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COMMISSION STAFF WORKING DOCUMENT

EUROPEAN RESEARCH AREA FACTS AND FIGURES 2013

Accompanying the document

REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT

EUROPEAN RESEARCH AREA PROGRESS REPORT 2013

{COM(2013) 637 final}

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1. FOREWORD

Europe has a long tradition of excellence in the fields of research and development as well as in innovation. However, to achieve lasting economic recovery and to tackle grand challenges, Europe needs the very best research with the highest impact. This requires more transnational cooperation and more competition within the EU research systems, because of the scale of efforts needed, and because it provides higher added value, creates more jobs and improves Europe's competitiveness at global level.

This is the rationale behind the proposal for a European Research Area (ERA) which was reiterated in a Commission Communication of 17 July 2012 on 'A reinforced European research area partnership for excellence and growth'. The European Commission wants to see researchers, research institutions and businesses move, compete and co-operate across borders more intensively.

Since 2000, Member States (MS) and other involved Associated Countries (AC) have made substantial progress in achieving the ERA. However, more can be done, as acknowledged by the Council on 11 December 2012, which stressed the importance of stepping up the progress across the Union. The Council welcomed the Commission's proposal for a reinforced partnership between Member States, stakeholder organisations (SHO) and the European Commission to make progress on the priorities identified in the ERA Communication. As conditions for success, the Council invited Member States to identify their national reforms and actions needed to achieve the ERA, according to their national specificities, and to present them in their National Reform Programmes starting from the 2013 European Semester. The Council also considered that achieving the ERA requires monitoring of ERA progress in close connection with the European Semester, and invited the Commission to establish a robust ERA monitoring mechanism.

This ERA Progress Report is the first outcome of the ERA monitoring mechanism. It presents the degree of advancement in each of the five priorities identified in the ERA Communication. The overview of advancement was obtained through the identification and analysis of different national policy measures fostering ERA – in place or well advanced in their development – as well as of the implementation of ERA by Research Performing Organisations (RPOs) and Research Funding Organisations (RFOs). The state of advancement also considers the support provided to ERA by the representative stakeholder organisations which signed a joint statement with the Commission as well as through actions by the Commission.

The report is accompanied by Country fiches which present the state of play for each ERA priority as identified so far in Member States and selected Associated Countries. The fiches also indicate new measures when they were mentioned in the 2013 National Reform Programmes and/or identified during the country visits. A list of the most important policies and initiatives identified so far is presented in Country fiches annexes. This first attempt to identify the state of play should not be considered as a static document but constitutes a first presentation of the state of play in ERA. It is expected to be completed and harmonized in

future editions of the ERA Progress Report with the help of Member States and Associated Countries.

The ERA Facts and Figures 2013 is based on different sources of information:

- First of all, contributions and comments by national authorities - provided in very short deadlines - on the policy context and different measures identified by the Commission: they were extremely valuable to present the best possible overview of the situation in the ERA.

- The 2013 National Reform Programmes submitted by the Member States in the context of the European Semester were essential sources of information: ERA related structural reforms contribute to create the conditions to reaching the 3% target of Gross Domestic Product dedicated to Research and Development by 2020.

- Country missions undertaken by the Commission's services to analyse EU Member States' programmes of economic and structural reforms: they helped for identification, discussion and awareness raising of ERA priorities with national authorities.

- Eurostat: official statistics were used where relevant.

- Specific analysis of the implementation at national level of the ERA Communication priorities[1], carried out by the Joint Research Centre[2] with the support of independent national experts: they were a primary source of information.

- Research Funding Organisations' (RFOs) and Research Performing Organisations' (RPOs) responses to the "2012 Survey of State of Play of the implementation of ERA"[3]: RFOs and RPOs made a strong effort to respond to the ERA survey 2012 carried out by DG RTD. The results provide a detailed (even if partial) perspective on how ERA is being implemented at operational level.

- Contributions by Stakeholder Organisations which participate in the ERA Platform (the European Association of Research and Technology Organisations (EARTO), European Universities Association (EUA), the League of European Research Universities (LERU), NordForsk and Science Europe (SE)): they were useful to identify their on-going efforts in support of ERA.

1 http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/era_reports/, detailed in JRC-IPTS (2013) ERA Communication Synthesis Report.

2 European Commission, Joint Research Centre, Institute for Prospective Technological Studies

3 A thorough presentation of the ERA State of Play survey can be found in Euroepean Commission (2013). ERA SURVEY 2012 - State of Play concerning the ERA priorities in Research Funding and Research Performing Organisations - Overview of main results - http://ec.europa.eu/research/era/pdf/2012surveyresults_en.pdf

- Consolidated contribution to the ERA survey by seven EIROforum members (EIROs)[4] (CERN, Conseil Européen pour la Recherche Nucléaire; EFDA-JET: European Fusion Development Agreement: Joint European Torus; EMBL: European Molecular Biology Laboratory; ESO: European Southern Observatory; ESRF: The European Synchrotron Radiation Facility; EU.XFEL: European XFEL and ILL: The Institute Laue-Langevin): it highlighted the state of play in these intergovernmental initiatives.

- Researchers' report 2012[5]: it constitutes a valuable source of information on the situation in each Member State affecting researchers.

- The MORE2 Survey[6]: It provided insights on mobility and careers of more than 10,000 individual researchers in European Higher Education Institutes surveyed by the study.

- She Figures 2012[7]: it presents data with respect to gender in research.

- ERAWATCH Country Analytical Reports (2012)[8]: it provided elements for identifying the state of play.

- Preliminary inputs from an Expert Group launched to support the implementation of the ERA Communication by Member States and the European Commission and from the Study on the "Analysis of the ERA state-of-play in Member States and Associated Countries: focus on priority areas": they help clarify the scope and potential of some actions.

- Finally, Commission services' contributions: this ERA Progress Report mobilised all services implementing specific components of the ERA policy.

One final word on the quantitative identification of the State of Play. Whenever possible, results from quantitative official sources were used in this report. However, they are not fully adequate to provide a precise indication of the state of advancement in the implementation of the different ERA actions. This motivated the Commission to launch an ERA survey 2012 in order to identify evidence.

Most national authorities provided the full list of public research funding and/or performing organisations, which in some cases was completed with public organisations participating in the 7th Framework Programme as well as other sources. Authorities in these organisations were invited to respond to the ERA survey 2012. Of the 10,500 institutions that were

4 The European Space Agency (ESA) is a large organisation, spanning a wide range of activities, only a subset of which can be counted as science. Thus, it was concluded that it would be extremely challenging to provide an ESA input to the fundamentally science-oriented ERA survey in a coherent, meaningful, and accurate way, particularly given the very limited timescale available.

5 http://ec.europa.eu/euraxess/pdf/research_policies/121003_The_Researchers_Report_2012_FINAL_REPORT.pdf

6 http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies

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

8 http://erawatch.jrc.ec.europa.eu/

addressed, 3,450 responded and many more contacted the Commission to justify their lack of answer to the survey (i.e. private institutions, non-autonomous organisations, merged with another institution, etc.) This response rate can be considered as quite high, given the voluntary nature of the exercise, the short delay to provide responses and the amount of information required.

The results presented in this report should be considered with caution, as they only reflect a partial situation, the one in those institutions which responded to the ERA survey[9]. In the case of RFOs, they reflect the situation in 108 RFOs managing 14% of total EU GBAORD[10] (Government budget appropriations or outlays for research and development). In the case of research performing organisations, the results reflect the situation in 1,319 public organisations, mobilising around 1.2 million[11] research staff in Europe. In the case of Associated Countries, the results concern, in the case of RFOs, nine organisations in five countries, and in the case of RPOs, 77 organisations in eight countries[12].

9 Moreover, the ERA survey reflects only partially the situation in Germany as German authorities presented a separate document on ERA progress.

10 Government budget appropriations or outlays for research and development abbreviated as GBAORD, are a way of measuring government support for research and development activities. GBAORD include all appropriations (government spending) given to R & D in central (or federal) government budgets. Provincial (or State) government posts are only included if the contribution is significant. Local government funds are excluded. The share of GBAORD managed by RFOs in the European Union is not known.

11 According to Eurostat, the total number of research staff (headcount) in the government and higher education system in 2010 was 2.1 million.

12 As mentioned above, the presentation of the methodology and results can be found in European Commission (2013) ERA SURVEY 2012.

2. INTRODUCTION

The 2012 European Research Area Communication[13] defines ERA as a unified research area open to the world based on the Internal Market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, their competitiveness and their capacity to collectively address grand challenges. Based on analysis of the strengths and weakness of Europe's research systems and the overall objective of inducing lasting step-changes in Europe's research performance and effectiveness by 2014, the Communication defined five priorities:

- **More effective national research systems** – including increased competition within national borders and sustained or greater investment in research

- **Optimal transnational co-operation and competition** - defining and implementing common research agendas on grand-challenges, raising quality through Europe-wide open competition, and constructing and running effectively key research infrastructures on a pan-European basis

- **An open labour market for researchers** - to ensure the removal of barriers to researcher mobility, training and attractive careers

- **Gender equality and gender mainstreaming in research** – to end the waste of talent which we cannot afford and to diversify views and approaches in research and foster excellence

- **Optimal circulation, access to, and transfer of, scientific knowledge including via digital ERA** - to guarantee access to, and uptake of, knowledge by all.

Completing ERA will bring efficiency, quality and impact gains as well as new opportunities for all Member States and Associated Countries. It is an opportunity for less well-performing countries to take responsibility for reforming their research systems, driving a process of smart specialisation, and helping to close the innovation divide.

For each priority, the Communication identified actions to be taken at all levels: national, institutional and Commission's. The report presents the state of play in the five ERA priorities.

3. EFFECTIVENESS IN NATIONAL RESEARCH SYSTEMS

Open national-level competition is crucial to deriving maximum value from public money invested in research. It involves allocating funding through open calls for proposals, evaluated by panels of leading independent domestic and non-domestic experts (peer review), which incites researchers to reach internationally-competitive levels of performance. It also implies assessing the quality of research-performing organisations and teams and their outputs as a

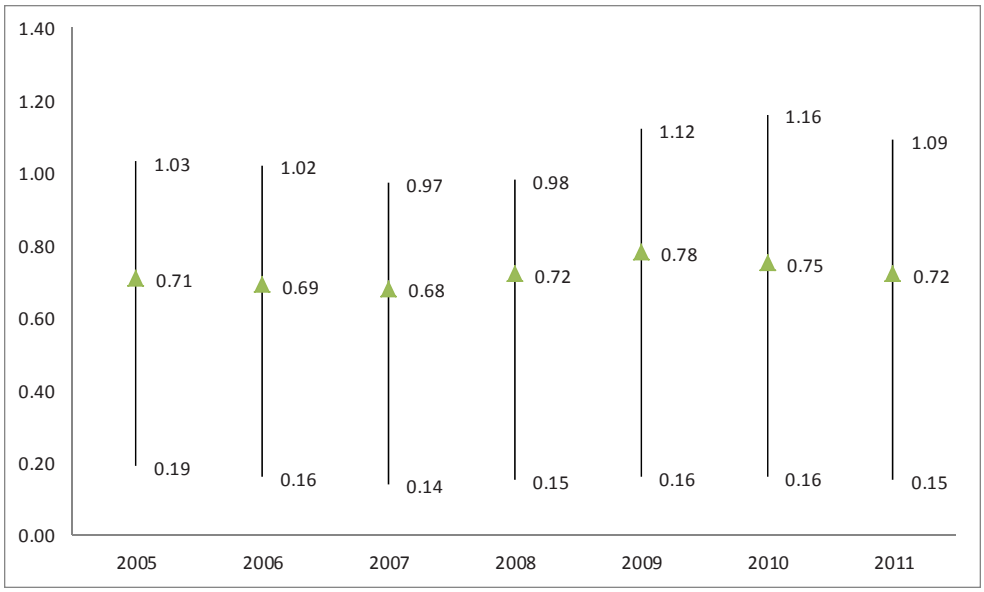
[13] COM(2012)392 final

basis for institutional funding decisions (peer review can form a part of such assessment) and in the long-term lead to organisational change. While the balance between these two approaches may vary, they should be at the core of research funding decisions at national and regional level in order to overcome divergences in performance across the EU. Careful planning of smart specialisation is also an important component of effectiveness, as it allows to make the most out of public investments.

PUBLIC RESEARCH FUNDING

Total Government Budget Appropriations or Outlays for R&D (GBAORD) in the EU have declined in relative terms since 2009[14], to reach 0.72% of Gross Domestic Product (GDP) in 2011 (Graph 1). However, in nine MS and Croatia the share was above the EU total, whilst in five others the shares were below half (0.36%) of the EU share.

Graph 1: Total GBAORD as a share of Gross Domestic Product in the EU and maximum and minimum share in the EU Member States

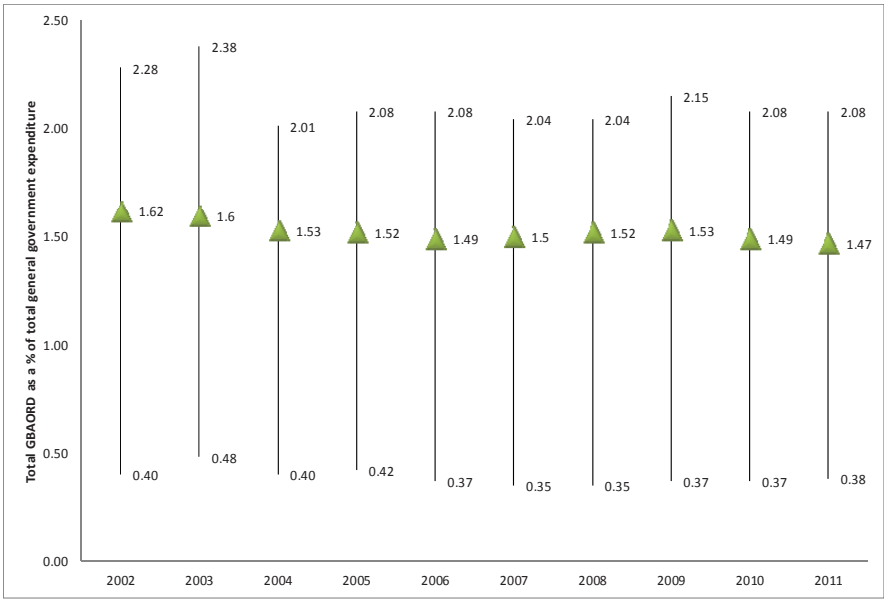


Source: Eurostat

Public effort in the European Union on research (measured as the share of total general government expenditures allocated to GBAORD) has also been declining in relative terms since 2009 to reach 1.47% in 2011 (Graph 2).

[14] In absolute terms, GBAORD started to decline in 2010.

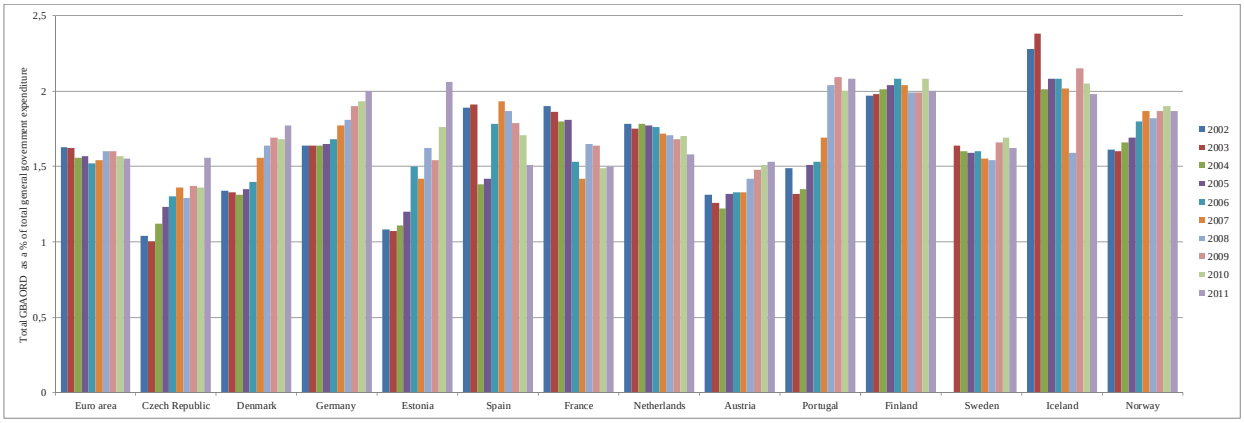
Graph 2: Share of total general government expenditures allocated to GBAORD in the EU and maximum and minimum share in the EU Member States



Source: Eurostat

The situation varies among MS. Graph 3 shows the evolution since 2002 in those countries which were above or equal to the effort at EU level in 2011. Some MS continously increased their efforts whilst in other MS they were stable or declining.

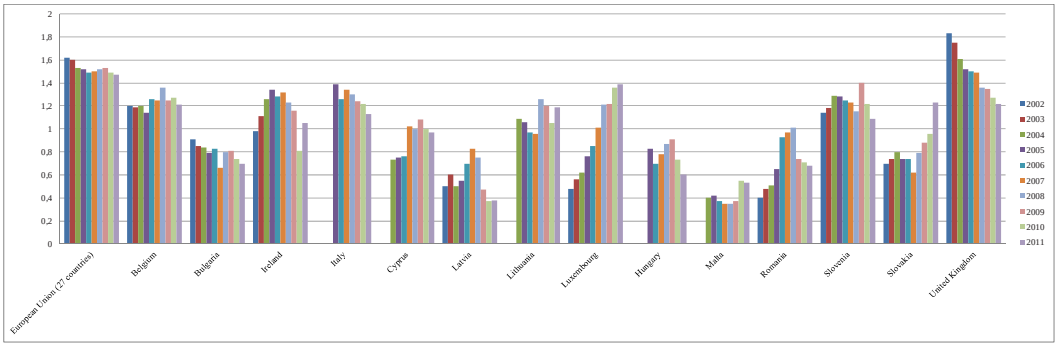
Graph 3: Evolution of share of total general government expenditures allocated to GBAORD in those MS and AC whose share is equal or higher than the EU share in 2011



Source: Eurostat

Half of MS are in the group of countries whose share was below the EU effort in 2011 and in most cases the share is declining (Graph 4)

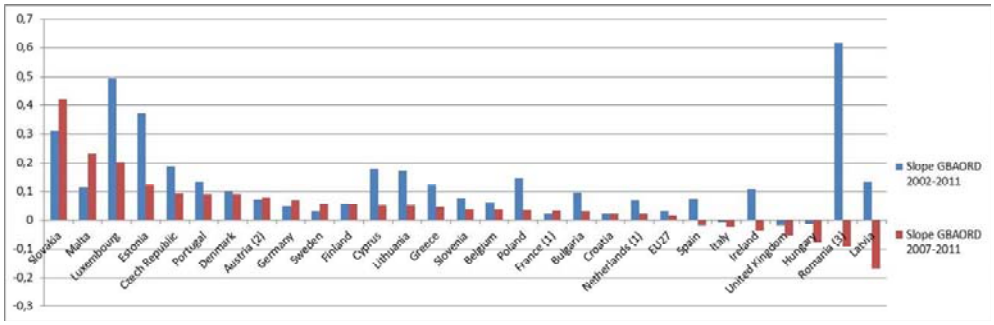
Graph 4: Evolution of share of total general government expenditures allocated to GBAORD in those MS whose share is lower than the EU share in 2011



Source: Eurostat

The slope of linear regressions[15] of the efforts on R&D for the periods 2002-2011 (2002=1) and 2007-2011 (2007=1) shows that in several cases the slopes are decreasing, implying that less budgetary efforts are given to R&D (Graph 5). This may probably reflect difficult budgetary contexts in some of the MS. However, these results should be considered with care, as they do not take into consideration the indirect support to R&D through tax incentives, which in 2009 were estimated to represent up to 0.14% of GDP[16] in the best case.

Graph 5: Slope of linear regression for the evolution of share of total general government expenditures allocated to GBAORD in two periods: 2002-2011 and 2007-2011



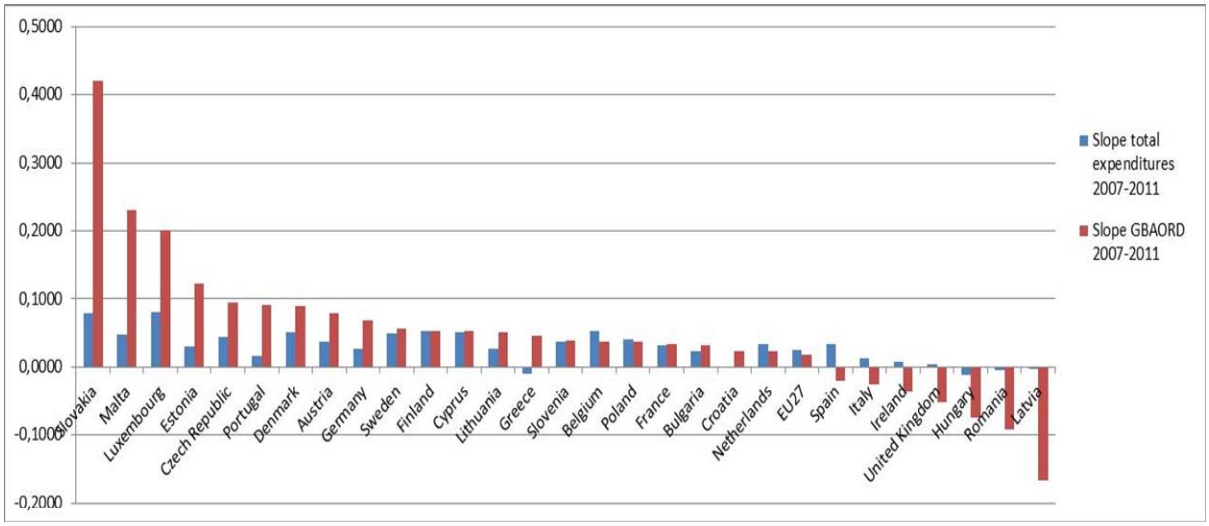
Source: DG RTD on the basis of Eurostat data. The analysis reflect the slopes between 2002-2011 with the exception of Malta (2004-2011); Sweden (2003-2011); Cyprus (2004-2011); Lithuania (2004-2011); Greece (2002-2008); Poland (2004-2009); France (2002-2005); Netherlands (2002-2005); Italy (2005-2011) and Hungary (2005-2011) and for the period 2007-2011 with the exception of Greece (2007-2008); Poland (2007-2009)and Croatia (2008-2011)

The comparison of the slopes of the linear regressions of the changes in total government expenditures and GBAORD for the period 2007-2011 (2007=1) shows that in some cases, the effort on R&D is increasing more rapidly than total government expenditures whilst in other cases it decreases even when total expenditures are growing.

15 Estimated using Least squares method.

16 Source DG Research and Innovation - Economic Analysis Unit based on OECD data. The estimates are available for only six Member States.

Graph 6: Slope of linear regressions for the evolution of total general government expenditures and GBAORD between 2007-2011 (base 2007, in Euros)



Source: DG RTD on the basis of Eurostat data. The analysis reflects in the case of GBAORD the period 2007-2011 with the exception of Greece (2007-2008); Poland (2007-2009)and Croatia (2008-2011).

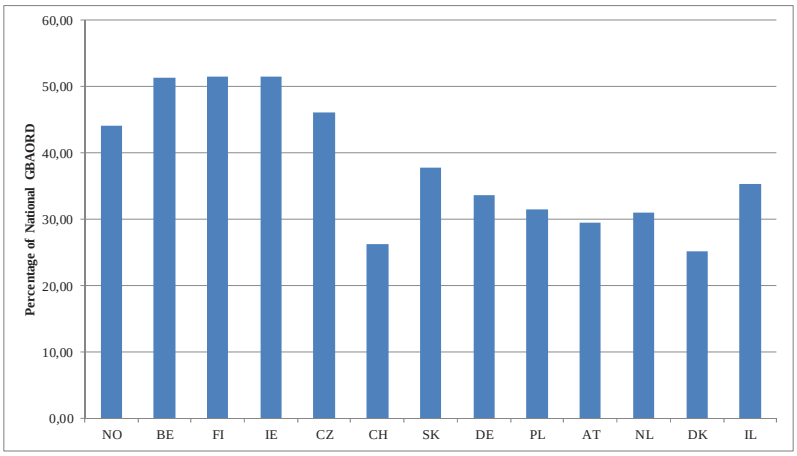
Budget cuts are mostly affecting research performing organisations with either short-term consequence, e.g. reductions in researchers' salary as well as temporary interruptions of R&D support measures, or, in very few countries, long-term implications, e.g. cuts in institutional funding[17]. Fiscal consolidation at the expense of R&D will probably endanger future growth and job creation.

PROJECT AND PERFORMANCE BASED RESEARCH FUNDING

All countries allocate research funding through competitive calls for projects. However the exact proportion is not available through official sources (Graph 7). Institutional funding is increasingly linked with the assessment of research performance. Based on current assessment and information provided by MS, at least 21 MS have provisions to link part, or all, institutional funding with performance. New and/or improved provisions have been proposed in 2013 in at least five MS.

[17] Forthcoming IPTS ERA Communication Synthesis report

Graph 7: Project-based public funding of research and development activities



Source: OECD Nesti. Observations reflect the situation in 2008, with the exception of Austria and Denmark (2009) and Finland (2010).

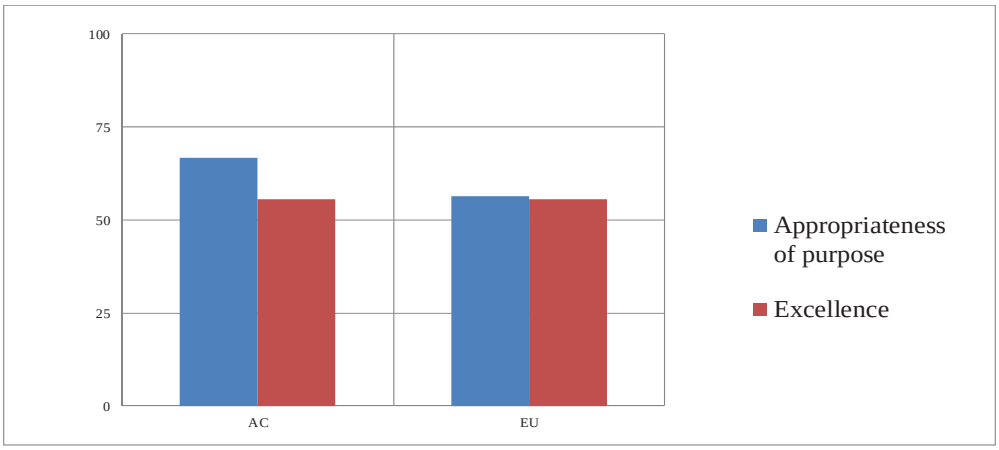
NATIONAL RESEARCH AND INNOVATION STRATEGIES

Based on current assessment and information provided by MS, in 21 MS a strategy for research and development as well as innovation has been adopted. In many cases they highlight the importance given to competition for funding and the importance of bridging knowledge generation with innovation. In some cases they are very comprehensive, including several measures which address the objectives of the ERA priorities, in some other cases they focus more specifically on the links between research and innovation. Based on current assessment and information provided by MS, at least twelve national strategies have been proposed and/or adopted in 2013. Some strategies are being aligned with the strategic priorities identified in Horizon 2020.

USE OF PEER REVIEW CRITERIA/EX-ANTE EVALUATION

The use of peer review raises the transparency and quality of the allocation of research funding in the ERA. The situation varies among MS on the type of evaluation criteria used for the peer review and on the inclusion of international experts in the review panels. In all MS (with two exceptions) there are provisions for using the core principles for international peer review, (nine of them explicitly adopted these criteria since 2012). Survey results show that a share of responding funding organisations throughout the EU apply both “Appropriateness” (relevance) and “Excellence” as evaluation criteria. EIROs always utilise international peer-review in the assessment of proposals and/or experiments and the selection is based on excellence.

Graph 8: Systematic use of appropriateness and excellence as evaluation criteria when funding organisations which responded to the ERA survey use peer review (in percentage of organisations)



Source: ERA survey 2012.

Ethical and integrity criteria are used systematically in the evaluation of proposals by 43% of the funding institutions which responded to the ERA survey 2012 in current EU MS, whilst they were 55% in AC.

There are little or no "formal" provisions for mobilising international experts systematically in MS.

SMART SPECIALISATION

Smart Specialisation Strategies (RIS3) in Research and Innovation (R&I) will be essential elements of effectiveness in the coming years. This new innovation policy concept has been designed to promote the efficient and effective use of public investment in research, essential in the ERA, notably in times of economic crisis. Its goal is to boost regional innovation in order to achieve economic growth and prosperity, by enabling regions to focus on their strengths. Smart specialisation Strategies will drive Structural Fund investments in R&I as part of the future Cohesion Policy's contribution to the Europe 2020 jobs and growth agenda.

Two out of three SHO partners in the ERA platform are developing actions to help their constituency in the design of smart specialisation strategies. EUA is producing guidelines for developing region-universities strategies for research and innovation, with the objective of informing future implementation of EU structural/regional funds. LERU has participated in the development of the white paper "Teaming for excellence" providing considerations on how to demonstrate the benefits of, and success factors in, teaming efforts. The Commission has produced a revised version of the "Annex III: a practical approach to RIS3 and its (self-) assessment" of the "Guide to research and innovation strategies for smart specialisation". The approach is intended to provide practical tools to policy-makers, experts and practitioners working at both national and regional level on how to approach the process of establishing research and innovation strategies for smart specialisation and to assess them.

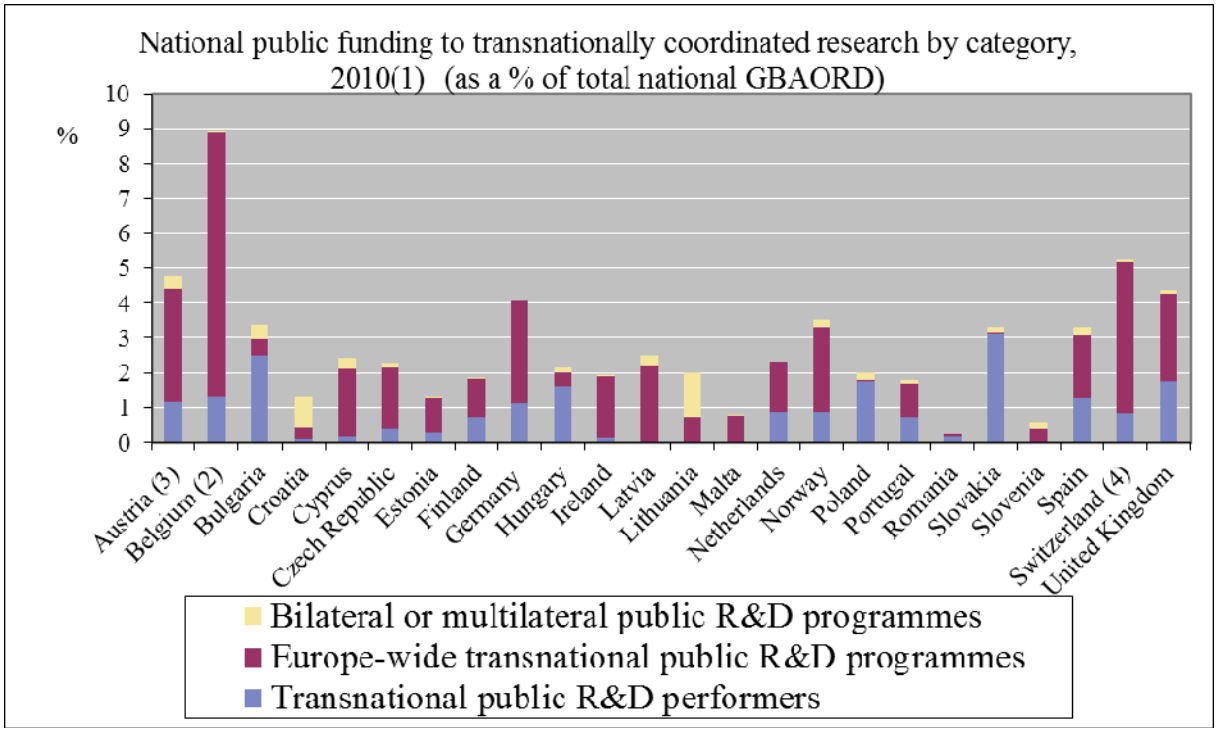
4. TRANSNATIONAL CO-OPERATION AND COMPETITION

Transnational co-operation and notably joint programming, has a large range of benefits. Joint activities mobilise cross-border complementarities and allow carrying out large scale research, which cannot be addressed by a single country. Joint activities also potentially contribute to enhance efficiency and attractiveness of the European Research Area. The EU needs to act coherently to achieve the scale of effort and impact needed to address grand challenges with the limited public research funds available. MS and AC also need to facilitate co-operation between funding organisations by adopting compatible funding rules and selection processes for the implementation of joint activities.

TRANSNATIONAL CO-OPERATION

According to experimental - or pilot – statistics gathered by Eurostat, the 2010 R&D budget directed towards transnational coordinated research was 3.79% on average (based on data provided by 21 MS), with variations among the different countries (Graph 9).

Graph 9: National public funding to transnationally coordinated research by category, 2010(1) (as a % of total national GBAORD)



Source: Eurostat

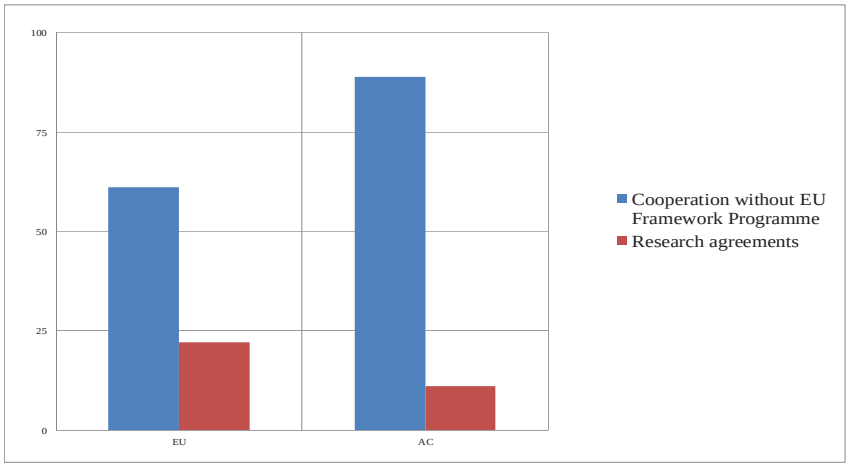
Notes: (1) Experimental data; (2) BE: data of some regional authorities in Belgium are probably not included; (3) AT: federal or central government only; (4) CH: data for 2009; uses 2008 GBAORD as denominator.

Transnational cooperation is supported by the EU Framework Programme: the 28 MS have received approximately 29.4 billions Euros and AC 2.9 billions Euros of EC contribution during the period of 2007-2012. FP funding represents on average 60 Euros per head of population.

The Commission is co-funding with national authorities five Article 185 Initiatives and continues facilitating the preparation of Strategic Research Agendas by Joint Programming Initiatives. All ten joint programming initiatives have developed joint activities, five JPIs have adopted Strategic Research Agendas and seven will have launched joint calls by the end of 2013.

Based on current assessment and information provided by MS and SHO, cross border research cooperation is carried out directly by at least 26 MS, either through bilateral or multilateral agreements or other specific types of transnational cooperation model (Open research area in Europe for the Social Sciences, large-scale programmes funded jointly by the Nordic countries and NordForsk, through real common pots; Lead agency such as D-A-CH, etc.). However, it is not possible yet to assess the importance of each of these actions. The ERA survey 2012 results point out that around 60% of responding funding organisations participate in one or more types of cooperation modality, without the involvement of the EU Framework Programme. A larger share is observed in AC (Graph 10).

Graph 10: Share of funding organisations implementing co-operation activities without EU framework programme, including those implementing research agreements[18]



Source: ERA survey 2012

Transnational co-operation is implemented by all EIROs.

COMPATIBLE RULES FOR TRANSNATIONAL CO-OPERATION

Compatible national funding rules to make transnational cooperation more effective are implemented by at least nine MS (based on current assessment and information provided by MS). They have set up provisions to promote and facilitate cross-border interoperability of national programmes. Based on current assessment and information provided by MS, at least 11 MS allow mutual recognition of evaluations that conform to the core principles of international peer-review (notably those evaluations which were carried out by the European Research Council) as basis for national funding decisions. The ERA survey 2012 results

18 Respondents were asked: Does your organisation participate in research agreements other than those mentioned above (i.e. LEAD agency, Money follows co-operation and Money follows researchers)?

indicate that more than 80% of responding funding organisations share eligibility criteria, that around 30% of them implement common priorities and common selection decisions, whilst around 20% face problems when trying to implement common priorities, common eligibility criteria and common funding rates.

SHO partners in the ERA platform are taking action to foster transnational co-operation and competition. Science Europe is producing a "tool-kit" with a guidance document to support the implementation of cross-border collaboration. Science Europe is also investigating the potential to expand an "International Co-investigators' initiative. NordForsk has identified four priority areas for Nordic cooperation and for realising ERA, among which the development of joint research initiatives and international cooperation. Since 2005 it has used the common pot funding mechanism for transnational initiatives, creating added value by high quality processes, identifying jointly agreeable topics, which Nordic research financiers are willing to commit to. In 2012, they included topics such as for example education for tomorrow, eScience, etc. EUA and EARTO have been providing evidence and advice to ERAC on the enhancement of cross border cooperation. EUA and its European Platform of Universities in Energy are working with EIT KIC Inno-Energy to develop a new partnership entitled UNI-SET to tackle the "energy" grand challenge.

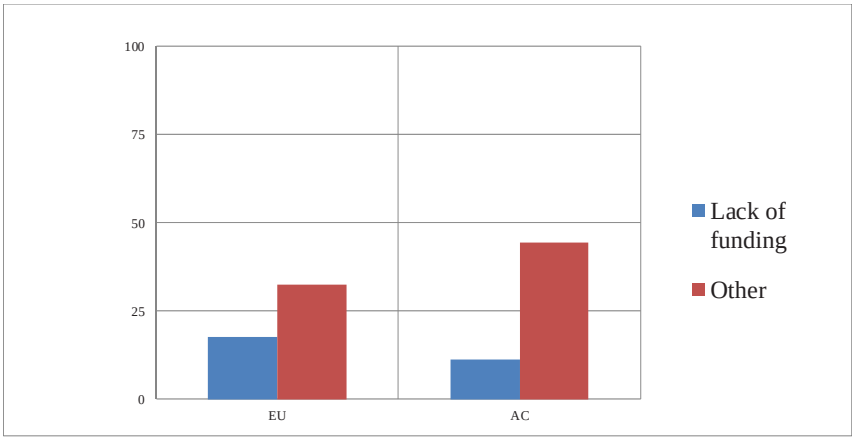
RESEARCH INFRASTRUCTURES

ROADMAPS AND FUNDING

Excellent research depends upon world-class facilities and research infrastructures (RIs), including ICT-based e-infrastructures (eRIs). Such RIs attract talent and stimulate innovation and business opportunities. eRIs in particular enable increasingly data-intensive collaborative research by geographically dispersed teams. The challenges are to ensure national commitments to the implementation of the ESFRI Roadmap, achieve maximum value-for-money from investment at all levels, overcome obstacles to the construction and operation of RIs and ensure access for researchers to RIs across Europe.

Based on current assessment and information provided by MS, all MS participate in the development of at least one of the RI identified by ESFRI. 18 MS contributed to fund one or more infrastructure projects listed in ESFRI and cofunded by FP7. MS and AC also fund the development and operations of EIRO. Based on current assessment and information provided by MS, national roadmaps for the development of national research infrastructures have been identified and/or are being implemented by a majority of MS (in at least 24 MS) of which at least 16 link them explicitly with ESFRI. At least 13 MS mention in their national roadmaps their contribution to funding of ESFRI. Other MS contribute to the funding of ESFRI, but it is not always possible to identify their contribution. At least seven MS have specific provisions for the development of e-infrastructures. Among funding organisations which answered the ERA survey 2012, around 20% fund the development of ESFRI. They indicate that they do not contribute more because of lack of funding and/or other reasons (Graph 11).

Graph 11: Barriers preventing funding or participation in the construction, development and/or operation of a Reseach Infrastructure included in the 2010 ESFRI Roadmap or to the European Strategy for Parical Physics of CERN (percentage of funding organisations)



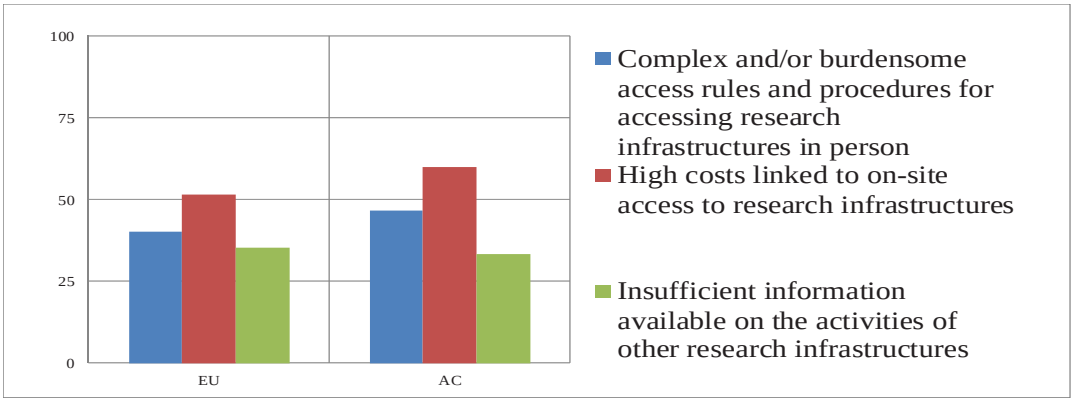
Source: ERA survey 2012.

ACCESS TO RI

The conditions for accessing RIs depend on the characteristics and specificities of each infrastructure. Based on current assessment and information provided by MS, at least 11 MS have provisions to facilitate access to RI. EIROs provide access (in some cases free of charge) to research infrastructures through different modalities: participation to research experiments, bilateral and multilateral agreements, visitors programmes and/or peer review calls for proposals.

Almost 60% of research performers which answered the ERA survey 2012 indicate that their researchers require access to research infrastructures of pan-European interest. Survey results indicate that around 37% of research performers requiring access to RI experience problems. The reasons are mainly complex access rules, high costs and/or insufficient information available on the RI (Graph 12).

Graph 12: Type of difficulties[19] identified by research performing organisations which have problems when trying to access research infrastructures of pan-European interest (percentage of organisations)



Source: ERA survey 2012.

The Commission has developed a first draft of the Charter of Access within the framework of the ESFRI Implementation Group which will be presented to the ESFRI Executive Board in October 2013. The Commission will also launch in Horizon 2020 training and awareness activities on RIs as well as calls to promote access to RIs of pan-European interest. It will continue facilitating and supporting the preparation, implementation, long-term sustainability and efficient operation of the research infrastructures identified by ESFRI and other world-class research infrastructures. Moreover, the Commission launched in 2012 the process of assessing the ESFRI projects by a high level assessment expert group in terms of (managerial and financial) maturity and possible implementation by 2015. The report of this high level group, expected in September 2013, will identify areas per project where support would be needed in order to facilitate implementation. ESFRI will complement the assessment with a scientific evaluation aiming at a prioritisation of the ESFRI Roadmap. Using this basis, the Commission will discuss with MS on possible follow up actions to facilitate implementation of the ESFRI Projects. Two SHO partners in the ERA platform are also active in the field of RI. Science Europe has launched a working group on Research Infrastructures. NordForsk has identified among its four priority areas for Nordic cooperation the development of research infrastructures, linking funding instruments with the joint use of, and access to, RIs.

19 Respondents having answered "yes" to the question Research may sometimes involve the use of cutting edge research infrastructures, which require means beyond the capacities of a single organisation. Does your organisation require access to such infrastructure(s) in your field(s) of research? And "yes" to Do researchers from your organisation face difficulties in accessing research infrastructures (including infrastructures of pan-European interest)? were asked to identify the barriers: 1. Insufficient information available on the activities of other research infrastructures; 2. Complex and/or burdensome access rules and procedures for accessing research infrastructures in person; 3. High costs linked to on-site access to research infrastructures; 4. Complex access rules and protocols for remote access; 5. Intellectual property rights issues; 6. The rules for accessing confidential data vary among the research infrastructures, thus preventing access to some of them; and 7. Other.

5. OPEN LABOUR MARKET FOR RESEARCHERS

A genuinely open and attractive European labour market for researchers is an essential factor for the successful completion of the European Research Area. The barriers to the free circulation of researchers across borders and sectors are well-known: a lack of open, transparent, merit-based recruitment, reduced access to and the portability of national grants, social security and pension issues, visa problems, skills mismatch between academic training and private requirements, and uncertain career paths and development. Significant progress has been made in recent years. MS have introduced a range of measures, programmes, strategies and legislative acts to address the barriers and train researchers to create the conditions to meet their national R&D target. A series of EU policy initiatives such as the development of the EURAXESS network, the "Scientific Visa Directive", a Human Resources Strategy for Researchers based on the Charter and Code, and Principles of Innovative Doctoral Training have also contributed to this progress. However, a number of challenges remain and a coordinated effort by the Commission, MS and institutions is needed to remove remaining obstacles, in particular practices, to researcher mobility, training and attractive careers.

OPEN, MERIT BASED AND TRANSPARENT RECRUITMENT

Open, merit based and transparent recruitment ensures that research performers are able to select the best researchers from the widest possible pool of talents, thereby fostering mobility opportunities for innovation and more generally contribute to the advancement of ERA.

The implementation modalities of open recruitment vary among the countries. So far, EURAXESS data shows an increase from 7,500 job advertisements in 2010 up to 36,500 in 2012. This excellent progress, which is helping to match demand and supply across borders, is due to concerted efforts by the Commission, several MS and institutions to ensure that a much larger proportion of research vacancies are posted on the portal, e.g. the inclusion of vacancies from major job providers such as Naturejobs and Galaxie.

A comprehensive review of more than 100 universities or research institutes who have gained the "HR Excellence in Research" logo reveals that more than 90% had reviewed, or were in the process of reviewing, recruitment processes[20]. Institutions were typically encouraging staff to involve at least three people in selection panels, including a representative from HR, having a gender balance on panels and creating a policy/guideline for recruitment panels to adhere to, including external experts as well as training all staff involved in the process. EIROs open their vacancies to any nationality.

The MORE2 Survey[21] shows that around 40% of researchers associated to European Higher Education Institutes 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 (the range goes from 22% to 69%). The Commission is

[20] http://www.vitae.ac.uk/CMS/files/upload/Vitae-HR-Strategies-for-researchers-Report-2013.pdf

[21] http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies [forthcoming]

carrying out a study in 2013 to determine the current situation with regard to recruitment policies and practices in each MS and to consider the feasibility and appropriateness of possible further measures to boost the level of open recruitment.

2012 saw a growth in divergence in innovation performance among MS. In this environment, coupled with cuts to research budgets in the countries most affected by the financial crisis, open recruitment and career progression become all the more important to create the conditions for more balanced growth across Europe extending the spread of excellence.

ATTRACTIVE CAREERS

MS and AC continue to support the implementation of the Code and Charter (C&C) which aim to improve researchers' working conditions. As of June 2013, 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. Level of institutional endorsements of the C&C principles continues to grow.

The Commission's Human Resources Strategy for Researchers (HRS4R) focuses on the practical implementation of the C&C principles. Award of the 'HR Excellence in Research' logo[22] recognises institutional progress in implementing C&C principles. Currently, some 230 organisations are members of the Strategy Group. So far 148 organisations have received the logo, half of them within one country, reflecting the enabling framework provided by national authorities. EIROforum members have Human Resources strategies well aligned with the C&C.

With the HRS4R now reaching a critical mass of involvement, the Commission has decided to build upon this work through a feasibility study into a quality certification of Human Resources in public research institutes. SHO partners in the ERA platform encourage their members to engage in the HRS4R process by organising working groups, high level discussions and workshops, launching surveys, and improving guidelines.

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[23]. In some MS, the proportion is higher. Furthermore, the mobility experience is largely positive. At EU level, 80% of internationally mobile researchers believe mobility had (strongly) increased the advancement of their research skills and 62% the quality of their research publications.

MS have put in place various measures to remove obstacles to researchers' mobility. These include reforms in the higher education sectors linked to the Bologna process. In 2010 the average EU-27 shares of non-national doctoral candidates coming from another Member State

[22] http://ec.europa.eu/euraxess/index.cfm/rights/strategy4Researcher

[23] MORE2 Survey 2012

or from outside the EU[24] was 8% and 20% respectively. A comprehensive overview including examples of good practice can be found in the Commission's Researchers Report 2013.

A 'Task Force on Highly Mobile Workers', composed of representatives from different Commission services, was set up at the end of 2012. Its task is to define elements as to who should be regarded as a 'highly mobile worker' and to identify legal, administrative and practical barriers for such workers. This work will provide a prioritised list of barriers. Three categories of 'highly mobile workers' will be addressed: artists and culture professionals, international researchers and international transport workers. The document will serve as a basis for discussion and reflection on the problems and challenges faced by such workers with regard to their social protection, working conditions and in dealing with national, regional or local administrations.

ACCESSIBILITY AND PORTABILITY OF GRANTS

The modalities in support of the implementation of accessibility to and portability of national grants vary among MS and AC. Several regional initiatives such as the 'Money follows Researcher' and the 'Money follows Cooperation Line' schemes have been adopted.

SOCIAL SECURITY AND VISA PROCEDURES FOR MOBILE RESEARCHERS

Mobile researchers face obstacles related to social security, including pensions systems, as well as visa granting procedures. The Commission continues to support stakeholders in setting up pan-European supplementary pension fund(s) for researchers. It has helped to create a Task Force, made up of representatives of various employer organisations, whose role is to investigate the feasibility of setting up a multi-country Retirement Savings Vehicle (RSV) that can be used to provide retirement benefits to professionals employed by research organisations throughout the EEA. The Task Force will make a proposal based on its findings by the end of 2013.

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[25] 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.

SHO partners in the ERA platform have launched a set of activities to address mobility: studies to investigate mobility patterns, surveys, working groups and participation in Commission's activities.

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[24] Source: Eurostat education statistics. More detailed information on the EU and on the different Member States can be found in the Researchers' Report 2013 [http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies].

[25] In 2005, the Council adopted the Scientific Visa Directive to reduce obstacles to the entry and residence in the EU of third-country nationals.

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 (150,000 queries in 2012). The Commission will explore the possibility of rolling out an Industry User Interface for business users tailored to the needs of business users across Europe.

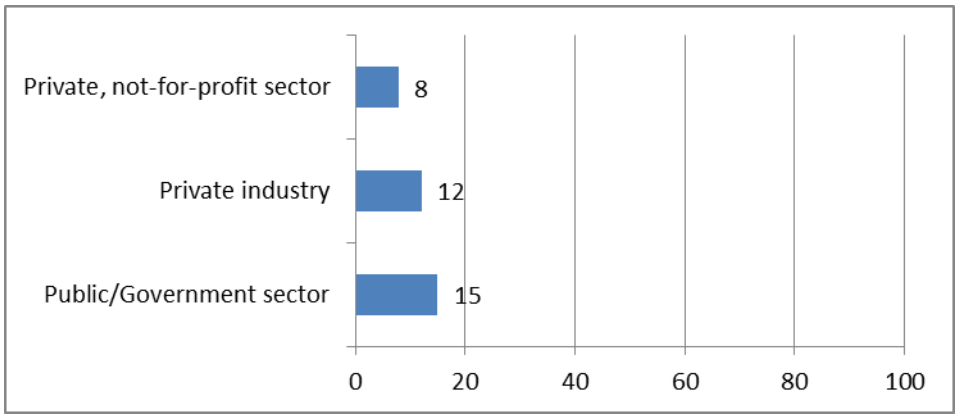
EURAXESS Links continue to support European researchers in the US, Japan, China, India, ASEAN region and, as of 2013, Brazil and Canada. Its mandate has recently been extended to include promoting Europe as an attractive place for international researchers. For example, EURAXESS Links Information Officers act as intermediates between the non-EU country and a EURAXESS Service Centre, thus speeding up the provision of information.

ACADEMIA-INDUSTRY MOBILITY

MS 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.

The MORE2 survey shows that EU-wide, relatively few researchers have experience of working in private industry. While 23% of PhD researchers had work experience as researchers outside academia during their PhD, only 4% of researchers were active in industry. During the post-doctoral career stages, 12% of university-based researchers had worked for at least three months in industry (Graph 13).

Graph 13: Share of university-based researchers having completed their PhD with experience of working as a researcher outside academia for a period of at least three months



Source: MORE2 Survey 2012

INNOVATIVE DOCTORAL TRAINING

Europe has relatively few researchers employed in industry, making up only 45% of total researchers compared with 78% in the US, 74% in Japan and 62% in China. At the same time

Europe continues to train an increasing number of PhDs (115,000 graduated in 2010[26]). Although the nature of PhD training is diversifying and the majority of PhD graduates embark on careers outside of academia, early stage researchers are often inadequately informed about career paths outside of academia and have insufficient experience in industry and other relevant employment sectors. Only one in ten early-stage researchers reported receiving training in entrepreneurship or intellectual property rights during their PhD. As a response, the Commission worked with experts from industry, academia, and national research ministries to prepare seven Principles for Innovative Doctoral Training[27] , to foster excellence and a critical mindset and provide young researchers with transferable skills and exposure to industry and other employment sectors. The Council of Ministers has endorsed these principles and has called on MS and universities to provide financial support.

This year, experts designated by the Commission are visiting a number of doctoral schools in order to learn how to further spread the use of these principles. The EUA Council for Doctoral Education plays a key role by bringing together vice-rectors, deans and heads of doctoral schools from all over Europe to develop and improve doctoral education within European universities through the dissemination of best practices, advocacy and research. SHO partners in the ERA platform are also tackling innovative doctoral training through the development of position papers, summer school training, conferences, and funding instruments.

[26] Eurostat education statistics

[27] http://ec.europa.eu/euraxess/pdf/research_policies/Report_of_Mapping_Exercise_on_Doctoral_Training_FINAL.pdf

6. GENDER

European research still suffers from a substantial loss and inefficient use of highly skilled women, and from a lack of gender dimension in research content. Furthermore too few women are in leadership positions or involved in decision-making. In 2010, women represented 46% of EU PhD graduates, 32.4% of researchers, 19.8% of senior academic staff. Gender unbalance is more striking in decision-making, where only 15.5 % of women are heads of institutions and 10% are rectors in the higher education sector[28].

Concerning the labour market, the MS must apply the provisions of the Directives on gender equality established at EU level. Specifically in the field of research, MS use different mechanisms to promote gender equality. Based on current information provided by MS[29], measures, incentives and/or strategies for gender equality are in place in at least 18 MS to various degrees. Among them, targets are set in at least 10 MS, specific legislation for gender equality in research is in place in at least five MS and four MS require action plans for gender equality at the level of research performing organisations. Some MS (at least 4) report the inclusion of a gender dimension in research programmes. Several MS (at least 13) have legal provisions requesting a minimum share of females in evaluation and recruitment panels.

Awareness programmes to attract girls to science and women to research are enforced by more than one third of MS (by at least 10, based on current assessment and information provided by MS). Four out of the five SHO partners in the ERA platform have implemented actions addressing gender issues: adoption of internal policy and position papers, round tables, guidelines, working groups and dedicated sections in surveys. EIROs also implement a variety of actions to improve gender balance.

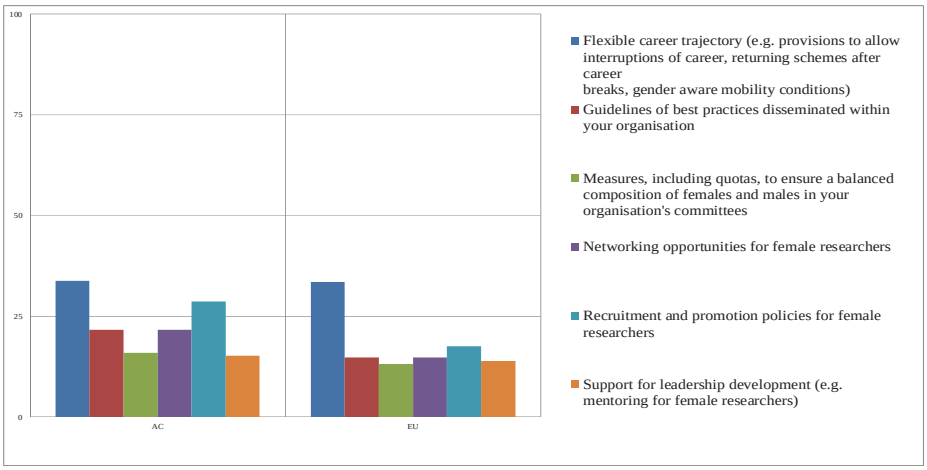
Among the universities and research performing organisations which responded to the ERA survey 2012 ("responding organisations" for short), the "median" share of women in recruitment panels is 40% while in research evaluation committees it is slightly above 30%. The ERA survey 2012 results also show that among the activities implemented in connection to gender issues, half of the responding organisations in the EU are implementing work-life balance measures and more than 30% allow for flexible career trajectories. Less than 20% apply recruitment and promotion policies and provide support leadership development for female researchers. Slightly over one tenth have guidelines of best practices and networking opportunities for female scientists. The share is somewhat higher in AC than in MS, mainly because of the strong initiatives of the Nordic countries (Graph 14). About 23% of the responding organisations have drawn up a gender equality plan or strategy. More than half of the responding organisations in the EU have targets for achieving gender equality and around one third support / request audits of existing procedures in order to identify gender bias.

[28] 2010 data from She Figures 2012 - except for researchers: Eurostat data showing a decrease of 0.5 % points from 2009 - http://epp.eurostat.ec.europa.eu/portal/page/portal/science_technology_innovation/data/main_tables

[29] In many countries universities have a high degree of autonomy, notably when implementing gender-related policies at the institutional level. This implies that identifying and monitoring the measures may be difficult.

Around 20% of the responding organisations include a gender dimension in research and innovation content of programmes, projects and studies.

Graph 14: Activities implemented in connexion with gender issues[30] by research performing organisations (percentage of organisations)



Source: ERA survey 2012.

The FP7 Science in Society work programme provides support to universities and research organisations to set up and implement gender equality (GE) plans. Up to now, 11 projects are funded involving around seventy research organisations and universities. The incoming ERA-NET project GENDER-NET has been designed as a key initiative helping Members States and AC to join forces to address common challenges for gender equality in research and innovation.

In the Commission Proposal for Horizon 2020, the EC is committed to promote effectively gender equality and the gender dimension in research content, including them in its programmes.

30 Respondents were asked: There is an array of activities which may be implemented in connection with gender issues. Which of the following activities were implemented by your organisation in 2011? 1. Recruitment and promotion policies for female researchers; 2. Measures, including quotas, to ensure a balanced composition of females and males in your organisation's committees (involved in recruitment, career progression, or in evaluation of research programmes or projects); 3. Flexible career trajectory (e.g. provisions to allow interruptions of career, returning schemes after career breaks, gender aware mobility conditions); 4. Work-life-balance measures (e.g. parental leave, flexible working arrangements for researchers); 5. Support for leadership development (e.g. mentoring for female researchers); 6. Networking opportunities for female researchers; 7. Guidelines of best practices disseminated within your organisation; 8.Other.

7. KNOWLEDGE CIRCULATION

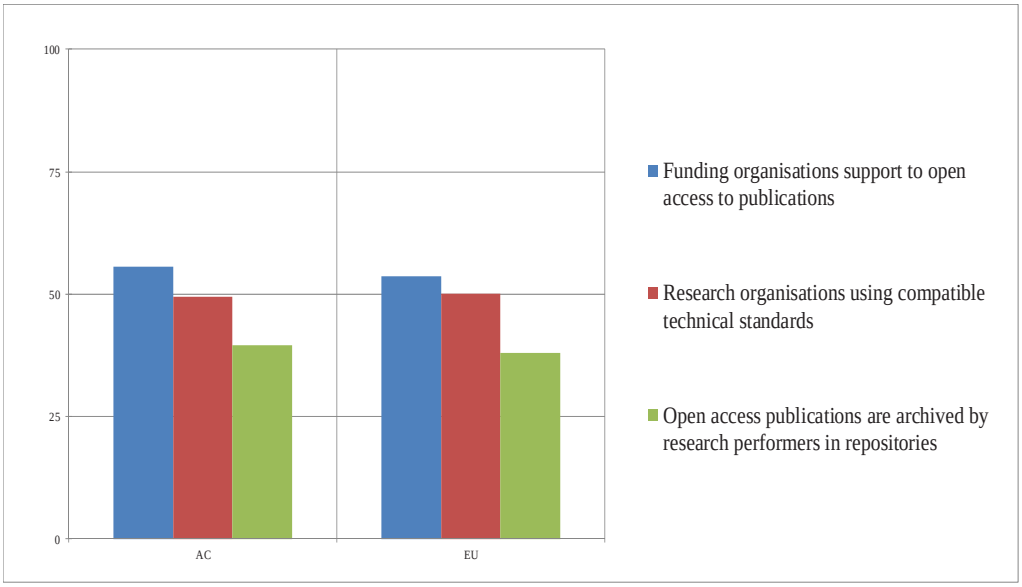
To complete ERA, knowledge needs to circulate freely and effectively, in order to improve the efficiency and impact of research and innovation. Three aspects must be considered to facilitate the circulation of knowledge. First, scientists, research institutions, businesses and citizens should be able to easily access, share and use existing scientific knowledge. Second, Open Innovation should be promoted by more and better links between research, business and education, and in particular by knowledge transfer between public research institutions and the private sector. Third, effective collaborative research processes should be facilitated by implementing a digital ERA which allows researchers to profit from seamless online access to e-infrastructure and digital research services for collaboration, computing and accessing scientific information (e-Science).

OPEN ACCESS TO PUBLICATIONS AND DATA

Open Access to publicly funded scientific content is increasing in Europe and is expected to have strong economic and social benefits. The process among MS is gradually yet visibly gaining importance, while it has gained significant ground among the research community and research administrators throughout Europe and the rest of the world. Almost all MS (at least 25, based on current assessment and information provided by MS) have set up the legal and administrative context in support to Open Access. At least eight have measures in place which foster Open Access to both publications (including the development of repositories) and data. The rest (at least 17 MS) concentrate their support on Open Access to publications, of which nine support the development of repositories.

The ERA survey 2012 results show that half of responding funding organisations are supporting Open Access to publications and data, as well as the use of compatible technical standards for publications, while almost 40% fund the development of repositories for publications (Graph 15). Green Open Access seems to be the preferred modality supported by responding funding organisations. Among responding research performing organisations, around 50% indicated that their publications are in Open Access, and almost 50% of research performing organisations have compatible data repositories. A similar situation is observed in the case of AC.

Graph 15: Support to open access by funding organisations and implementation by research performing organisations[31] (percentage of organisations)



Source: ERA survey 2012.

The Commission has launched actions to support MS's networking on Open Access and to train researchers in the use of Open Access. Besides, a group of national reference points on Open Access has been identified to facilitate dialogue with MS. Open Access to publications will also be supported by Horizon 2020 and a pilot action on Open Access to data will be launched in the same context. SHO partners in the ERA platform - following Science Europe's initiative - are in close dialogue among themselves, learned societies and publishers. EIROs endorse open access to research results obtained utilising public funding.

KNOWLEDGE TRANSFER

In the area of knowledge transfer all MS have taken action to bridge the gap between academia and industry. A recent Commission funded Knowledge Transfer study[32] shows that Knowledge Transfer policy is generally accepted as an important issue in Europe. The vast majority of countries (90%) said that national and regional governments promote policies and procedures for the management of Intellectual Property resulting from public funding. The study indicated that throughout the EU a strong emphasis is put on the development of capacities and skills in research performing organisations, whereas the development of Knowledge Transfer strategies has not yet received the same support (although this was

31 Funding organisations were asked: Does your organisation support open access to publications (i.e. online and free access to publications) as part of its institutional and/or project-based funding? while research performers were asked: Does your data repository follow technical standards that make it compatible with other repositories (ISO standards, OPENAire)? and Does your organisation archive the open access publications in a repository?

32 Knowledge Transfer Study 2010-2012. This Commission funded study monitored the status of implementation of the European Commission's "Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations" from 2008

advised in the 2008 'Commission IP Recommendation[33]'). Whilst a larger share of countries (41%) reported that "universities and other PROs are legally required to define KT as a strategic mission", only one fifth (21%) said that "universities and other PROs are legally required to formulate a KT strategy". A quarter (26%) stated that "funding of universities and other PROs depends partly on having a KT strategy". Finally, high KT policy intensity was found[34] to go together with high national innovativeness (as measured by the European Innovation Scoreboard) and competitiveness (as measured by the Global Competitive Index).

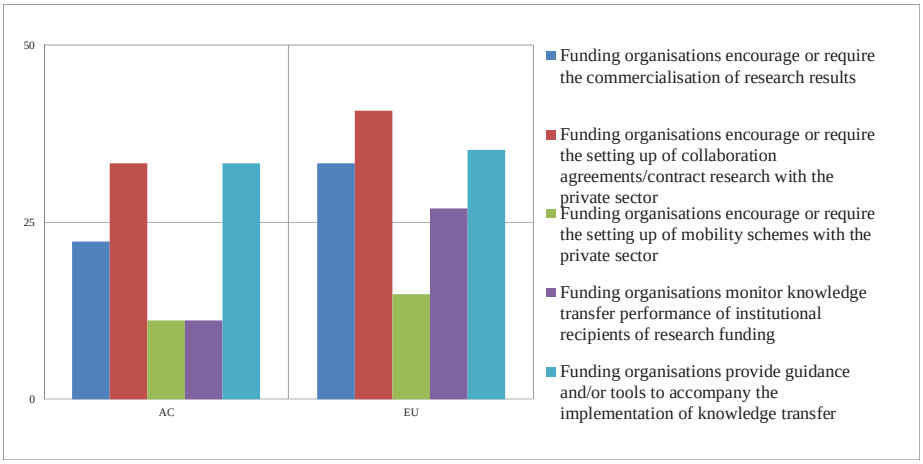
The three SHO partners in the ERA platform with commitments in this field are encouraging open innovation and knowledge transfer and supporting /funding public-private mobility programmes. EIROs regularly jointly develop many research projects with industry. The Commission is, with the support of a high level Expert Group, developing a comprehensive policy approach on Open Innovation and Knowledge Transfer, for which it will consult stakeholders in 2014.

More than 60% of the responding funding organisations to the ERA survey 2012 support knowledge transfer, notably by encouraging or requiring the setting up of collaboration agreements with the private sector and the commercialisation of research results and by providing guidance and tools to accompany the implementation of knowledge transfer. A lower share of organisations is supporting knowledge transfer in AC (Graph 16).

[33] The Commission Recommendation on the management of intellectual property in knowledge transfer activities and Code of Practice for universities and other public research organisations (2008) recommends that Knowledge transfer is a strategic mission of public research organisations.

[34] The regression analyses correlated KT policy activity with selected national characteristics

Graph 16: Support to different knowledge transfer activities by funding organisations[35] (percentage of organisations)

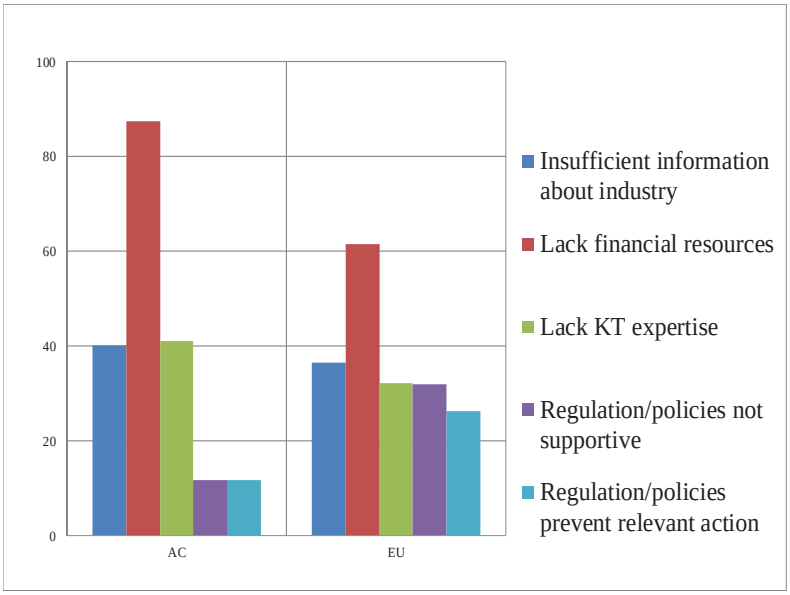


Source: ERA survey 2012

Around 28% of research performing organisations declare facing problems with implementing knowledge transfer, mainly due, for more than 60% of them, to regulations or policies preventing or not supporting it. The results for AC show a more difficult situation (Graph 17).

35 Funding organisations having answered "yes" to: Does your organisation support knowledge transfer as part of its institutional and/or project-based funding? (Knowledge transfer is the process of transferring the rights to use and exploit knowledge from the sources to those in a position to best exploit it when placing new products and services on the market) were asked to specify the type of activity(ies) supported by the organisation: 1. Our organisation provides guidance and/or tools to accompany the implementation of knowledge transfer; 2. Our organisation encourages or requires the setting up of collaboration agreements/contract research with the private sector; 3. Our organisation encourages or requires the setting up of mobility schemes with the private sector; 4. Our organisation encourages or requires the commercialisation of research results; and 5. Our organisation monitors knowledge transfer performance of institutional recipients of research funding

Graph 17: Barriers to the development and implementation of knowledge transfer activities experienced by research performing organisations[36] (percentage of organisations)



Source: ERA survey 2012

DIGITAL ERA

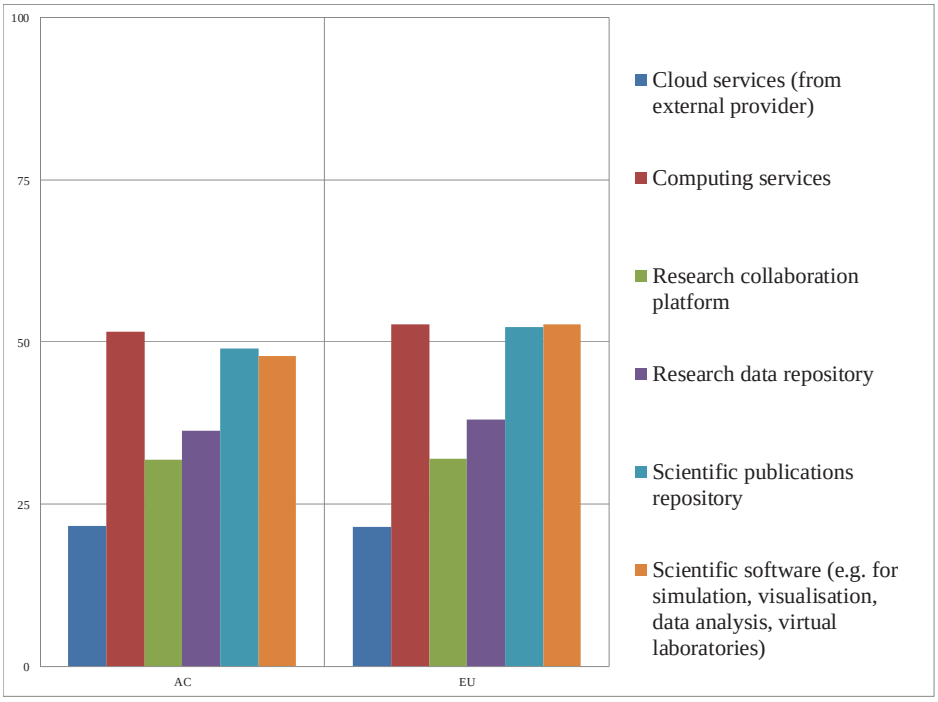
Based on current assessment and information provided by MS, in the area of Digital ERA at least seven countries support a wide range of actions (provision of digital research services, development of e-infrastructures and seamless electronic access), while at least 14 other MS are partly promoting some of the necessary measures (for example, some MS tackle digital services and e-infrastructure while some others are concentrating on e-infrastructure and electronic access). Fifteen MS are members of EDUGain[37] and four other MS are in the process of joining it. At least 11 MS have some specific provisions for the implementation of electronic identities for researchers, on top of their participation in EDUGain. The Nordic countries (Denmark, Finland, Iceland, Norway and Sweden), which are members of NordForsk (the only SHO ERA partner committed to promote e-science activities), have signed a 10-year agreement on joint development of advanced IT-services for research. In the first part of 2013 the Commission has implemented a public consultation on Open data infrastructures. EIROs have been actively contributing to and supported the Digital ERA for many years.

36 Respondents who answered yes to: Has your organisation experienced barriers to the development and implementation of knowledge transfer activities? were asked: If yes, how important are the following barriers? 1. Regulations or policies at national or regional level do not allow to take relevant action; 2. Regulations or policies at national or regional level are not specifically supportive of such development; 3. Insufficient information about potential industry partners; 4. Knowledge transfer is not part of the organisation's mandate; 5. Knowledge transfer is not an important activity within our organisation; 6. Lack of financial resources; 7. Lack of expertise in knowledge transfer; and 8. Other.

37 The eduGAIN service is intended to enable the trustworthy exchange of information related to identity, authentication and authorisation between the GÉANT (GN3plus) Partners' federations.

Survey results indicate that around 20% of responding funding organisations are funding the development and uptake of digital research services. Among responding research performers, more than 50% of the organisations are already implementing several types of services (repositories, software provision, computing services). The situation is similar among the respondents from AC (Graph 18).

Graph 18: Provision of digital research services by research performers[38] (percentage of organisations)



Source: ERA survey 2012.

Over 40 % of responding research performing organisations in the EU are participating in electronic identity federation schemes for researchers[39]. The share (48%) is higher among respondents in AC.

38 Respondents were asked: Does your organisation provide the following digital research services for researchers? 1. Scientific publications repository; 2. Scientific software (e.g. for simulation, visualisation, data analysis, virtual laboratories); 3. Research data repository; 4. Research collaboration platform, 5. Computing services; 6. Cloud services (from external provider), and 7. Other digital research service.

39 Respondents were asked: Can researchers from your organisation access digital research services in other organisations by using their own user account (i.e. federated electronic identify)?

8. CONCLUSIONS

Several conclusions can be drawn from this ERA Facts and Figures report.

First, overall European budgetary efforts to implement national research seem to be decreasing as a consequence of public budget constraints affecting many EU MS, with notable national exceptions. Both more effective national systems - in which excellence is improved - and sufficient public resources dedicated to research, development and innovation, are now more urgent than ever to create the conditions for future growth and job creation.

Second, different degree of completion of ERA at national level - reflecting national priorities - is observed (presented in the Country fiches). Even if this diversity is one of the strengths of the European research system, there are areas in which more co-ordinated efforts between MS could contribute to improving both European excellence and national effectiveness.

Third, the partnership approach is generating a new momentum for ERA, in which all concerned stakeholders participating in the SHO Platform are moving together for the completion of ERA.

Four, factual monitoring mechanism delivers information for policy making. This first data collection exercise, even if still partial, proves that it is feasible to collect relevant information for ERA policy. It is expected that MS and AC continue to further motivate their stakeholders to provide the necessary information in the future in order to improve the representativeness of results.

9. LIST OF ACRONYMS

AC: Associated countries to the 7th Framework Programme for Research. These include Albania, Bosnia & Herzegovina, Croatia (until 30 June 2012), Faroe Islands, Iceland, Israel, Liechtenstein, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Norway, Serbia, Switzerland and Turkey

EARTO: European Association of Research and Technology Organisations

EIROs: seven EIROforum members[40] CERN, Conseil Européen pour la Recherche Nucléaire; EFDA-JET: European Fusion Development Agreement: Joint European Torus; EMBL: European Molecular Biology Laboratory; ESO: European Southern Observatory; ESRF: The European Synchrotron Radiation Facility; EU.XFEL: European XFEL and ILL: The Institute Laue-Langevin

ERA: European Research Area

ERA Platform: in the ERA platform interact the European Commission, the European Association of Research and Technology Organisations (EARTO), European Universities Association (EUA), the League of European Research Universities (LERU), NordForsk and Science Europe (SE)

EUA: European Universities Association

GBAORD: Government Budget Appropriations or Outlays for R&D

GDP: Gross Domestic Product

HRS4R Human Resources Strategy for Researchers

KT: Knowledge Transfer

LERU: League of European Research Universities

MS: Member States of the European Union

NordForsk: The organisation under the Nordic Council of Ministers

PRO: Public Research Organisation

RFO: Research Funding Organisation

RI: Research infrastructures

RSV: Retirement Savings Vehicle

[40] The European Space Agency (ESA) is a large organisation, spanning a wide range of activities, only a subset of which can be counted as science. Thus, it was concluded that it would be extremely challenging to provide an ESA input to the fundamentally science-oriented ERA survey in a coherent, meaningful, and accurate way, particularly given the very limited timescale available.

RPO: Research Performing Organisation (Universities, research centres, hospitals, etc.) public or under private law with public mission

SE: Science Europe

SHO: Stakeholders' organisations

10. GLOSSARY

2010 European Strategy Forum on Research Infrastructure (ESFRI) Roadmap[41]: the ESFRI Roadmap identifies new Research Infrastructures of pan-European interest corresponding to the long term needs of the European research communities, covering all scientific areas, regardless of possible location.

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

Article 185 (Art. 185): research programmes undertaken jointly by several Member States in which the EU participates, including those undertakings created for the execution of national programmes.

Assessment (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 decisions.

Associate country to the EU Framework Programme (AC): Several countries are associated to the implementation of the EU 7th Framework Programme for Research and Technological Development. These include Albania, Bosnia & Herzegovina, Croatia (until 30 June 2013), Faroe Islands, Iceland, Israel, Liechtenstein, Former Yugoslav Republic of Macedonia, Moldova, Montenegro, Norway, Serbia, Switzerland and Turkey.

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

Call with pre-defined common priorities: a call based on a commonly designed research agenda of a joint programme that limits the proposals to predefined topics).

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

Computing services: services enabling researchers to use local or remote computing resources, offered e.g. 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.

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

Core principles of peer review[42]: the principles relate to Excellence, Impartiality, Transparency, Appropriateness for purpose, Efficiency and speed, Confidentiality and Ethical and integrity considerations.

COST (European Cooperation in Science and Technology): one of the longest-running European frameworks supporting cooperation among scientists and researchers across Europe.

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

ERA-NET: action supported by the EU Framework Programme in which national and regional research programmes coordinate research activities in a specific research field through networking of research funding.

European Union (EU): economic and political union of 28 Member States. EU countries are: 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: EU's main instrument for funding research in Europe. The 7th EU Framework Programme with a total budget of over 50 billion Euros over the period 2007-2013 provides grants to research actors all over 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 portal[43]: portal is a service which provides information and services to mobile researchers, including job vacancies.

European Charter for Researchers and Code of Conduct for the recruitment of researchers[44]: the charter aims at ensuring 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

42 http://www.vr.se/download/18.2ab49299132224ae10680001647/1315408483304/European+Peer+Review+Guide.pdf

43 http://ec.europa.eu/euraxess/

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

which specifies the roles, responsibilities and entitlements of researchers as well as of employers and/or funders of researchers. 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)[45]: 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.

Established researcher: researcher who has reached a degree of seniority in the research field.

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

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

Federation (community): group of institutions and organisations that sign up to an agreed set of policies for exchanging information about users and resources to enable access via authentication. Federation can for example be on national level (e.g. Haka in Finland), and these national federations can then join into European-wide community (e.g. EduGAIN)

First stage researcher: researcher who is at the beginning of his career (i.e. junior researchers, PhD candidates, Post-Docs)

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

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

Gold open access: payment of publication costs is shifted from subscribers to the author of an article. Often these costs are supported by the university or the research institute to which the researcher is affiliated or by the funding agency supporting the research.

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.

Green open access (also known as Green or ‘Green’ open access model - self-archiving): a version of the article (the final published article or final peer-reviewed manuscript) is archived by the researcher in an online repository before, after or alongside its publication in a journal.

[45] http://erc.europa.eu/

Access to the deposited article is often delayed (‘embargo period’) at the request of the publisher so that subscribers retain an added benefit.

Innovation: technological product and process (TPP) innovations comprise implemented technologically new products and processes and significant technological improvements in products and processes. A TPP innovation has been implemented if it has been introduced on the market (product innovation) or used within a production process (process innovation). TPP innovations involve a series of scientific, technological, organisational, financial and commercial activities (Source: OECD, 2005)

Institutional funding: general funding of institutions with no direct selection of R&D project or programmes (Source: OECD, 2011). 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.

International peer review: the evaluation of research proposals is carried out by at least one international independent external expert, from countries whose funding agency(ies) and researchers do not take part in the joint call.

Invention disclosure: this occurs when a research organisation first discloses its idea to a firm subject to a confidentiality agreement. This takes place before any patent or licencing activity and thus represents an early indicator of future transfer.

Joint call: (single) call for transnational research proposals launched by the common consortium, including all necessary aspects for the implementation and management of the joint call.

Joint Programming Initiative (JPIs): a common initiative aimed at addressing major societal challenges, in order to strengthen Europe's capacity to transform the results of its research into tangible benefits for society and for the overall competitiveness of its economy. Participation of Member States and FP Associated Countries in such an initiative is carried out on a voluntary basis and according to the principle of variable geometry and open access. To date, 10 JPIs have been selected by the High-level Group on Joint Programming (Groupe de programmation conjointe, GPC)

Joint research agendas are multiannual research agendas for a joint programme between EU Member States.

Joint Technology Initiatives (JTIs) address strategic areas where research and innovation are essential to European competitiveness. These public/private partnerships, involving industry, research communities and public authorities, pursue ambitious common research objectives.

Knowledge transfer is the process of transferring the rights to use and exploit knowledge from the sources 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. D-A-CH)

Leading researcher: internationally recognised researcher (e.g. team leaders, management positions, etc.)

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

Money-Follows-Researcher: 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.

Non-national: person who does not hold the citizenship of a given country.

Non-resident: person who is not residing in a given country.

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

Open call: a call which is entirely open and not restricted to a given research field or a call in a given research field (e.g. materials research or chemistry) without limiting the submission of proposals to any predefined topics within this research field)

Peer review: the evaluation of research proposals is carried out by independent external experts based on transparent and evaluation criteria communicated in advance. Peer review can be based on a group of principles: excellence, impartiality and transparency, appropriateness of purpose, efficiency and speed.

Portability of grants: situation in which a researcher who moves to a research institution in a different country may transfer on-going grant funding to the new institution and continue research activities according to original terms and objectives.

Principles for innovative doctoral training[46]: the principles for innovative doctoral training 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.

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-private linkages: within the framework of R&D activities, public-private linkages aim at connecting organisations from the public sector with those in the private sector.

[46] http://ec.europa.eu/euraxess/pdf/research_policies/Principles_for_Innovative_Doctoral_Training.pdf

Examples of linkages include networking and communication activities with the private sector, implementation of research training agreements, structured programmes for placements in the private sector or bilateral agreements.

Public sector: it includes the government and higher education sectors but excludes public-sector corporations which 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)

Recognised researcher: researcher who has already engaged in a research career.

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

Research and experimental development (R&D): research and experimental development comprise creative work undertaken on a systematic basis in order to increase 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)

Research collaboration platform: collaboration platform which gathers together 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 evaluation committees are responsible for the evaluation of research projects and programmes. The outcome of the evaluation may be linked to the allocation of research funding and/or other resources.

Research infrastructures: 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, 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. Cutting-edge research infrastructure makes reference to most advanced, state of the art research infrastructures, requiring important levels of investment for their development and operation.

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

Structured innovative doctoral training programmes: these programmes apply the principles for innovative doctoral training (see principles for innovative doctoral training)

Synchronised call: national calls for proposals may be subject to a pan-European selection process of research proposals, where the results of peer review are shared amongst the funding agencies.

SOURCES

OECD (2011): OECD Science, Technology and Industry Scoreboard 2011: Innovation and Growth in Knowledge Economies[47]

OECD (2005): Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3rd Edition[48]

OECD (2002): Proposed Standard Practice for Surveys on Research and Experimental Development, Frascati Manual 2002[49]

47 http://www.oecd.org/sti/oecdsciencetechnologyandindustryscoreboard2011innovationandgrowthinknowledgeeconomies.htm

48 http://www.oecd.org/innovation/innovationinsciencetechnologyandindustry/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm

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