D programmes and bilateral or multilateral public R&D programmes established directly between Member State governments. It reflects the importance given by the government to collaboration and sharing of experiences in R&D across borders, whether national, regional or organisational, as an effective way to access new ideas, innovative approaches and new skills.
Number of researchers (headcount)	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. Head count data corresponds to the total number of researchers employed by the public and private sectors.
Number of researchers/1000 active population (headcount)	The indicator presents the total number of researchers as a share of active population.
Non-EU doctorate students as a percentage of all doctorate students	This indicator presents the share of non-EU doctorate students among all doctoral students measure in headcounts at a particular point in time. It reflects the openness of the education system to students from outside the EU.
Share of women researchers (headcount)	It addresses gender balance among researchers.
Share of women PhD graduates (% based on headcount)	It presents gender balance after PhD graduation. Compared with the share of women researchers, the different represents the degree of utilisation

Indicator	Rationale
	(in the country) of potential female scientists
Share of women senior researchers (% based on headcount)	This indicator addresses gender balance in senior research positions. It can be compared with the share of women researchers as a proxy for the openness of the national public research system for career progression of women researchers.
Share of women heads of institutions in the Higher Education Sector (% based on headcount)	This indicator highlights gender balance in leading positions. It can be compared with the share of women researchers as a proxy for the capacity of the national public research system to ensure career progression for women.
Publications by researcher	<p>The indicator has been estimated using the total number of publications in international publications databases and the total number of researchers in the country.</p> <p>Publications are research articles, reviews, notes and letters published in referenced journals which are included in the Scopus database of Elsevier. A full counting method was used at the country level. However, for the EU aggregate, double counts of multiple occurrences of EU Member States in the same record were excluded. Source: Scopus (Elsevier); treatments and calculations: Science Metrix.</p> <p>It measures the scientific productivity of the national research system.</p>
Co-publications within the EU by researcher	<p>EU transnational co-publications refer to international co-publications which involve at least one author from an EU country. This category includes both co-publications by authors from at least two different EU Member States (as defined by research papers containing at least two authors' addresses in different countries) and co-publications between one or several authors from the EU together with at least one author from a country outside the EU.</p> <p>It has been estimated using the total number of EU transnational co-publications and the total number of researchers in the country.</p> <p>It is a proxy to analyse the degree of openness of the national system to collaborate within Europe.</p>

Indicator	Rationale
Co-publications with researchers from outside the EU by researcher	<p>Extra-EU co-publications is a sub-category of the broader EU transnational co-publications. It refers exclusively to international co-publications involving at least one EU author and at least one non-EU author, as defined by the authors' addresses in different countries.</p> <p>The indicator has been estimated using the total number of Extra-EU co-publications and the total number of researchers in the country.</p> <p>It is a proxy to analyse the degree of openness of the national system to collaborate with researchers working in institutions located outside Europe.</p>
PCT patent applications by researcher	<p>The Patent Cooperation Treaty (PCT) is an international treaty, administered by the World Intellectual Property Organization (WIPO), signed by 133 Paris Convention countries. The PCT makes it possible to seek patent protection for an invention simultaneously in each of a large number of countries by filing a single “international” patent application instead of filing several separate national or regional applications. Indicators based on PCT applications are relatively free from the "home advantage" bias (proportionate to their inventive activity, domestic applicants tend to file more patents in their home country than non-resident applicants). The granting of patents remains under the control of the national or regional patent offices. The national distribution of patent applications is assigned according to the inventor's country of residence. If one application has more than one inventor, the application is divided equally among all of them and subsequently among their countries of residence, thus avoiding double counting.</p> <p>The indicator has been estimated using data computed by Bocconi University (Italy), based on WIPO-PCT applications and PATSTAT database for the number of patent applications and Eurostat for the number of researchers (number of patent applications per country/number of researchers in the same country).</p> <p>In general, patent applications can be filed by researchers and non-researchers. However, data is not available on the occupation of the inventor. Therefore, this proxy is presented to compare the effectiveness of national research systems in terms of PCT patent applications.</p>

5.7. Glossary

2010 European Strategy Forum on Research Infrastructure (ESFRI) Roadmap⁴⁹: the ESFRI Roadmap identifies new RIs of pan-European interest corresponding to the long term needs of the European research communities. It covers all scientific areas, regardless of possible location.

Applied research: applied research is an original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective (Source: OECD, 2002).

Assessment or evaluation procedure (within the context of funding allocation): evaluation procedure which analyses the entire institution in terms of input, throughput (processes) and output factors. Among the latter, the assessment may include research performance and may be linked to funding allocation. Salaries and other staff costs are not included in the assessment.

Associate country to the EU Framework Programme (AC): several countries are associated with the implementation of the EU 7th Framework Programme for Research and Technological Development. These include Albania, Bosnia & Herzegovina, Faroe Islands, Iceland, Israel, Liechtenstein, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Norway, Serbia, Switzerland and Turkey.

Basic (fundamental) research: basic research is experimental or theoretical work undertaken primarily to acquire new knowledge of underlying foundations of phenomena and observable facts, without any particular application or use in view (Source: OECD, 2002).

Cloud services: services to remotely deliver computing and storage capacity to end-users.

Collaboration programmes (within the context of international cooperation): programmes whose activities have been agreed on or arranged by the national agency and agencies of one or more third countries aimed at promoting collaboration in research between organisations or individuals from these countries.

Collaborative agreement: an agreement between two or more legal entities to co-invest in the R&D of products or processes.

Computing services: services enabling researchers to use local or remote computing resources, offered, for example, by High Performance Computers, or distributed grid- or cloud-based computing infrastructures. For example, PRACE and EGI support the development and provision of these services in the EU.

Dedicated staff employed in knowledge transfer activities: number of employed people engaged in KT activity.

⁴⁹ http://ec.europa.eu/research/infrastructures/pdf/esfri-strategy_report_and_roadmap.pdf#view=fit&pagemode=none

Digital research services: examples of digital services include scientific repositories, computing services, cloud services (from external provider), scientific software, research collaboration platform, etc.

European Union (EU): economic and political union of 28 Member States. EU countries namely: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

EU countries: countries which are part of the EU. These include Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

EU Framework Programme for Research and Technological Development: the EU's main instrument for funding research in Europe. It provides grants to research actors in Europe and beyond, in order to co-finance research, technological development and demonstration projects. Grants are determined on the basis of calls for proposals and a peer review process.

EURAXESS portal⁵⁰: a service which provides information and services to mobile researchers.

European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers⁵¹: aims to ensure that the nature of the relationship between researchers and employers or funders is conducive to successful performance in generating, transferring, sharing and disseminating knowledge and technological development, and to the career development of researchers. It outlines a set of general principles and requirements which specifies the roles, responsibilities and entitlements of researchers as well as those of employers and/or researcher funders. The Code of Conduct for the recruitment of researchers consists of a set of general principles and requirements that should be followed by employers and/or funders when appointing or recruiting researchers. The principles are complementary to those in the European Charter for Researchers.

European Research Council (ERC)⁵²: the mission of the ERC is to encourage the highest quality research in Europe through competitive funding and to support investigator-initiated frontier research across all fields of research, on the basis of scientific excellence.

Evaluation: process of evaluating after completion, the outcome, results and impacts of projects, programmes and/or research agendas.

⁵⁰ <http://ec.europa.eu/euraxess/>

⁵¹ http://www.upr.si/fileadmin/user_upload/RK_RS/RK_RS_angleska/am509774CEE_EN_E4.pdf

⁵² <http://erc.europa.eu/>

Federated electronic identity: federated identity allows researchers to use their own organisation user account when accessing other organisations' digital services.

Full Time Equivalent (FTE): a unit to measure employment, taking into account work load of individual persons (average number of hours worked per week). An FTE of 1 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker works only half-time.

Gender balanced committee/panel: a committee/panel is considered gender balanced when the percentage of members of the under-represented sex is at least 40 %. In cases of committees/panels with only three members, these committees are considered 'gender balanced' if they are represented by both sexes.

Gender dimension in research content: making gender a dimension of research by integrating it as part of the research design and process. This entails sex and gender analysis being integrated into basic and applied research.

Gender equality (GE): also known as sex equality or sexual equality. It is the goal of equality of genders. GE entails making women's rights equal to men's, and making men's rights equal to women's.

Gender equality plan (GEP): a GEP is a consistent set of provisions and actions aiming at ensuring GE.

Grant: research specific grant, with funding associated with setting up a medium- and/or long-term research programme. The term 'grant' used in this survey does not include grants to doctorate candidates for short-term mobility.

Head of organisation: highest decision making official in the organisation (e.g. rector or equivalent in the academy, president or equivalent in non-academic research organisations).

Headcount: headcount data measures the total number of persons who are fully or partially employed by an organisation.

Human Resources (HR) Strategy for Researchers (HRS4R): it supports research institutions and funding organisations in the implementation of the Charter & Code (C&C) in their policies and practices.⁵³

Innovation: the implementation of a new or significantly improved product (goods or services) in the market, or implementation of new or significantly improved processes or a new organisational or marketing method, never used before.

Institutional funding: general funding of institutions with no direct selection of R&D project or programmes. There are various formulae for the allocation of institutional funding that consider, to a lower or higher extent, the research performance. In some cases, institutional funding includes a quota related to number of staff, students etc. (Source: OECD, 2011).

⁵³ <http://ec.europa.eu/euraxess/index.cfm/rights/strategy4Researcher>

International organisation: an international organisation arises from an association of states. It is established on the basis of a treaty or similar act and has an international legal personality distinct from that of its Member States. It has an international membership, scope, or presence.⁵⁴

Joint research agendas: annual or multiannual research agendas for a joint programme between EU Member States outside the framework of the EU Framework Programme. Joint research agendas include activities such as JPIs and ERA-Net+ where the bulk of funding does not come from EU sources.

Knowledge transfer (KT): the process of transferring the rights to use and exploit knowledge from one source. It is transferred to those in a position to best exploit it in placing new products and services on the market.

Lead agency: this procedure foresees that research councils accept the results of the evaluation of international projects done by the ‘lead agency’ and fund the parts of the project that are being performed in their respective countries (e.g. DE, AT, CH).

Leading researcher: internationally recognised researcher (e.g. team leader, in management positions, full professor, etc.).

Legal status: the relative position or standing of an organisation in the eyes of the law.

Licence held: all licenses, options and assignments for all types of IP (count multiple (identical) licences with a value of less than EUR 500 as one licence).⁵⁵

Licence income: total income from all types of know-how and intellectual property (patents, copyright, designs, material transfer agreements, confidentiality agreements, plant breeder rights, etc.) before disbursement to the inventor or other parties. It includes license issue fees, annual fees, option fees and milestone, termination and cash-in payments. It excludes licence income forwarded to institutions other than those served by the KT office or to companies.

Money-Follows-Cooperation Line: this scheme allows small parts of a project funded by one of the participating research councils to be conducted in a different country (overhead costs are, however, excluded).

Money-Follows-Researcher (MfR): this scheme enables researchers moving to a research institution in a different country to transfer on-going grant funding to the new institution and continue research activities according to original terms and objectives.

National identification number: a unique number allocated to organisations or individuals for the purposes of work, taxation, government benefits, health care, and other government-related functions. The equivalent of the national identification number for private organisations is the value added tax identification number.

⁵⁴ http://ec.europa.eu/research/fp6/model-contract/pdf/fp6-public-bodies-annex5231_en.pdf

⁵⁵ http://www.wipo.int/sme/en/ip_business/licensing/licensing.htm

Non-governmental sector: the non-governmental sector includes organisations which are neither a part of a government nor conventional for-profit businesses.

Open access: refers to the practice of granting free access to research outputs over the internet, most notably peer-reviewed publications and research data.

Organisation under private law with public mission: refers to a public sector body or a legal entity governed by private law with a public service mission⁵⁶.

Patent: an exclusive right granted by a government authority (typically a patent office) for an invention, which is a product or a process that provides a new way of doing something or offers a new technical solution to a problem. In order to be patentable, the invention must fulfil certain conditions⁵⁷.

Patent application: an application made to a government authority (typically a patent office) to have a patent granted for invention. An invention is a product or a process that provides, in general, a new way of doing something or offers a new technical solution to a problem. In order to be patentable, the invention must fulfil certain conditions⁵⁸.

Peer review: the evaluation of research proposals by independent external experts, based on transparent evaluation criteria communicated in advance. Peer review can be based on a group of principles such as excellence, impact, quality and efficiency of the project implementation⁵⁹.

Peer reviewed scientific publications: original empirical or theoretical piece of work in sciences which are subject to the scrutiny of peers. These peers are experts in the same field. The peer review process takes place before the paper is published in a journal.

PhD graduate: an individual who earned a doctoral diploma, having successfully completed a PhD programme.⁶⁰

PhD candidate: an individual who attends a PhD program in order to obtain a PhD diploma.

Portability of grants: situation in which a researcher who moves to a different country may transfer an on-going grant.

Post-doc: a postdoctoral research candidate has completed doctoral studies and intends to further deepen expertise in a specialised subject.

⁵⁶ http://ec.europa.eu/research/fp6/model-contract/pdf/fp6-public-bodies-annex5231_en.pdf

⁵⁷ Source: http://www.wipo.int/patentscope/en/patents_faq.html#patent

⁵⁸ Source : http://www.wipo.int/patentscope/en/patents_faq.html#patent

⁵⁹ http://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-h-esacrit_en.pdf

⁶⁰ UNESCO, UIS (2012), International Standard Classification of Education ISCED 2011, available at: <http://www.uis.unesco.org/Education/Documents/isced-2011-en.pdf>

Principles for innovative doctoral training⁶¹: the principles include research excellence, attractive institutional environment, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance.

Private organisation without a public mission: a firm or company in the private (non-public) sector of an economy whose main aim is to generate profit, which is controlled and operated by private individuals (and not by civil servants or government-employees) and is not accountable to governmental organisations⁶².

Project-based funding: funding attributed on the basis of a project submission by a group or individuals for an R&D activity that is limited in scope, budget and time (Source: OECD, 2011).

Public sector: includes the government and higher education sectors but excludes public-sector corporations who are part of the business enterprise sector, as defined in the Frascati Manual. The higher education sector may include private and public corporations as well as private not-for-profit organisations as defined in the System of National Accounts (Source: OECD, 2011).

R&D personnel: persons employed directly on R&D as well as those providing direct services such as R&D managers, administrators, and clerical staff (Source: OECD, 2002).

Recruitment committee: no matter how they are designated (e.g. by nomination, election, pool), recruitment committees are set for the recruitment of one or more persons when there is an open position (at any level temporary or permanent).

Repository: electronic archive for the storage of academic publications such as peer reviewed scientific articles.

R&D budget (for RFOs): the estimation of the total amount of funds (or revenue and expenses) handled by the organisation for the purpose of funding R&D activities.

R&D budget (for RPOs): the estimation of the total amount of funds (or revenue and expenses) handled by the organisation for the purpose of performing and funding R&D activities. It should include overheads but not funding for teaching activities.

Research and experimental development (R&D): research and experimental development comprise creative work undertaken on a systematic basis in order to increase both the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (Source: OECD, 2002).

⁶¹ http://ec.europa.eu/euraxess/pdf/research_policies/Principles_for_Innovative_Doctoral_Training.pdf

⁶² Source: BusinessDictionary

Research and Technology Organisations (RTOs): mission-oriented providers of innovation services to governments and firms, dedicated to improving quality of life and building economic competitiveness.⁶³

Research collaboration platform: a collaboration platform which gathers scientific resources, tools, data and work management facilities to enable remote collaboration and exchanges between researchers on a specific research topic or working as a research team.

Research data (within the context of open access to research data): data collected, observed or created for the purpose of analysis to produce original research results.⁶⁴

Research evaluation committees: these are responsible for the evaluation of research projects and programmes as well as performance at the institutional or individual level. The outcome of the evaluation may be linked to the allocation of research funding and/or other resources.

Research infrastructures (RIs): an RI comprises facilities, resources and related services used by the scientific community to conduct top-level research in their respective fields. Examples include singular large-scale research installations, collections, special habitats, libraries, databases, biological archives, integrated arrays of small research installations, high-capacity/high speed communication networks, highly distributed capacity and capability computing facilities, data infrastructure, etc.

Researcher: a professional engaged in the conception or creation of new knowledge, products, processes, methods and systems and also in project management. Postgraduate students at the PhD level engaged in R&D should be considered as researchers (OECD, 2002).

Scientific software: software for specific scientific tasks, such as modelling and visualisation of data, or operating specific virtual laboratory experiments. This kind of software can be installed in one institution and also accessed remotely by researchers from other institutions.

Structure for KT activities: a structure in place which facilitates or incentivises KT. This could be a formal Knowledge/Technology Transfer Office or dedicated staff.

Structured innovative doctoral training programmes: these apply all the principles for innovative doctoral training. The principles include research excellence, attractive institutional environment, interdisciplinary research options, exposure to industry and other relevant employment sectors, international networking, transferable skills training and quality assurance⁶⁵.

Total number of staff: the total number of employees in an organisation.

⁶³ Source: EARTO

⁶⁴ <http://www.bu.edu/datamanagement/background/whatisdata/>

⁶⁵ http://ec.europa.eu/euraxess/pdf/research_policies/Principles_for_Innovative_Doctoral_Training.pdf

Young researcher: a researcher who is at the beginning of his/her career. This includes first stage researchers (up to the point of PhD), post-docs and junior researchers.

SOURCES

OECD (2011): OECD Science, Technology and Industry Scoreboard 2011: Innovation and Growth in Knowledge Economies⁶⁶

OECD (2005): Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition⁶⁷

OECD (2002): Proposed Standard Practice for Surveys on Research and Experimental Development, Frascati Manual 2002⁶⁸

World Intellectual Property Organisation

⁶⁶ <http://www.oecd.org/sti/oecdsciencetechnologyandindustryscoreboard2011innovationandgrowthinknowledgeeconomies.htm>

⁶⁷ <http://www.oecd.org/innovation/innovationinsciencetechnologyandindustry/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm>

⁶⁸ http://www.uis.unesco.org/Library/Documents/OECDFrascatiManual02_en.pdf

5.8. Concepts used in the analysis of national policy context in support of ERA

PROJECT-BASED FUNDING IN THE COUNTRY

The allocation of public research funding is typically done via two mechanisms: allocation of funding through open calls for proposals (also known as project-based funding) and institutional funding. Project-based funding is attributed on the basis of a project submission by a group or individuals for an R&D activity that is limited in scope, budget and time. One example is the EU Framework Programme which allocates public funding via open calls for proposals.

USE OF CORE PRINCIPLES OF INTERNATIONAL PEER REVIEW

When evaluating open calls for proposals, a rigorous peer review process using the international principles should be in place. The evaluation of research proposals should be carried out by independent external experts based on transparent and evaluation criteria communicated in advance. The problem is that there is no consensus on the core principles of international peer review. In agreement with the Julia in the survey we indicated that: Peer review can be based on a group of principles such as excellence, impact, quality and efficiency of the project implementation. This reflects the criteria used at EU level in the Framework Programme.

INSTITUTIONAL FUNDING BASED ON INSTITUTIONAL ASSESSMENT

Institutional funding refers to general funding of research institutions (incl. universities) with no direct selection of R&D projects or programmes. It can be bulk funding based on past figures (e.g. number of staff/PhD candidates, past funding budgets). In other cases, funding allocation can be based on research performance. Performance-based institutional funding means that the quality of research-performing organisations, their teams and their output is assessed and constitutes the basis for institutional funding decisions. In some case, a 'formula' is used for calculating the funding (for example, in some countries a mix between number of PhD candidates, disciplines and publications is used). For the purpose of the survey, the following definition was used: Assessment or evaluation procedure: evaluation procedure which analyses the entire institution in terms of input, throughput (processes) and output factors. Among the latter, the assessment may include research performance and may be linked to funding allocation. Salaries and other staff costs are not included in the assessment.

JOINT PROGRAMMING INITIATIVES (JPIs)

Research efforts can be essential to address major societal challenges. In some cases these are so great that national research programmes cannot tackle them effectively on their own. Yet, the vast bulk of research programmes in Europe are run in isolation, leading to unwanted fragmentation or ineffectiveness. Joint programming aims to remedy this situation.

The overall aim of the joint programming process is to pool national research efforts in order to make better use of Europe's precious public R&D resources and to tackle common European challenges more effectively in a few key areas.

It is a structured and strategic process whereby Member States agree, on a voluntary basis and in a partnership approach, on common visions and Strategic Research Agendas

(SRA) to address major societal challenges. On a variable geometry basis, Member States commit to JPIs where they implement together joint SRAs.

What is of utmost importance is that MSs express how they participate in JPI activities. Only presenting the funding volume allocated to a joint call or in RIs is not enough. Ideally, they should indicate how the participation in JPIs is reflected in their national programming landscape (alignment).

The JPI is a vehicle to increase common funding principles, mutual peer review recognition, international joint peer review etc. That is why there are less important criteria for the assessment, and hierarchically the JPI participation of a MS should be assessed first.

Pour mémoire, there are 10 JPIs: Neurodegenerative diseases (JPND); Agriculture, Food Security and Climate Change (FACCE); Healthy diet for a healthy life (Diet and Health JPI); Cultural Heritage and global change: a new challenge for Europe; Healthy Ageing – More Years, Better Lives (Demographic Change); Anti-Microbial resistance; Water Challenges for a Changing World; Healthy and Productive Seas and Oceans; JPI Climate and Urban Europe.

Alignment can be characterised as:

The strategic approach taken by Member States' programming authorities to modify their national programmes and activities as a consequence of the adoption of joint priorities at EU level Public-public partnerships (for example the Strategic Research Agendas of JPIs).

Alignment is gradual and very hard to detect and the assessment to what extent a MS aligns its national programmes towards a JPI should at this stage remain at the level of what strategies/programmes/action plans are in place for participation in a JPI.

Joint strategic research agendas: annual or multiannual research agendas for a joint programme between EU Member States outside the framework of the EU Framework Programme. Joint strategic research agendas are the basis of JPIs, ERA-Nets or other joint programmes where the bulk of funding does not come from EU sources.

ARTICLE 185 INITIATIVES

Article 185 TFEU (ex Article 169 TEC) states that: 'In implementing the multiannual framework programme, the Union may make provision, in agreement with the Member States concerned, for participation in R&D programmes undertaken by several Member States, including participation in the structures created for the execution of those programmes.'

In practical terms, Article 185 TFEU foresees the participation of the EU in the joint implementation of (parts of) R&D national programmes. The participating EU Member States integrate their research efforts by defining and committing themselves to a joint research programme, based on the voluntary integration of scientific, managerial and financial aspects. The EU provides financial support to the joint implementation of the (parts of the) national research programmes involved, based on a joint programme and the setting-up of a dedicated implementation structure.

ERA-NETS

ERA-Nets are an FP instrument for the coordination of national and regional research programmes through joint activities such as joint calls for trans-national proposals. Under FP7, ERA-NET Plus provided additional EU financial support to facilitate joint calls for proposals between national and/or regional programmes.

H2020 essentially merged the ERA-NET and ERA-NET Plus instrument into a single new instrument called ERA-NET Co-fund.

OTHER JOINT RESEARCH AGENDAS

These concern bi- or multilateral agreements or programmes in place among EU-MS and AC.

MUTUAL RECOGNITION OF EVALUATIONS THAT CONFORM TO INTERNATIONAL PEER-REVIEW STANDARDS

Mutual recognition or (Lead Agency Procedure) of each other's peer review implies that the national funding agencies have signed an agreement or MoU that regulates this procedure. If a national funding agency cedes the right to nationally evaluate its project proposals to another agency, it recognises the peer review of the other agency and bases its funding decision on it. This can sometimes be a one way process only and this is not mutual recognition. Mutual recognition will be easier if funding agencies apply similar peer review standards, e.g. international peer review.

COMMON FUNDING PRINCIPLES TO MAKE NATIONAL RESEARCH PROGRAMMES COMPATIBLE, INTEROPERABLE (CROSS-BORDER) AND SIMPLER FOR RESEARCHERS

This goes more into the technicalities of what measures and procedures funding agencies have put into place to implement cross-border activities. We are not interested in cross-border activities that are based on EC-co-funded activities (ERA-Net, Article 185) because there the Commission requires them anyway in order to harmonise their rules.

By common funding principles we mean:

- Definition of priorities (calls, programmes);
- Eligibility criteria;
- Standards for proposal evaluation;
- Selection decisions;
- Definition of eligible costs;
- Funding rates;
- Reporting requirements;
- Intellectual property rights issues.

PARTICIPATION IN THE DEVELOPMENT AND OPERATION OF RESEARCH INFRASTRUCTURES INCLUDED IN THE ESFRI ROADMAP

ESFRI, the European Strategy Forum on Research Infrastructures, is a strategic instrument to develop the scientific integration of Europe and to strengthen its international outreach. The competitive and open access to high quality RIs supports and benchmarks the quality of European scientists' activities and attracts the best researchers from around the world.

The mission of ESFRI is to support a coherent and strategy-led approach to policy-making on RI in Europe; and to facilitate multilateral initiatives leading to the better use and development of RIs, at EU and international level.

The ESFRI Roadmap identifies new RIs of pan-European interest corresponding to the long term needs of the European research communities, covering all scientific areas, regardless of possible location.

Potential new RI (or major upgrade) identified are likely to be realised in the next 10 to 20 years. Therefore, they may have different degrees of maturity but it should be noted that they are supported by a relevant European partnership or intergovernmental research organisation. A growing number of countries have prepared national roadmaps that establish the prioritisation of national and pan-European RIs, using the ESFRI Roadmap as a reference. This helps to define national budgets, facilitates political support and enables long-term financial commitment.

PARTICIPATION IN ERICS

The Community legal framework for a European Research Infrastructure Consortium (ERIC) entered into force on 28 August 2009. This specific legal form is designed to facilitate the joint establishment and operation of RIs of European interest. On 2 December 2013, the Council adopted the Council Regulation EU n° 1261/2013 amending the Regulation EC 723-2009 concerning the ERIC. The participation of countries associated to the EU research framework programmes in ERICs is now on the same footing as EU Member States. Their contributions to ERICs will be fully reflected in terms of membership and voting rights. The regulation entered into force on 26 December 2013.

NATIONAL ROADMAPS LINKED TO ESFRI

RIs play an increasingly important role in the advancement of knowledge and technology. They are a key instrument in bringing together a wide diversity of stakeholders to look for solutions to many of the problems that society is facing today. RIs offer unique research services to users from different countries, attract young people to science and help to shape scientific communities.

Types of RIs: The term 'research infrastructures' refers to facilities, resources and related services used by the scientific community to conduct top-level research in their respective fields, ranging from social sciences to astronomy and genomics to nanotechnologies. Examples include singular large-scale research installations, collections, special habitats, libraries, databases, biological archives, clean rooms, integrated arrays of small research installations, high-capacity/high speed communication networks, highly distributed capacity and capability computing facilities, data infrastructure, research vessels, satellite and aircraft observation facilities, coastal observatories, telescopes, synchrotrons and accelerators, networks of computing facilities, as well as infrastructural centres of competence which provide a service for the wider research community based on an assembly of techniques and know-how. RIs may

be 'single-sited' (a single resource at a single location), 'distributed' (a network of distributed resources), or 'virtual' (the service is provided electronically).

These key infrastructures have not only been responsible for some of the greatest scientific discoveries and technological developments, but are also influential in attracting the best researchers from around the world and in building bridges between national and research communities and scientific disciplines.

The list of available national roadmaps can be found at:

http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri-national-roadmaps

ACCESS TO RESEARCH INFRASTRUCTURES OF PAN-EUROPEAN INTEREST

Member States may have taken actions to ensure access to their national RIs.

The Commission has also been supporting access to effective RIs for researchers all over Europe for more than a decade. This action has been instrumental in enhancing European researchers' access to the infrastructures they require to conduct their research, irrespective of the location of the facility.

It is now possible to see on an interactive map the location of RIS that open their doors to all researchers in Europe. This map

(http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=mapri)

shows the location of the RIs funded under the Seventh Framework Programme that provide transnational access to researchers. These infrastructures form part of networks supported through Integrating Activity projects with a view to making the most of existing facilities by optimising their use for the benefit of the scientific communities.

GENDER

All MSs comply with the EU directives on equal opportunities and equal treatment. In general MSs transpose the EU legislation in the general national legislation related to the labour market, according to their national legal system, (it might be an Equality Act, a Gender Equality Law or another type of legislation).

In terms of implementation of EU legal provisions, employers of researchers, as with any other employer, must comply with the EU legislation on equal opportunities and equal treatment. The main directive (2006/54) covers the implementation of these principles in employment and occupation, including equal pay for equal work or work of equal value, vocational training, promotion and working conditions, occupational social security schemes, returning after maternity leave and paternity leave. It also provides for positive action. Furthermore, the Council Directive (96/34/EC) lays down minimum requirements on parental leave designed to facilitate the reconciliation of parental and professional responsibilities for working parents for all workers, men and women, who have an employment contract or employment relationship as defined by the law, collective agreements or practices in force in each MS.

The aim of the present analysis is to focus on public research thereby giving a picture of national provisions and initiatives relating to GE in this sector, including related indicators. This is done by assessing three groups of actions at national level:

- Specific actions (SAs) for the implementation of the EU directives in the specific sector of public research;

- Positive actions (PAs) providing specific advantages in order to make it easier for the under-represented sex to pursue a vocational activity or to prevent or compensate for disadvantages in professional careers within the public research sector;
- Additional actions (AAs) to achieve GE in R&D. These actions are not covered by the EU directives on GE in the labour market. They address institutional changes in the public research sector in order to correct gender inequalities and ensure GE. They also cover actions relating to the integration of the gender dimension in research content/programmes.

FOSTER CULTURAL AND INSTITUTIONAL CHANGE ON GENDER

In terms of policy at the national level, we need to pay attention if MSs have the following additional actions:

- Specific laws/acts regulating GE in public research, for instance as those in AT, ES, NO, FR (since 2013) and BE (Walloon region);
- Acts/incentives stimulating or obliging RPOs to explicitly set up GEPs; for instance the laws on GE in ES, AT and NO, performance agreements in AT, Athena Swan in the UK, the Finnish Equality Act covering educational institutions such as universities;
- Strategies (i.e. guidelines, charters/codes, awards, etc.) at the national/ministerial or at the regional level for GE in RPOs. For instance the UK Athena Swan award, the AT performance agreements and the NO GE Award.

CAREERS –WORKING CONDITIONS IN PUBLIC RESEARCH

Concerning researchers' careers and their working conditions, the possibilities could be:

- SAs implementing or facilitating the implementation in public research of the EU directives covering maternity leave (2006/54) and parental leave (96/34) and support given to researchers' careers to cope with career breaks and facilitate re-entry;
- Access to funding is a key element of researchers' career. In almost all countries statistical evidence exists of higher success rates for men in access to research funding than for women. Therefore, the analysis could look at the existence of provisions to ensure a balanced participation of women and men in research programmes/projects at national or regional level, or at the level of RFOs, such as NordForsk;
- Positive Actions targeting women, such as incentives given to RPOs for the recruitment and promotion of female researchers (i.e. 'Excellentia programme' in AT, Federal Programme for Female Professors in DE, additional chairs awarded if a certain benchmark is reached in DK, BALANSE Programme in NO, ASPASIA Programme in NL) and actions to support women researchers individually (i.e. awards such as the L'Oreal Prize, fellowships). It's important to check if these incentives are provided at the national/regional, level or by RFOs and other funders.

GENDER BALANCE IN PUBLIC RESEARCH DECISION MAKING

Several measures can help to address gender imbalances in decision making processes. In particular they concern the setting up of quotas and targets in decision making bodies of RPOs by national or regional authorities:

- Quotas in decision making bodies of RPOs;
- Targets in decision making bodies of RPOs.

GENDER DIMENSION IN RESEARCH CONTENT/PROGRAMMES

This entails the integration of sex and/or gender analysis in research content:

- Gender dimension (GD) is integrated in research content/programmes. If yes, it's important to check at which level GD is integrated. For example, in 2013 NordForsk adopted a new funding policy requiring GD to be explicitly mentioned (hence evaluated) in the research proposals where relevant; the Irish Research Council in 2013;
- There are dedicated budgets/programmes for women/gender studies.

OPEN ACCESS TO PUBLICATIONS AND DATA RESULTING FROM PUBLICLY FUNDED RESEARCH

Open access can be defined as the practice of providing online access to scientific information (please note that term 'scientific' refers to all scholarly disciplines) that is free of charge to the user and is re-usable. In the context of R&D, 'scientific information' can refer to (i) peer-reviewed scientific research articles (published in scholarly journals) or (ii) research data (data underlying publications, curated data and/or raw data). The general guideline is that the Commission mandates open access (OA) for publications and encourages OA to data, although it is not prescriptive in how the Member States achieve OA, e.g. via the green or the gold route for publication or via hard or soft law.

(i) OA to scientific publications refers to free of charge online access for any user. Legally binding definitions of 'open access' and 'access' in this context do not exist, but authoritative definitions of OA can be found in key political declarations on this subject (Budapest Declaration (2002), Berlin Declaration (2003)). There are two main routes towards OA to publications:

A. Self-archiving (also referred to as 'green' OA) means that the published article or the final peer-reviewed manuscript is archived (deposited) by the author - or a representative - in an online repository before, alongside or after its publication. Repository software usually allows authors to delay access to the article ('embargo period').

B. OA publishing (also referred to as 'gold' OA) means that an article is immediately provided in OA mode as published. In this model, the payment of publication costs shifts away from readers, paying access via subscriptions. The business model most often encountered is based on one-off payments by authors. These costs (often referred to as Author Processing Charges, (APCs)) can usually be borne by the university or research institute to which the researcher is affiliated, or to the funding agency supporting the research. In other cases, the costs of OA publishing are covered by subsidies or other funding models.

(ii) OA to research data refers to the right to access and re-use digital research data under the terms and conditions set out as a formal obligation. Openly accessible research data can typically be accessed, mined, exploited, reproduced and disseminated free of charge to the user. Please note that 'Research data' refers to information, in particular facts or numbers, collected to be examined and considered as a basis for reasoning, discussion or

calculation. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form.

KNOWLEDGE TRANSFER AND OPEN INNOVATION

OI is the emerging paradigm for innovation, involving business models that use partnering, licensing and venturing to combine internal and external sources of ideas and technologies (DG Enterprise). In its truest sense it is the open circulation of knowledge between companies and research organisations. It helps to create and share knowledge. The central idea behind OI is that, in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy patented processes or other inventions from other companies. In addition, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-offs).

KT: involves the processes for capturing, collecting and sharing explicit and tacit knowledge, including skills and competence. It includes both commercial and non-commercial activities such as research collaborations, consultancy, licensing, spin-off creation, researcher mobility, publication, etc. While the emphasis is on scientific and technological knowledge, other forms such as technology-enabled business processes are also concerned (DG Enterprise). In the ERA survey the following definition was used: KT is the process of transferring the rights to use and exploit knowledge from one source. It is transferred to those in a position to best exploit it in placing new products and services on the market.

KT as a 3rd pillar: The OI/KT expert group report (2014) refers to the triple helix concept which puts entrepreneurial universities at the heart of the innovation ecosystem. It describes how the potential of innovation and economic development in a knowledge society lies in a more prominent role for universities and the hybridisation of elements from university, industry and government to generate new institutional and social formats for the production, transfer and application of knowledge. KT can be specific as a 3rd pillar in the policies/strategies or KT can form part of an innovation strategy.

POLICIES FOR PUBLIC E-INFRASTRUCTURES AND ASSOCIATED DIGITAL RESEARCH SERVICES

Public e-infrastructure

E-Infrastructure is a technical infrastructure that makes digital research services possible, such as:

- High-speed network infrastructure (GEANT) (check whether the country has a research and education network at <http://www.geant.net/About/partners/Pages/Home.aspx>);
- Computational infrastructures (high-performance, grid and cloud computing);
- Grid computing: which applies the resources of many computers in a network to a single problem;

- Cloud computing, and cloud services in particular, offer the research and education (R&E) sector huge opportunities to both maximise effectiveness and reduce the capital investment and development time for projects. They offer the R&E community a number of key benefits: •Reduced capital costs; •Reduced support costs; •The ability to leverage purchasing power across the community; •Easier remote access for collaborative projects and users; •Scalability. By utilising shared and off-the-shelf services for commodity activities, the R&E community can refocus its design, development and support resources into those fields that cannot be easily provided by the commercial sector. However, together with these benefits there are risks associated with security, data integrity and reliability which need to be addressed when selecting and purchasing cloud services;
- Data infrastructures (data repositories, data services, authentication and authorisation infrastructure, digital authors identification, data object identifiers).

DIGITAL RESEARCH SERVICES

Digital research services make reference to computing services, cloud services, scientific software (e.g. for simulation and visualisation), research collaboration platforms, virtual laboratories and remote instrumentation.

- Collaboration support: this includes network collaboration tools, such as Voice over IP and group collaboration services; provision of networked e-Science resources, including cloud resources; e-learning; interaction with NREN clients and relatively new areas of broker services and software development;
- Cloud services: see above (collaboration support);
- Research collaboration platforms: if you are interested in the topic, check <http://www.terena.org/publications/files/TERENA-Compendium-2013.pdf> pages 67-85;
- Premium service means consultancy and security audits, but not NREN service implementation support.

FEDERATED ELECTRONIC IDENTITIES

Cross-organisational researcher identity (federated identity): Digital authentication and authorisation in a cross-organisational manner, i.e. the possibility to use the user account in one (home) organisation to access services in another organisation.

Identity Management System: (IdM), a system that combines technologies and policies to allow institutions to store users' personal information and keep it up to date. An IdM is the first step to providing authentication and authorisation infrastructure - a term used for systems supporting the process of determining both (1) whether users are who they declare themselves to be (authentication) and (2) that they have the appropriate rights or privileges necessary to access a resource (authorisation) - for a local or federated environment.

eduGAIN is intended to simplify the movement of people and data between federations, providing all the resources that researchers need. NRENs will offer a greater range of services to their users, delivered by multiple federations in a truly collaborative environment; and service providers will offer their services to users in different federations.

5.9. Sources of information

Official sources:

Eurostat

- Total GBAORD by NABS 2007 socio-economic objectives:

<http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do;jsessionid=9ea7d07d30dee944cfc4811346f498c4da83635b2550.e34OaN8PchaTby0Lc3aNchuNa3qOe0>

Extracted on 14.03.14

- Total GBAORD as a % of total general government expenditure [gba_nabste]

http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=ts_c00007&plugin=1

Extracted on 23.04.14

- Total GBAORD by funding mode

http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gba_fundmod&lang=en

Extracted on 14.05.14

- National public funding to transnationally coordinated R&D

http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gba_tncoor&lang=en

Extracted on 23.04.14

- Share of women researchers, by sectors of performance

http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=ts_c00005&plugin=1

- Graduations in ISCED 3 to 6 by field of education and sex

http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_grad5&lang=en

Extracted on 19.06.14

- Population on 1 January by age and sex [demo_pjan]

Extracted on 23.04.14

Other sources

Mathieu Doussineau, Elisabetta Marinelli, Mariana Chioncel, Karel Haegeman, Gérard Carat, Mark Boden, ERA Communication Synthesis Report, European Commission JRC-IPTS, 2013

Researcher's Report 2014

She figures, 2012

http://ec.europa.eu/research/science-society/document_library/pdf_06/she-figures-2012_en.pdf

Bibliometrics

European Commission - Analysis and monitoring of national research policies Unit, based on information provided by Science-Metrix (Scopus).

Patents

European Commission - Analysis and monitoring of national research policies Unit, based on information provided by University Bocconi.

5.10. Results of the survey by country

	ERA compliant	Limited compliance to ERA	ERA not applicable
Share of organisations which implement open access for data	27.5	29.6	35.7
Share of organisations which implement cloud services	38.9	17.9	11.6
Share of organisations which consider the gender dimension in research content	47.7	21.8	27.6
Share of organisation which advertise their research vacancies on Euraxess	50.7	6.9	3.5
Share of organisations which provide federated electronic identity to their researchers	55.3	33.8	22.1
Share of organisations which have adopted Gender Equality Plans	62.1	18.9	16.1
Share of organisations which have adopted the Charter and Code principles	62.3	9.6	13.6
Share of organisations whose institutional funding is based on performance assessment by the funding organisation	64.3	36.6	25.6
Share of organisation which implement innovative doctoral training	73.1	28.7	15.1
Share of organisations which have a structure to promote knowledge transfer	79.8	30.4	20.6
Share of organisations which include minimum requirements when publishing research vacancies	85.6	44.2	24.6

	Project Based funding	Institutional funding based on institutional assessment	Institutional funding not based on institutional assessment
AL	70.0	0.0	30.0
AT	49.0	15.3	0.4
BA	67.0	0.0	33.0
BE	45.9	46.2	6.9
BG	80.0	0.0	20.0
CH	98.7	0.0	1.3
CY	100.0	0.0	0.0
CZ	53.2	45.4	1.2
DE	56.9	42.2	0.0
DK	77.1	22.6	0.2
EE	89.4	5.5	0.0
EL	75.5	0.0	24.5
ES	64.6	0.4	33.5
FI	91.5	0.0	8.4
FO	100.0	0.0	0.0
FR	89.2	1.6	9.1
HR	100.0	0.0	0.0
HU	82.4	0.0	17.6
IE	78.8	1.6	12.1
IL	99.0	0.0	0.0
IS	99.7	0.0	0.0
IT	51.4	35.7	12.9
LT	47.1	25.2	27.7
LU	100.0	0.0	0.0
LV	81.4	18.5	0.0
ME	100.0	0.0	0.0
MT	100.0	0.0	0.0
NL	89.2	7.8	2.9
NO	81.4	13.3	5.3
PL	92.0	6.8	0.0
PT	79.7	8.9	0.0
RO	97.9	0.0	0.0
SE	81.4	15.2	2.5
SI	24.9	7.9	33.8
SK	100.0	0.0	0.0
UK	80.0	20.0	0.0

	Share of funding allocated to joint research agendas (RFO)
AL	0.0
AT	1.9
BA	0.0
BE	2.6
BG	0.0
CH	0.0
CY	0.7
CZ	0.6
DE	0.8
DK	16.3
EE	0.1
EL	0.9
ES	0.1
FI	5.3
FO	0.0
FP	0.0
FR	5.3
HR	0.0
HU	0.0
IE	0.3
IL	0.0
IS	2.0
IT	1.9
LI	0.0
LT	0.1
LU	10.0
LV	0.9
MD	0.0
ME	0.0
MK	0.0
MT	28.5
NL	9.2
NO	1.0
PL	2.0
PT	3.8
RO	3.0
RS	0.0
SE	2.8
SI	0.7
SK	0.0
TR	0.0
UK	0.9

	Share of funding allocated to international cooperation (%)
AL	0.0
AT	0.2
BA	0.0
BE	0.2
BG	0.0
CH	1.7
CY	0.0
CZ	1.1
DE	4.3
DK	2.0
EE	0.0
EL	1.0
ES	0.5
FI	1.6
FO	0.0
FR	2.6
HR	0.0
HU	0.0
IE	0.0
IL	0.0
IS	0.0
IT	0.4
LT	0.5
LU	0.0
LV	0.9
ME	0.0
MT	0.0
NL	2.1
NO	2.7
PL	1.4
PT	2.5
RO	0.8
SE	1.1
SI	0.7
SK	0.0
UK	1.9

	Share of funding received from abroad by RPOs
AL	0.08
AT	1.08
BA	0.00
BE	0.02
BG	3.95
CH	0.85
CY	3.37
CZ	0.01
DE	1.22
DK	1.36
EE	0.00
EL	1.98
ES	1.08
FI	0.65
FO	0.00
FP	0.00
FR	0.20
HR	0.66
HU	8.44
IE	4.02
IL	0.00
IS	0.68
IT	0.25
LI	0.00
LT	0.55
LU	0.00
LV	0.88
MD	0.00
ME	0.00
MK	0.00
MT	0.00
NL	0.52
NO	1.48
PL	0.40
PT	0.09
RO	0.14
RS	1.94
SE	1.57
SI	0.00
SK	0.54
TR	0.30
UK	3.01

	Funding support to the implementation of gender balance (%)			
	Frequently	Occasionally	None	Not applicable
AL	0.0	0.0	0.0	0.0
AT	60.2	35.4	0.0	4.0
BA	0.0	0.0	0.0	100.0
BE	78.5	6.7	12.4	2.4
BG	0.1	0.0	0.0	0.0
CH	93.6	2.7	0.0	3.6
CY	26.3	0.0	73.7	0.0
CZ	0.2	57.3	30.5	9.5
DE	100.0	0.0	0.0	0.0
DK	22.4	0.0	21.1	56.5
EE	0.0	0.0	39.3	60.7
EL	0.0	0.0	98.1	1.9
ES	76.0	0.9	13.4	9.6
FI	36.7	0.0	8.9	54.4
FO	0.0	0.0	100.0	0.0
FP	0.0	0.0	0.0	0.0
FR	2.8	0.0	80.8	16.4
HR	0.0	0.0	0.0	100.0
HU	0.0	0.0	100.0	0.0
IE	45.3	0.0	25.9	4.6
IL	0.0	0.0	0.0	0.0
IS	99.7	0.0	0.3	0.0
IT	94.0	0.0	3.3	2.7
LI	0.0	0.0	0.0	0.0
LT	0.0	44.1	55.9	0.0
LU	0.0	0.0	0.0	100.0
LV	7.1	0.0	0.0	0.5
MD	0.0	0.0	0.0	0.0
ME	100.0	0.0	0.0	0.0
MK	0.0	0.0	0.0	0.0
MT	95.0	0.0	0.0	5.0
NL	95.3	3.6	0.0	0.6
NO	88.4	0.0	0.0	11.6
PL	61.4	0.0	38.6	0.0
PT	3.6	33.0	62.9	0.5
RO	0.0	0.0	0.1	99.9
RS	0.0	0.0	0.0	0.0
SE	75.7	3.8	17.1	3.3
SI	100.0	0.0	0.0	0.0
SK	0.0	0.0	100.0	0.0
TR	0.0	0.0	0.0	0.0
UK	99.3	0.0	0.2	0.3

	Gender Equality Plans adopted by RPO (%)		
	Adopted	Not adopted	Not applicable
AL	98.5	0.0	0.0
AT	89.8	8.7	0.7
BA	0.0	31.8	54.0
BE	58.2	13.5	2.6
BG	11.4	42.5	15.9
CH	96.4	1.3	0.0
CY	9.0	89.1	1.2
CZ	26.3	23.3	9.1
DE	95.7	2.0	0.1
DK	45.2	4.5	0.4
EE	0.0	84.8	2.4
EL	27.4	57.9	9.6
ES	61.4	30.4	2.4
FI	90.4	6.7	0.0
FO	0.0	100.0	0.0
FP	0.0	0.0	0.0
FR	91.7	4.5	2.9
HR	4.1	17.0	4.4
HU	39.1	54.3	3.0
IE	28.7	50.4	0.0
IL	94.3	5.6	0.0
IS	97.0	0.0	0.0
IT	47.4	34.9	2.1
LI	0.0	0.0	0.0
LT	16.8	11.3	31.3
LU	4.0	96.0	0.0
LV	2.5	29.5	10.8
MD	0.0	0.0	0.0
ME	0.0	100.0	0.0
MK	0.0	0.0	0.0
MT	99.6	0.0	0.4
NL	83.0	3.0	0.1
NO	71.6	8.5	8.8
PL	19.4	50.9	2.7
PT	4.4	79.2	10.3
RO	19.0	27.3	48.8
RS	12.1	55.1	1.8
SE	99.0	0.8	0.1
SI	10.8	31.3	1.6
SK	2.0	67.1	17.1
TR	10.0	51.5	18.3
UK	89.8	1.4	1.5

	Implementation of recruitment and promotion practices by RPO (% RPO weighted)
AL	100.0
AT	78.6
BA	0.0
BE	56.5
BG	6.3
CH	91.0
CY	22.2
CZ	46.2
DE	89.9
DK	34.3
EE	15.0
EL	30.1
ES	30.3
FI	74.9
FO	0.0
FP	0.0
FR	57.3
HR	12.2
HU	78.7
IE	49.0
IL	99.9
IS	92.1
IT	24.3
LI	0.0
LT	19.8
LU	4.0
LV	63.3
MD	0.0
ME	0.0
MK	0.0
MT	100.0
NL	92.7
NO	83.1
PL	34.1
PT	14.3
RO	38.1
RS	9.3
SE	78.8
SI	55.3
SK	9.2
TR	11.3
UK	86.6

	Support to the inclusion of gender contents in research agendas by funders (%)				
	Frequently	Occasionally	None	Not applicable	No answer
AL	0.0	100.0	0.0	0.0	0.0
AT	40.2	53.5	1.9	4.0	0.4
BA	0.0	0.0	0.0	100.0	0.0
BE	0.0	45.9	44.7	9.0	0.3
BG	0.1	0.0	0.0	0.0	99.9
CH	9.3	0.0	3.7	87.1	0.0
CY	0.0	0.0	73.7	26.3	0.0
CZ	0.0	0.0	87.8	3.8	8.4
DE	24.6	74.6	0.0	0.7	0.0
DK	0.0	0.0	67.1	32.9	0.0
EE	0.0	0.0	42.4	57.6	0.0
EL	0.0	0.0	0.0	100.0	0.0
ES	1.7	0.2	83.5	9.7	5.0
FI	31.1	0.0	8.9	54.4	5.6
FO	0.0	0.0	100.0	0.0	0.0
FP	0.0	0.0	0.0	0.0	100.0
FR	0.0	5.9	93.8	0.2	0.0
HR	0.0	0.0	100.0	0.0	0.0
HU	0.0	0.0	100.0	0.0	0.0
IE	7.3	0.0	63.9	4.6	24.2
IL	0.0	0.0	100.0	0.0	0.0
IS	0.0	0.0	100.0	0.0	0.0
IT	94.0	0.0	6.0	0.0	0.0
LI	0.0	0.0	0.0	0.0	100.0
LT	0.0	0.0	100.0	0.0	0.0
LU	0.0	0.0	0.0	100.0	0.0
LV	0.0	92.4	7.6	0.0	0.0
MD	0.0	0.0	0.0	0.0	100.0
ME	100.0	0.0	0.0	0.0	0.0
MK	0.0	0.0	0.0	0.0	100.0
MT	0.0	0.0	95.0	5.0	0.0
NL	20.0	4.3	75.2	0.0	0.6
NO	88.4	0.0	0.0	11.6	0.0
PL	0.0	0.0	100.0	0.0	0.0
PT	0.0	0.0	63.4	33.0	3.6
RO	0.0	0.0	100.0	0.0	0.0
RS	0.0	0.0	0.0	0.0	100.0
SE	16.8	17.5	61.4	4.2	0.0
SI	0.0	0.0	100.0	0.0	0.0
SK	0.0	0.0	100.0	0.0	0.0
TR	0.0	0.0	0.0	0.0	100.0
UK	0.0	0.1	3.7	2.6	93.6

	Inclusion of the gender dimension in research contents (% RPO)			
	Yes	No	Not known	Not applicable
AL	100.0	0.0	0.0	0.0
AT	69.9	10.0	7.7	12.4
BA	19.3	0.0	27.5	53.2
BE	57.8	15.6	25.9	0.7
BG	23.0	45.0	14.1	17.8
CH	76.8	5.8	17.2	0.2
CY	1.3	1.3	85.1	12.3
CZ	35.2	9.4	36.1	19.4
DE	62.9	9.5	14.3	13.2
DK	61.1	31.6	7.1	0.1
EE	75.2	21.5	0.0	3.2
EL	4.2	59.2	3.8	32.8
ES	28.1	41.4	27.7	2.8
FI	37.8	22.9	34.1	5.1
FO	0.0	100.0	0.0	0.0
FP	0.0	0.0	0.0	0.0
FR	50.8	27.3	6.5	15.4
HR	15.6	9.6	66.3	8.4
HU	11.4	66.8	10.3	11.5
IE	45.7	49.7	3.9	0.7
IL	94.3	0.0	0.0	5.7
IS	75.0	22.0	3.0	0.0
IT	24.5	50.0	20.3	5.2
LI	0.0	0.0	0.0	0.0
LT	59.0	1.5	39.5	0.0
LU	51.0	49.0	0.0	0.0
LV	69.9	20.5	9.0	0.6
MD	0.0	0.0	0.0	0.0
ME	0.0	100.0	0.0	0.0
MK	0.0	0.0	0.0	0.0
MT	0.4	99.3	0.0	0.3
NL	47.1	10.8	42.0	0.1
NO	44.8	12.4	19.6	23.2
PL	25.1	35.1	27.4	12.4
PT	65.3	28.1	1.6	4.9
RO	49.1	26.2	8.1	16.5
RS	56.3	18.3	24.2	1.3
SE	52.9	18.2	4.1	24.8
SI	47.0	18.1	20.6	14.4
SK	15.1	15.3	44.9	24.7
TR	31.5	29.4	1.5	37.5
UK	21.2	20.0	57.2	1.6

	Support to open access to publications (% RFO)			
	Frequently	Occasionally	None	Not applicable
AL	0.0	100.0	0.0	0.0
AT	64.5	0.0	30.6	4.8
BA	0.0	100.0	0.0	0.0
BE	59.5	33.8	0.0	6.7
BG	0.1	0.0	0.0	99.9
CH	92.4	0.0	4.0	0.0
CY	0.0	0.0	73.7	26.3
CZ	0.0	64.5	14.1	15.6
DE	18.3	0.0	0.0	81.7
DK	88.9	0.0	0.0	10.8
EE	53.2	43.7	0.0	3.1
EL	0.0	0.0	0.0	1.9
ES	74.6	0.0	0.0	23.7
FI	46.1	0.0	0.0	53.8
FO	0.0	0.0	0.0	0.0
FP	0.0	0.0	0.0	0.0
FR	78.1	2.4	13.0	3.0
HR	0.0	0.0	0.0	100.0
HU	0.0	77.1	0.0	22.9
IE	59.9	0.0	36.3	3.8
IL	100.0	0.0	0.0	0.0
IS	100.0	0.0	0.0	0.0
IT	25.7	43.8	28.9	1.6
LI	0.0	0.0	0.0	0.0
LT	0.0	99.0	0.0	1.0
LU	0.0	100.0	0.0	0.0
LV	92.4	7.1	0.0	0.5
MD	0.0	0.0	0.0	0.0
ME	0.0	100.0	0.0	0.0
MK	0.0	0.0	0.0	0.0
MT	95.0	0.0	0.0	5.0
NL	75.8	20.0	3.6	0.0
NO	88.4	0.0	0.0	11.6
PL	73.0	0.0	27.0	0.0
PT	0.0	33.0	62.9	0.5
RO	0.0	0.0	99.9	0.1
RS	0.0	0.0	0.0	0.0
SE	16.1	6.6	0.0	64.4
SI	32.8	0.0	0.0	67.2
SK	0.0	0.0	100.0	0.0
TR	0.0	0.0	0.0	0.0
UK	99.5	0.3	0.2	0.0

	Support to open access to data (% RFO)			
	Frequently	Occasionally	None	Not applicable
AL	0.0	100.0	0.0	0.0
AT	17.1	1.5	66.0	4.8
BA	0.0	100.0	0.0	0.0
BE	46.1	4.7	42.2	6.7
BG	0.0	0.1	0.0	99.9
CH	8.1	0.0	87.3	0.0
CY	0.0	0.0	73.7	26.3
CZ	5.8	7.3	14.1	15.6
DE	18.3	0.0	0.0	81.7
DK	45.3	44.2	0.0	0.6
EE	0.0	43.7	53.2	3.1
EL	0.0	1.9	0.0	0.0
ES	5.6	0.0	82.5	10.3
FI	46.1	53.6	0.0	0.2
FO	0.0	0.0	0.0	0.0
FP	0.0	0.0	0.0	0.0
FR	9.3	3.2	71.1	6.7
HR	0.0	0.0	0.0	100.0
HU	0.0	77.1	0.0	22.9
IE	14.6	7.3	50.1	28.0
IL	100.0	0.0	0.0	0.0
IS	0.3	0.0	99.7	0.0
IT	23.0	71.0	1.6	1.6
LI	0.0	0.0	0.0	0.0
LT	0.0	100.0	0.0	0.0
LU	0.0	100.0	0.0	0.0
LV	0.0	0.0	92.4	7.6
MD	0.0	0.0	0.0	0.0
ME	0.0	100.0	0.0	0.0
MK	0.0	0.0	0.0	0.0
MT	0.0	0.0	95.0	5.0
NL	21.6	0.6	66.2	11.5
NO	0.0	88.4	0.0	11.6
PL	61.4	11.6	27.0	0.0
PT	0.0	33.0	62.9	0.5
RO	99.9	0.0	0.1	0.0
RS	0.0	0.0	0.0	0.0
SE	42.3	0.0	46.5	8.2
SI	0.0	0.0	32.8	67.2
SK	0.0	0.0	100.0	0.0
TR	0.0	0.0	0.0	0.0
UK	96.7	0.2	2.7	0.2

	Support to the implementation of KT and OI (% RFO)				
	Frequently	Occasionally	None	Not applicable	No answer
AL	0.0	0.0	0.0	0.0	100.0
AT	43.6	38.8	15.1	2.5	0.0
BA	0.0	100.0	0.0	0.0	0.0
BE	4.9	64.7	23.7	6.7	0.0
BG	100.0	0.0	0.0	0.0	0.0
CH	14.0	83.3	0.0	2.7	0.0
CY	0.0	100.0	0.0	0.0	0.0
CZ	5.8	69.2	18.5	3.7	2.8
DE	74.6	4.3	0.0	21.0	0.0
DK	63.4	0.0	24.3	12.0	0.4
EE	0.0	83.0	13.9	1.4	1.7
EL	0.0	98.1	0.0	0.0	1.9
ES	96.8	3.1	0.0	0.0	0.0
FI	46.1	53.7	0.0	0.2	0.0
FO	0.0	0.0	100.0	0.0	0.0
FP	0.0	0.0	0.0	0.0	100.0
FR	16.3	3.5	68.4	11.6	0.3
HR	100.0	0.0	0.0	0.0	0.0
HU	0.0	22.9	77.1	0.0	0.0
IE	76.9	7.1	12.1	3.8	0.0
IL	100.0	0.0	0.0	0.0	0.0
IS	0.3	99.7	0.0	0.0	0.0
IT	25.7	74.3	0.0	0.0	0.0
LI	0.0	0.0	0.0	0.0	100.0
LT	1.0	99.0	0.0	0.0	0.0
LU	0.0	100.0	0.0	0.0	0.0
LV	0.0	92.4	7.1	0.5	0.0
MD	0.0	0.0	0.0	0.0	100.0
ME	0.0	100.0	0.0	0.0	0.0
MK	0.0	0.0	0.0	0.0	100.0
MT	95.0	5.0	0.0	0.0	0.0
NL	99.4	0.6	0.0	0.0	0.0
NO	1.0	0.0	0.0	10.6	88.4
PL	61.4	0.0	11.6	27.0	0.0
PT	62.9	37.1	0.0	0.0	0.0
RO	0.0	100.0	0.0	0.0	0.0
RS	0.0	0.0	0.0	0.0	100.0
SE	41.6	13.5	41.4	0.0	3.6
SI	32.8	67.2	0.0	0.0	0.0
SK	0.0	0.0	100.0	0.0	0.0
TR	0.0	0.0	0.0	0.0	100.0
UK	99.1	0.4	0.1	0.1	0.3

	Presence of TTOs in RPO (% RPO)				
	Have TTO	Use TTO	Does not have	Does not know	TTO not applicable
AL	98.5	0.0	0.0	0.0	1.5
AT	67.3	21.0	8.0	0.9	1.3
BA	0.0	0.0	0.0	41.7	0.8
BE	90.1	4.0	3.0	0.7	0.1
BG	24.4	11.9	21.4	21.4	3.3
CH	95.8	1.6	2.4	0.0	0.0
CY	0.0	0.0	98.3	0.0	1.6
CZ	49.5	15.0	19.6	3.3	5.7
DE	72.6	10.9	11.8	0.0	0.2
DK	86.5	4.9	5.8	0.9	0.5
EE	89.3	0.0	8.6	0.0	0.0
EL	63.9	0.7	10.8	0.0	0.1
ES	88.7	1.9	7.4	0.2	0.5
FI	77.5	0.0	21.7	0.0	0.3
FO	0.0	0.0	100.0	0.0	0.0
FP	0.0	0.0	0.0	0.0	0.0
FR	89.0	6.8	1.9	0.0	0.3
HR	74.2	11.9	8.9	1.3	0.5
HU	68.8	1.6	18.8	1.4	0.2
IE	96.7	0.9	1.7	0.0	0.7
IL	10.2	0.0	0.1	0.0	5.6
IS	82.0	10.1	7.9	0.0	0.0
IT	87.5	0.9	5.6	0.2	0.1
LI	0.0	0.0	0.0	0.0	0.0
LT	79.7	6.8	2.9	0.0	10.6
LU	94.8	0.0	5.2	0.0	0.0
LV	67.8	11.1	14.5	2.3	0.0
MD	0.0	0.0	0.0	0.0	0.0
ME	0.0	6.7	0.0	93.3	0.0
MK	0.0	0.0	0.0	0.0	0.0
MT	99.3	0.0	0.3	0.0	0.4
NL	96.0	1.9	1.6	0.4	0.1
NO	62.4	12.4	6.7	3.0	4.8
PL	81.9	0.6	8.5	5.2	1.1
PT	63.2	13.7	20.6	0.1	1.6
RO	72.3	4.8	15.1	2.5	4.4
RS	68.0	10.3	8.9	2.9	0.0
SE	87.9	1.9	8.1	0.8	0.1
SI	55.4	0.0	16.2	18.4	4.2
SK	49.0	16.9	19.8	1.2	6.9
TR	68.9	10.0	19.9	0.0	1.2
UK	90.9	1.5	3.2	0.5	0.0

	Share of RPO according to the number of digital services provided (% RPO)							
	Seven	Six	Five	Four	Three	Two	One	None
AL	0.0	0.0	0.0	0.0	98.5	0.0	1.5	0.0
AT	3.9	26.0	11.5	9.6	37.2	8.9	0.1	2.8
BA	0.0	0.0	0.0	0.0	14.2	0.0	0.0	85.8
BE	10.2	55.2	1.9	4.8	1.4	0.6	0.0	26.0
BG	0.0	3.3	19.4	18.0	34.3	5.3	8.3	11.4
CH	63.1	0.5	3.3	15.0	8.7	2.6	2.9	4.0
CY	8.0	0.0	0.0	10.6	22.2	58.1	0.0	1.1
CZ	2.1	8.3	31.8	1.3	21.0	16.6	2.8	16.2
DE	32.8	22.7	23.5	8.4	3.1	1.5	0.3	7.7
DK	0.3	10.1	45.1	15.9	2.6	20.5	4.9	0.6
EE	2.4	0.0	1.1	78.7	1.3	0.8	0.0	15.8
EL	17.8	0.0	0.3	10.4	38.8	2.6	3.1	26.8
ES	19.8	16.4	18.4	26.0	9.9	3.6	1.7	4.2
FI	3.7	65.2	12.9	0.0	5.3	12.0	0.2	0.7
FO	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FR	1.3	16.5	10.8	4.8	2.4	0.7	52.4	11.2
HR	0.0	59.2	4.4	2.3	7.4	10.2	0.7	15.7
HU	4.1	0.0	0.6	6.8	67.1	2.7	6.0	12.6
IE	68.5	0.9	26.8	0.0	2.0	1.2	0.5	0.0
IL	0.0	0.0	0.1	0.0	15.8	0.0	0.0	84.0
IS	0.0	77.7	0.0	1.1	18.2	0.0	3.0	0.0
IT	23.3	14.6	12.8	21.5	9.5	12.1	1.2	5.1
LI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LT	31.0	36.7	6.8	24.4	0.3	0.8	0.0	0.0
LU	0.0	0.0	51.0	0.0	0.0	4.0	0.0	45.0
LV	0.0	9.0	0.7	0.0	63.3	19.8	0.0	7.2
MD	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ME	0.0	0.0	0.0	0.0	0.0	0.0	93.3	6.7
MK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MT	0.0	0.0	0.0	0.0	99.3	0.3	0.4	0.0
NL	7.8	58.6	22.5	7.7	0.0	0.8	1.3	1.2
NO	1.3	40.5	28.8	12.3	1.0	2.9	1.5	11.8
PL	24.9	13.5	5.2	24.8	2.8	7.9	3.2	17.7
PT	5.0	11.5	69.0	4.4	9.2	0.2	0.2	0.6
RO	10.6	9.2	49.9	8.7	5.4	5.4	7.1	3.6
RS	0.0	4.8	39.8	20.8	18.4	1.3	4.1	10.8
SE	5.2	33.8	1.9	38.5	3.4	15.4	0.0	1.8
SI	3.1	7.8	23.2	1.9	0.0	17.7	0.0	46.4
SK	23.1	0.0	9.2	0.0	13.9	7.1	15.2	31.4
TR	11.5	5.7	7.7	33.8	34.4	5.7	1.2	0.0
UK	0.0	14.8	13.7	6.9	38.5	9.4	11.6	5.3