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Associated Countries to the Framework Programme**

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

**European Research Area Progress Report 2014**

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## **Iceland**

### **Priority: More effective national systems**

#### 1. Research and Innovation structure

The main legal framework for the research and innovation system in Iceland is found in acts no. 2/2003 on the Science and Technology Policy Council, no. 3/2003 on Government Support for Scientific Research and no. 75/2007 on Government Support for Technology, Research and Industry Development.

The Science and Technology Policy Council (STPC), headed by the prime minister, is the body in charge of R&D policy at a strategic level. The STPC currently includes six of the government nine ministers as well as representatives appointed by the ministries, higher education institutions and industry and labour organizations. Two working committees, the Science Committee and the Technology Committee operate under the STPC and its secretariat is divided between the Ministry of Education, Science and Culture and the Ministry of Industries and Innovation. The role of the STPC is to define the strategic orientations for STI development policy in Iceland. The primary instruments for supporting the policy are the three main competitive funds: the Research Fund, the Technology Development Fund and the Infrastructure Fund.

Two institutions are central in providing service and support to the research and innovation community in Iceland: The Icelandic Centre for Research (Rannís) and Innovation Center Iceland. Rannís reports to the Ministry of Education, Science and Culture. Rannís provides support to the research and innovation community. It administers competitive funds and strategic research programmes, coordinates and promotes Icelandic participation in collaborative international projects in science and technology, monitors resources and performance in R&D and promotes public awareness of research and innovation in Iceland. The Innovation Center Iceland, which operates under the auspices of the Ministry of Industries and Innovation, encourages innovation and promotes the advancement of new ideas in the Icelandic economy by providing active participation and support to entrepreneurs and businesses. It acts as an intermediary between individual entrepreneurs, companies and public agencies and operates an incubation center.

#### 2. National strategy for Research and Innovation

The national STI policy is developed by the STPC. The ministries, which are largely independent and autonomous, are responsible for operationalizing the policy. The current policy (2014-2016) was adopted in November 2013 and has been followed up with an Action Plan (<http://www.forsaetisraduneyti.is/vt/>). The focus of the policy is fourfold: to increase recruitment in research and innovation; to strengthen collaboration between higher education institutions, research institutions and companies; to increase funding and investment in research and innovation; and to strengthen the evaluation of the quality and impact of research and innovation.

Furthermore, the Ministry of Education, Science and Culture is currently preparing a new roadmap for research infrastructures.

### 3. Research and Innovation funding

In recent years, competitive funds have accounted for between 15 per cent and 20 per cent of the total public investment in research and innovation. One of the aims of the STPC Policy Action Plan is to increase the proportion of competitive funding in the system to 27 per cent of the total public funding by 2016.

The four main public competitive funds in Iceland are the Icelandic Research Fund, the Infrastructure Fund, the Strategic Research Programme, and the Technology Development Fund.<sup>1</sup> Several smaller public funds exist, some of which are directed at specific industries, such as the Added Value for Seafood Research Programme Fund (AVS) and the Fisheries' Project Fund (see Table 1).

In the years following the economic collapse (2009-2011), contributions to the Technology Development Fund decreased somewhat while the Research Fund remained relatively stable. In 2013 both funds were increased considerably. In 2014 they decreased from the 2013 level, but remain well above their 2012 level in both real and nominal value.

The Strategic Research Programme was established over a decade ago with the aim of stimulating research and development in strategically chosen areas. The scheme was seen as supplementary to the two other funds that are open. The fund has been one of the most important schemes in promoting collaboration between companies, research institutes and higher education institutes.

**Table 1: Public investment in competitive funds 2009-2014. MISK, real value.\***

	2009	2010	2011	2012	2013	2014**
The Technology Development Fund	807	1,037	782	830	1,309	983
The Research Fund	983	982	907	819	1,351	1,185
The Graduate Student Fund***	120	115	103	103	98	-
The Strategic Research Programme for Science and Technology	394	491	267	208	406	193
The Infrastructure Fund	405	184	174	225	110	106
<b>Total, main competitive funds</b>	<b>2,709</b>	<b>2,809</b>	<b>2,233</b>	<b>2,185</b>	<b>3,274</b>	<b>2,467</b>
Research Fund for Increased Value in Fisheries	414	249	449	304	257	164
Other research and development funds	182	172	687	675	210	100

<sup>1</sup> The Research Fund, the Infrastructure Fund and the Strategic Research Programme fall under the auspices of the Ministry of Education, Science and Culture while the Technology Development Fund is administered by the Ministry of Industries and Innovation.

Tax reduction scheme****			614	818	1,139	1,084
<b>Total</b>	<b>3,184</b>	<b>3,114</b>	<b>3,879</b>	<b>3,879</b>	<b>4,781</b>	<b>3,814</b>

Source: Rannís.

\*Original sources: Government accounts for 2009-2012, the national budget for 2014.

\*\* The 2014 prices are based on prices in the 2014 draft budget.

\*\*\* The Research Fund for Graduate Students was merged with the Research Fund in 2013.

\*\*\*\*Established in 2009. Refunding first took place in 2011.

A tax reduction scheme came into effect in 2011, which enabled companies to receive a refund of up to 20 per cent of R&D costs. Public contribution to the scheme has increased considerably since its implementation (Table 1). The STPC policy calls for a considerable increase in private investments in R&D in 2015-2016. If Iceland is to achieve the new policy's goal of reaching 3 per cent in R&D expenditure by 2016,<sup>2</sup> it has been estimated that the required additional investment in 2015 and 2016 amounts to approximately 8 billion ISK. Of this amount 2.8 billion ISK represents an increase to the public funds. The rest is foreseen to come from private companies.

#### 4. Institutional funding based on institutional assessment

Over 80 per cent of the public contribution to R&D is in the form of block grants allocated directly to institutions. The Ministry of Education, Science and Culture has signed five year contracts (2012-2016) with all universities in Iceland (public and private). The contracts, which include performance indicators, are reviewed and monitored annually. The ministry has also signed three years contracts with knowledge centres and performance contracts with two research institutions.

### **Priority: Transnational Cooperation**

International cooperation is vital for the development of research and innovation in Iceland. Iceland has been participating in European programmes in the fields of education and research since 1994.

#### 5. Implement joint research agendas

##### a. Framework Programme

Currently Iceland is participating in the JPI on healthy and productive seas and oceans. Iceland is also an active partner in nine ERA-NETs (M-Era, Neuron II, Era SysApp, EuroNanoMed II, HERA, NORFACE, SEAS-ERA, Era Marine BioTech, Era Geothermal, Cofasp).

<sup>2</sup> The 2014 level of spending on R&D is 2,7% of GDP.

Iceland participates in a number of ERA-Net projects some of which have the objective of becoming established Article 185 initiatives in the future. Eurostars has been running as an Article 185 initiative since 2008, with Icelandic participation from the start. Iceland has not had an official policy towards participation in Article 187 initiatives. However, Icelandic organisations participate in Innovative Medicines and Hydrogen and Fuel Cells initiatives. Iceland is a member of EUREKA, COST and ESPON.

b. Other joint research agendas

Iceland is part of the NORIA, the Nordic Research and Innovation Area, which is responsible for the Nordic R&D cooperation in the fields of research and innovation. This involves Nordic research funding institutions, fixed-term research programmes, Nordic Centres of Excellence, the Top-level Research Initiative (the largest joint Nordic research and innovation initiative to involve the very best agencies and institutions in the Nordic region, and promote research and innovation), grant schemes, and the coordination and planning of major infrastructure investments among the Nordic countries.

A strategic document on Iceland's participation in joint programming initiatives and other international programs is still to be developed.

6. Openness of Member State/Associated Country (MS/AC) for international cooperation

For a small country like Iceland, international cooperation is extremely important and many international researchers collaborate extensively with researchers overseas. Iceland has signed a number of bilateral agreements with third countries such as the US, China and India.

Common funding principles to make national research programmes compatible, interoperable (cross-border) and simpler for researchers.

According to the STPC Policy Action Plan, the regulations for funding, including definitions of eligible costs, are to be changed in order to coordinate with international regulations, in particular Horizon 2020.

7. Interoperability, mutual recognition of evaluation results and other schemes

Iceland participates in joint programming initiatives where there is mutual peer review recognition. Furthermore, the board of the Technology Development Fund may, in some cases, recognize international peer-review as a part of its procedures. However, due to legal restrictions, the Research Fund does not accept international peer-review. The STPC Policy Action Plans aim to revise the legal framework of the Research Fund and address the issue of recognizing international peer-review in that process.

**Priority: Research Infrastructures**

8. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest

Iceland has participated in the preparatory phases of several ESFRI infrastructures. Iceland does not currently have a national strategy on financial commitments in ESFRI, but a new Roadmap is expected in 2015.

**Priority: Open labour markets for researchers**

9. Open, transparent and merit based recruitment of researchers

According to the legal framework for higher education institutions (act. 63/2006), the recruitment and selection of researchers in HEIs should be transparent and merit based. Apart from these general principles, the boards of the higher education institutions have autonomy to set recruitment strategies for their institutions. The largest university, the University of Iceland has recently experimented with advertising for open positions, where the aim is to recruit excellent researchers in any field rather than specifying the field or the research area. The method has proven to be successful for attracting high-level international researchers to the University.

There are no formal barriers to recruiting non-nationals for permanent research and academic positions. On EURAXESS Iceland, foreign researchers can access information on vacant positions in Icelandic universities and research institutions as well as companies. All Icelandic universities have signed the European charter for researchers and the code of conducts for their recruitment.

The STPC Policy Action Plan includes actions to encourage the rapid handling of work permit applications for researchers outside the EU in order to facilitate international recruitment in private companies and universities in Iceland.

10. Researchers careers

There is a strong tradition in Iceland for seeking doctoral education overseas. However, in recent years, the possibilities of pursuing doctoral training within Icelandic institutions have increased. Three universities are accredited to award doctoral degrees: the University of Iceland, the Agricultural University (in collaboration with the University of Iceland) and the University of Reykjavík. Of these, the University of Iceland is by far the largest. In the years 2000-2003 there were on average six doctoral graduates per year from the University of Iceland, but in the past four years (2010-2013) this number has increased to 44 PhDs per year on average.

The aim of the STPC Policy Action Plan is the continued development of doctoral training in Iceland. The Plan's aim is that by 2016, 200 doctoral students will be fully funded in Iceland. This is to be achieved through a increase in competitive funding. Moreover, a Strategic Research Programme specifically aimed at strengthening the recruitment of young researchers, is to be launched in 2015. Furthermore, the Action

Plan includes actions to increase the participation of private companies in doctoral training.

One of the challenges in Iceland has been to offer an attractive research environment to early career researchers. The University of Iceland is currently addressing this issue by increasing the number of post-doc positions at the institution.

#### 11. Cross-border access to and portability of national grants

The legal framework of the Research Fund prohibits cross-border funding flows. However, in order to increase Iceland's participation in international programs, the STPC Policy Action Plan includes a re-examination of the law as one of its actions. The other large competitive fund, the Technology Development Fund, has not dealt with the same restrictions as the Research Fund and has thus been able to fund researchers outside Iceland.

#### 12. Support structured innovative doctoral training programmes

The STPC Policy Action Plan aims to increase research collaboration between higher education institutions, research institutions and private companies, including collaboration on doctoral training. As a part of this a Strategic Research Programme on recruitment to research and innovation will be launched in 2015. The Research Programme will aim to increase graduates in natural science and technology, but Iceland is currently below the EU average in tertiary education graduates in these fields.

### **Priority: Gender balance and gender contents in research**

Iceland has had a special statute intended to ensure equality between women and men and their equal status in all respects since 1976. The current Gender Equality Act dates from 2008.<sup>3</sup> There are no specific acts regulating gender equality in public research. However, in some cases individual higher education institutions have formed strategies specifically aimed at promoting equal rights in research.

#### 13. Foster cultural and institutional change on gender

##### a. National policies on gender equality in public research

The Gender Equality Act stipulates that all enterprises and institutions with more than 25 employees, on average over the year, shall set themselves a gender equality programme or mainstream gender equality perspectives into their personnel policy. This applies to research performing organizations and higher education institutions. These gender equality programmes and gender equality perspectives in personnel policies shall be reviewed at three-year intervals.

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<sup>3</sup> [http://eng.velferdarraduneyti.is/media/acrobat-enskar\\_sidur/Act-on-equal-status-and-equal-rights-of-women-and-men\\_no-10-2008.pdf](http://eng.velferdarraduneyti.is/media/acrobat-enskar_sidur/Act-on-equal-status-and-equal-rights-of-women-and-men_no-10-2008.pdf)

According to a recent report on gender equality in higher education in Iceland<sup>4</sup> the current status of addressing gender issues is different in the seven higher education institutions in Iceland. Many positive developments have taken place in recent years and all HEIs have gender equality plans for students and staff. Moreover, almost all HEIs have an equality board or council which supervises the gender equality action plan. In addition most HEIs have a gender equality officer. The HEIs in Iceland have similar concerns when it comes to gender equality in higher education:

- gender balance in certain study areas,
- high drop-out rates of male students,
- future prospects of female graduates,
- lack of time for gender equality work,
- lack of time to execute the gender action plans,
- increase cooperation between universities needed, and
- to have a broader definition of gender equality.

The Centre for Women's and Gender Studies (RIKK) was founded at the University of Iceland in 1991. It has been instrumental in coordinating and organizing women's studies in Iceland. The Centre supports women's studies at academic level, publishes research on gender issues, orchestrates a lecture series and seminars during the academic year and provides an information service. The centre co-ordinates research projects on various subjects in the fields of sociology, gender research, anthropology etc. It participates in several Nordic and European projects and is now taking part in running several national projects. The centre also oversees Edda – Center for Excellence established in 2009 and GEST – The Gender Equality Studies and Training Programme.

The University of Iceland has offered Gender Studies programme since 1996, for undergraduate, graduate and PhD students. The programme is now part of the Faculty of Political Science, but in addition many courses are available in other faculties. The programme focuses on providing students with broad and multidisciplinary perspectives. In addition the objective is to provide critical knowledge and expertise in the practical implementation of gender equality principles.

#### b. Careers – Working conditions in public research

In 2012 the Ministry of Education, Science and Culture took part in a Nordic project on gender balance in academia. The aim of the project was to compare the developments in gender equality legislation, statistics and policy in the Nordic countries and find good examples of successful instruments and measures that have improved the gender balance in academia in these countries.<sup>5</sup>

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<sup>4</sup> <http://www.menntamalaraduneyti.is/media/MRN-pdf/Jafnretti-i-haskolum-a-Islandi.pdf>

<sup>5</sup> <http://www.norden.org/en/publications/publikationer/2013-544>



#### 14. Gender balance in decision making process

The current Gender Equality Act aims to establish and maintain equal status and equal opportunities for women and men, and thus promote gender equality in all spheres of society. It introduces a minimum quota of 40 per cent women in governmental (state and municipal) committees and councils, if the body consists of more than three members and gender mainstreaming is institutionalized.

Since 2008 the Centre for Gender Equality has been working on a project called Side by Side, a gender-mainstreaming project funded by the EU Progress Programme. The aim of the project is to implement and develop gender mainstreaming in national policies and activities in Iceland.

Furthermore, since 2009 there has been a focus on gender responsive budgeting in Iceland and this is reflected in a recent parliamentary resolution on a four year gender equality action programme 2011-2014. Funds and public support for scientific research should include provisions to systematically collect information on the gender composition of expert councils, applicants and grantees, and grant amounts. If an uneven distribution is found between the grantees of either gender they should examine whether action should be taken to correct this inequality, for example, by making grant applications more accessible, or reviewing the allocation rules.

Other recent and current activities in this area include:

- a study on gender balance in all research and innovation funds,
- a study on gender balance in universities, and
- a feasibility study on implementing a gender equality prize for universities.

## **Priority: Knowledge circulation**

### 15. Open access for publications and data resulting from publicly funded research

According to Act no. 3/2003 with later amendments regarding public funding of scientific research, the results of research funded by the public funds should be published in open access fora unless otherwise agreed. All grantees of the competitive funds administered by Rannís are encouraged to publish in open access journals.

The STPC Policy Action Plan aims at establishing a working group on research infrastructures in 2014. One of the tasks of the working group is to address the question of open access to data gathered through regular monitoring and research in public research institutions.

### 16. Open innovation (OI) and knowledge transfer (KT) between public and private sectors

Knowledge transfer is actively being promoted by the Research Liaison Office of the University of Iceland.

Since 2009, the Strategic Research Programme for Centres of Excellence and Research Clusters (Markáætlun um öndvegissetur og klasa) has emphasized the collaboration of higher education institutions, public research institutes and businesses. Currently there are a small number of cooperation fora within certain research fields, driven by this program, focusing on geothermal energy, artificial intelligence, and studies in equality and diversity.

### 17. Policies for public e-infrastructures and associated digital research services

There are open repositories maintained by Landspítali University Hospital and the National and University library, and a national synchronized repository (CRIS based on CERIF) is being planned in 2013/14.

Iceland has developed the Iceland Consortia (IC) for electronic subscriptions, hosted by the National and University library. The aim of the IC is to secure access to academic and scholarly content for students and staff of academic and research institutions and the general public in Iceland. Current licenses include e-journals, databases, citations databases and encyclopaedias. It serves academics and research institutions as well as every computer in the country that is connected to the Internet through an Icelandic Internet Service Provider (ISP).

## **Montenegro**

### **Priority: More effective national systems**

#### 18. Research and Innovation structure

The Ministry of Science (MoS), which was created in December 2010 (previously organized as a department within Ministry of Education), as the main public administrative body implementing research and development policy (through national and international programmes of public interest), negotiates and implements bilateral scientific and technology (S&T) cooperation agreements, concludes memorandums, protocols and programmes of collaboration with ministries and foreign organizations. CSRA prepares and proposes R&D strategies to the Government, monitors implementation of the strategies, gives expert proposals and has an advisory role.

The research community is made of 46 licensed scientific research institutions, out of which 32 faculties (public and private), eight institutes (public and private) and six other scientific research institutions. 2,303 professionals are employed in the R&D sector<sup>3</sup>, which accounts for 0.8% of the total labour force.

#### 19. National strategy for Research and Innovation

Montenegro published a Strategy for science and research (Strategija naučno-istraživačke djelatnosti Crne Gore (2008-2016), which covers an eight year period and describes the strategic importance of science and research for the economic and social development of Montenegro. The strategy covers areas of research, innovation and technological development, as well as international cooperation.

#### 20. Competitive funding through calls for proposals applying the core principles of international peer review

##### **a. Project-based funding in the country**

Competitive funding through calls for proposals applying the core principles of international peer review is implemented for the national scientific research projects for the cycle 2012-2015. The call was open for the licensed scientific research institutions in Montenegro; 198 proposals were submitted and have been evaluated by thematic panels of independent international experts (two evaluators per project). The evaluations involved 420 international independent experts. The success rate was 52,50%. After the first research year, all research teams submitted their reports on the implementation as well as the research plan for the second year.

One of the initiatives that provide research grants on a project basis is the Higher Education and Research for Innovation and Competitiveness Project – HERIC. The objective of HERIC is to strengthen the quality and relevance of higher education and research in Montenegro through reforming the higher education

finance and quality assurance systems and by strengthening research and development capabilities. The Ministry of Science, within the HERIC initiative has realized activities on the establishment of the first Centre of Excellence and large collaborative research grants, both through the calls for proposals applying the core principles of international peer review.

The Ministry of Science published the call for the establishment of the first Centre of Excellence in Montenegro, on May 30<sup>th</sup> 2013. A total of 10 research institutions applied. At the end of December 2013, a two-stage application evaluation process, conducted by foreign experts, was completed. Each application that met eligibility, administrative and environmental compliance criteria was remotely evaluated by two independent and unbiased International Scientific Peer Reviewers (ISPRs). The individual evaluation reports, prepared by the ISPRs, was examined and discussed by the Final Evaluation Committee composed of three unbiased International Project Implementation Experts (IPIEs) responsible for carrying out the final evaluation.

On May 20<sup>th</sup> 2014, the Ministry of Science published the second call for research grants with the deadline for submission on September 19<sup>th</sup> 2014. The same process of evaluation, as for the first call for research grants, will be applied.

#### 21. Institutional funding based on institutional assessment

Through the HERIC project, the Study on Research Equipment and Creation of Joint Research Area that presents the state of available equipment in 29 licensed research institutions in Montenegro, both public and private, was completed in November 2013. The licensed research institutions were selected based on priority research fields in which the Centre of Excellence and large research grants will be funded, but also according to the capacities of institutions. The Study on Scientific Equipment and Creation of Joint Research Area presents an overview of the existing equipment in research institutions, highlighting the necessity to purchase new equipment that would be used jointly by several institutions from the same field of research.

The study was taken into consideration during the process of determining which equipment should be financed, both for the Centre of Excellence and large collaborative research grants.

### **Priority: Transnational Cooperation**

#### 22. Implement joint research agendas

##### **a. Joint research**

##### *Participation in research programmes*

Montenegro participated in the Framework Programmes of the European Community (FP5, FP6 and first year of the FP7 programme) as a third country.

Based on the Memorandum of Understanding, as of January 25<sup>th</sup>, 2008, Montenegro participated as an associated country to the FP7 Programme. A network of National Contact Points (NCP) was established and coordinated by the Ministry of Science. In addition to this network, administrative capacity included the appointed members of Programme Committees, altogether composing the structure that provided support in disseminating information, searching for adequate partners, preparing and proposing projects for FP7.

Montenegro participated in 34 projects under the FP7 Programme, with a success rate of 19.48%.

## **b. FRAMEWORK PROGRAMME**

### *Participation in new Research and Innovation Framework Programme - Horizon 2020 (2014–2020)*

Taking into account the positive experience gained through participation in the EU Seventh Framework Programme for Research, Technological Development and Demonstration Activities - FP7, and according to the strategic goal of the Ministry of Science to provide continuity in supporting the scientific research community in Montenegro at international level, the Ministry of Science expressed its interest for Montenegro's association to the new EU Framework Programme for Research and Innovation Horizon 2020 (2014-2020), in January 2013.

On July 30<sup>th</sup> 2013, the Ministry of Science established the network of National Contact Points (NCP) for Horizon 2020, in accordance with the "Minimum standards and guiding principles", and appointed the members of Montenegro in the Programme Committees for Horizon 2020, on February 25<sup>th</sup> 2014, consisting of the representatives from the Ministry of Science, as well as from the academic community and the business sector. The appointed NCPs, participated in programme training in 2013/2014.

The Government of Montenegro, on May 29<sup>th</sup> 2014, adopted the International Agreement between the European Union and Montenegro on the participation of Montenegro in the Union programme Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020). Montenegro joined the EU Framework Programme for Research and Innovation – Horizon 2020 on July 01<sup>st</sup> 2014.

### *Participation in the Seventh Euratom Framework Programme*

Montenegro has not participated in projects concerning nuclear research area within the EURATOM Framework Programme FP7. In the forthcoming period, consultations will be held with the scientific research community in order to define priorities and future activities within the FP7 EURATOM. This is done in

consideration of Montenegro's declaration as a non-nuclear country, its available research and financial capacities, and programmes successfully implemented thus far in the framework of cooperation between Montenegro and the International Atomic Energy Agency (IAEA). Montenegro is a member of the IAEA since 2006.

On June 19th 2014, the Government of Montenegro adopted the Country Programme Framework (CPF) on cooperation between Montenegro and the International Atomic Energy Agency, 2014-2020.

In 2013, Montenegro initiated cooperation with the Department of Nuclear Sciences and Applications in order to provide opportunities to the Montenegrin scientific-research community to use the Department's programmes and projects.

Montenegro's involvement in the IAEA in 2006 resulted in 10 national projects and further participation in 76 regional projects.

Since 2012, Montenegro completed four national projects, 43 regional projects and one interregional project.

For the project cycle 2016-2017, three national projects were submitted to IAEA.

i. Joint programming initiatives

Montenegro recognized the importance of preparing for participation in joint programming initiatives in research.

Firstly, the Ministry of Science realized the Joint Call for co-financing national scientific research projects (2012-2015) of basic, applied and development research, which are in line with the Strategy for Scientific Research Activities and 10 priority areas in research.

Montenegro participated in the SEE-ERA.NET project to network research institutions in 14 Western Balkans countries and EU Member States, which was successfully funded under the FP6 programme. Research teams from Montenegro participated in six out of the 34 projects which were implemented in the period from 2007 to 2009. Research teams from Montenegro participated in six projects across the following thematic areas: Food, Agriculture and Biotechnology, Information and Communication Technologies and Environment including Climate Change.

The SEE-ERA.NET PLUS project was also implemented under the 7<sup>th</sup>FP, and research teams from Montenegro participated in three projects

across the following thematic areas: AgroFood and Information and Communication Technologies, from 2010 to 2012.

**c. Other joint research agendas**

Montenegro participated in three SEE-ERA.NET Plus networks, namely South East Europe ERA-NET from 2004-2009, South East European Research Area for e-Infrastructures in the period of 2009-2012, and lastly South East European ERA-NET Plus: Joint call for European Research projects in September 2009 in order to enhance the integration of the Western Balkan Countries into the European Research Area, which lasted from 2009 to 2013.

**23. Openness of Member State/Associated Country (MS/AC) for international cooperation**

International cooperation in science and research is realized through various programmes for science and research funding.

Montenegro has developed wide multilateral cooperation in the areas of science and technology by participating in the following programmes and organizations: EUREKA, European Cooperation in Science and Technology (COST), NATO “Science for Peace and Security Programme”, and the International Atomic Energy Agency (IAEA).

Montenegro is a member of the EUREKA programme since 22<sup>nd</sup> June 2012, when the Memorandum was signed, and participates in three projects. These are:

- ELDORO (Electronic Doctor’s Round) – improvement of the flow of information in hospitals and clinics through the use of modern communication technologies of the Company MG Soft (total amount: EUR 3,58 million)
- WINEREST (Sustainable and innovative use of waste from grape and fruit processing) – finding technology and introducing into production the economically viable and environmentally safe use of waste from the process of producing wine and fruit juices, Company “13. jul Plantaže” (total amount: EUR 0,6 million)
- LEADOC - (Longterm Archiving of Electronic Documents in the Cloud) - the project addresses the security and validity of electronic documents from the prospective of long term archiving using cloud computing. Special attention is given to safe and secure mobile access to the documents archived in trusted electronic cloud storage (total amount: EUR 1,33 million).

From 2012, Montenegrin institutions are implementing the following projects:

- Improvements in the Harmonized Seismic Hazard Maps for the Western Balkan Countries, 2012/15.

- Increasing the clearance capacity for unexploded ordnance in Montenegro, 2014/17.

Since gaining independence in May 2006, the Government of Montenegro concluded agreements on scientific and technological cooperation with 13 countries.

Bilateral S&T cooperation is based on agreements and realized through joint calls for co-financing scientific and technological cooperation. In the last two years Montenegro signed the following agreements on scientific and technological cooperation:

- Agreement on Scientific and Technological Cooperation with Hungary, on September 25<sup>th</sup>, 2012, in Podgorica;
- Agreement between Montenegro and the Republic of Poland on Culture, Education and Science was signed on October 26<sup>th</sup>, 2012, in Warsaw, Poland.
- Agreement on Scientific and Technological Cooperation with the Republic of Turkey and Protocol on Cooperation between the Ministry of Science and TÜBİTAK, on April 12<sup>th</sup>, 2013, in Ankara;
- Agreement between the Ministry of Science and National Research Council (CNR) of the Republic of Italy, followed by the Programme of scientific cooperation, on July 04<sup>th</sup>, 2013, in Podgorica; and
- Agreement on Scientific and Technological Cooperation with the Republic of Italy, on September 26<sup>th</sup>, 2013, in Podgorica.

Cross border cooperation is strengthened through pre-accession IPA II funds.

With a view to encouraging more intensive scientific and technological cooperation, Montenegro will make efforts to strengthen its institutional, administrative and financial capacities in the forthcoming period, through the EC's technical assistance programmes, cooperation with the EU member states and use of pre-accession funds.

Strengthening international co-operation in RDI is of great importance for fulfilling the following goals: integration of the Montenegrin research community in ERA and ensuring its greater participation in the programmes of the European Union and other international programmes.

*Common funding principles to make national research programmes compatible, interoperable (cross-border) and simpler for researchers*

National scientific research projects are implemented through public calls open to licensed scientific research institutions. Definition of priorities in the calls and eligibility criteria are set by the Ministry of Science, based on a suggestion from the Council for Scientific Research Activities, and with prior stakeholder consultation. The call for national scientific research projects for the project cycle 2012-2015 was open for licensed scientific research institutions (as a lead applicant). The chosen



institution conducts research in 10 priority research areas, which are in line with the EU priorities. In this way, international researchers can be involved in research activities in Montenegro. One of the main evaluation criteria for national projects was multilateral networking and regional linking, while for the Centre of Excellence and large research grants international cooperation was the obligatory criterion. Therefore, the international researchers are engaged in 85 national projects for the cycle 2012-2015 and in all research grants, as well as in the Centre of Excellence. Also, through bilateral projects, COST Actions and the EUREKA programme, the Ministry supports projects that Montenegrin researchers conduct with the international partners.

### **Priority: Research Infrastructures**

24. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest

#### **a. Participation in the development and operation of Research Infrastructures included in the ESFRI Roadmap**

The main objective of the Roadmap infrastructure is to define and present the priorities of Montenegro in the field of research infrastructures. With its content, the Roadmap will be complementary to the Strategy for Scientific Research Activities of Montenegro for the period 2012-2016, and will represent the implementation document in this area. The roadmap should serve as the basis for governmental bodies and infrastructure. One of its important functions is to provide a comprehensive overview of the current and planned activities at the state level, especially those related to the field of research infrastructure, their synergy and effective distribution of available funds. The document provides a certain level of predictability and understanding of state plans as well as monitoring the implementation of public policies and objectives in the field of research infrastructures. The document is not legally binding, and the dynamic and scope of implementing goals will vary from year to year and depend on the availability of funds in the state budget and the overall condition of the financial sector.

The abovementioned methodology includes:

- The number of potential researchers in a particular field and the possibility of hiring new researchers;
- The impact on the economy, particularly the benefits of potential participation of Montenegrin companies in developing research infrastructure, the impact on the industry and the potential to create spin-off companies;
- The importance of knowledge development in Montenegro, development of interdisciplinary research, and possibility of the use of modern equipment;

- The importance for society (improvement of living conditions, social challenges, promotion of science and development of scientific talents...); and
- The financial aspect ratio that includes investment and realized benefits.

The RI roadmap was prepared and sent for review to the licensed scientific research institutions in Montenegro. It should be completed by the end of September and presented at the next ESFRI meeting.

### **Priority: Open labour markets for researchers**

#### 25. Open, transparent and merit based recruitment of researchers

Montenegro is constantly developing its mobility opportunities which would give the chance for Montenegrin researchers to work in research centres and institutes abroad, as well as invite foreign researchers to work in Montenegrin scientific research institutions. In this way, Montenegrin and foreign researchers are able to conduct joint research through the use of technology and modern laboratories, sharing knowledge and experience through joint scientific research projects, as well as the possibility of professional development of young researchers engaged in projects. This opportunity is enabled through national research projects wherein one of the most important evaluation criteria is the support of researchers' mobility as well as the possibility for PhD students whose mentors are from abroad to realize part of their research in the institutions of their mentors. Moreover, through the first Centre of Excellence, one area of evaluation was international cooperation and mobility of researchers, as well as for large collaborative research grants.

Mobility of researchers is realised through bilateral scientific and technological (S&T) cooperation that Montenegro has with seven countries.

Through multilateral S&T cooperation, Montenegro enables mobility of researchers through FP7, COST, IPA IV, EUREKA and JRC, as well as through new the EU Framework Programme for Research and Innovation Horizon 2020 (2014-2020).

Furthermore, particular attention is devoted to increasing visibility of the scientific activities and to mobility opportunities to the public, through continuous support of the Ministry of Science, the Ministry of Education and the University's web portal, as well as EURAXESS Montenegro portal. The EURAXESS portal contains four main pillars, all devoted to researcher mobility: jobs, services, rights for researchers and links. Montenegro encourages the implementation of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. All three universities in Montenegro are signatories to the Charter and the Code.

#### 26. Researchers careers

The Ministry of Science has been providing support to young researchers through the engagement of young researchers in national scientific research projects for a period of three years, with the obligation to defend the master or doctoral thesis. The call for

co-financing national scientific research projects has given priority to projects in which young researchers are engaged. The Centre of Excellence and large research grants also provide the possibility for engaging young researchers as well as their full employment during the project's lifetime.

#### 27. Cross-border access to and portability of national grants

Bilateral cooperation is implemented through co-financing of joint research projects, already financed as national projects, in the form of mutual visits (costs of travel and subsistence) for researchers from Montenegro and the partner countries, which will perform joint research projects.

Costs related to the exchange of researchers are reimbursed in the following way:

- The party hosting a researcher covers the costs of accommodation and subsistence,
- The party sending a researcher covers the costs of travel between the sites of cooperating institutions.

The call for financing bilateral projects is open for holders (research institutes and faculties) of a current national research project grant from the Ministry of Science of Montenegro.

One of the main criteria for all research programmes that the Ministry finances is international cooperation. Therefore, one of the evaluation criteria for national programmes was multilateral networking and regional linking. This was an obligatory criterion for the Centre of Excellence and large research grants as well. Therefore, the international institutions have access to national grants for activities such as: costs for researchers from an international partner's institution engaged to exchange experience, teach and conduct research under the project; and costs for travel expenses – including travel costs, accommodation and subsistence. Also, through the EUREKA programme, the Ministry supports projects that Montenegrin companies conducted with international partners.

#### 28. Support to structured innovative doctoral training programmes

Montenegro supports doctoral training programmes through several measures. As mentioned, through national research projects, Ministry of Science supports the engagement of PhD students in scientific institutions, for a three-year period, as well as through the Centre of Excellence and large research grants. Also, through an annual call on co-financing scientific research activities, the Ministry of Science financially supports PhD studies after finishing the doctoral thesis.

Doctoral training programmes are additionally supported through the Higher Education and Research for Innovation and Competiveness Project – HERIC, through Promoting a Scholarship Program for Master's, PhD and Postdoctoral Studies, while the Ministry of Science supports PhD and Postdoctoral Studies and the Ministry of

Education supports master studies. It will be the first time that the country has committed such a large amount for scholarships to support students and researchers. The PhD scheme will fund students who are already in a full-time PhD programme in Montenegro or employed in Montenegro and in a fulltime PhD programme abroad. This scheme will support periods between six months and two years abroad to gain international expertise particularly that which cannot be obtained in Montenegro as part of the PhD programme. The students will return to Montenegro to complete their doctoral theses.

The programme will also help build national capacity for participation in the EU Horizon 2020 programme. The entire structure of the scheme, and especially the evaluation procedure, is modelled by Horizon 2020. This will give students and researchers invaluable experience in applying for funding modelled on that of the Marie Skłodowska Curie fellowship scheme. This will certainly give an advantage to national students and researchers if they decide to apply for European funding in the future.

The Scholarship Scheme is being finalised and the final draft is expected by September 2014.

#### 29. Support mobility between private and public sector

Montenegro supports mobility between the private and public sectors through the implementation of the Centre of Excellence and large collaborative research grants. For both programmes, cooperation between scientific research institutions and at least one company is obligatory.

### **Priority: Gender balance and gender contents in research**

#### 30. Foster cultural and institutional change on gender

##### Legal and strategic framework

According to the Law on Scientific Research Activities, conduct of scientific research activities is free and available to all domestic and foreign physical and legal persons (Article 3).

The Law on Gender Equality prescribes equal participation of women and men, equal positions and equal opportunities for exercising all rights and freedoms, as well as the use of personal knowledge and abilities for the development of society.

The Anti-Discrimination Law prohibits any form of discrimination on any grounds and determines measures to combat discrimination.

The Ministry of Science nominated a contact person for gender equality in science in 2011, responsible for the annual reporting on the implementation of the measures provided by the Plan of activities for achieving gender equality (PAPRR).

The Ministry of Science nominated representatives in the Helsinki group on Women in Science in September 2013.

Regarding promotional activities, the contact person for gender equality in science actively promotes the call for scholarships in the field of natural sciences for 2013, UNESCO – L'Oreal – 15 scholarships for young women scientists and Marie Curie Programme – Family friendly approach.

### 31. Gender balance in decision making process

Women in leadership positions in licensed scientific and research institutions 2012

<b>POSITION</b>	<b>TOTAL</b>	<b>Women</b>	<b>%</b>
Director m./f. or dean m./f.	46	10	21,74
Rector m./f.	3	0	0

Women in leadership positions in licensed scientific and research institutions 2013

<b>POSITION</b>	<b>TOTAL</b>	<b>Women</b>	<b>%</b>
Director m./f. or dean m./f.	56	13	23,21
Rector m./f.	3	0	0

Women in leadership positions in licensed scientific and research institutions 2013

<b>POSITION</b>	<b>TOTAL</b>	<b>Women</b>	<b>%</b>
Director m./f. or dean m./f.	56	13	23,21
Rector m./f.	3	1	33,33

According to UNESCO's Institute for Statistics publication: Women in science – Explore the data for countries worldwide, 50% of researchers are women in Montenegro.

More female researchers work in the academic and government sectors while more men work in the private research sector, which offers better salaries and opportunities for advancement.

Women researchers:

- Public sector – 57%
- Academic institutions – 48%
- Private sector – 38%

In the Report on the implementation of the Action plan for achieving gender equality (2013-2017) for 2013, the Ministry of Science was responsible for the following gender specific activities:

- Successful women in science award (for both 2012 and 2013),
- Support through funding: "Interaction of legal cultures and religions in medieval Zeta coastal towns and their impact on the identity of a woman" project (2012-2015).

### **Priority: Knowledge circulation**

#### 32. Open access for publications and data resulting from publicly funded research

Through the call for co-financing scientific research activities, the Ministry of Science stimulates research activities on an annual basis, including the publication of scientific work in relevant scientific journals. In that way, scientific work is published in international journals from the following lists: SCI (Science Citation Index Expanded), SSCI (Social Sciences Citation Index Journal List). This is done in accordance with the areas of science JRC (Journal Citation Report Science Edition and Social Science Edition), as well as in journals from list A&HCI (Art and Humanities Citation Index), with impact factor bigger than zero. Applicants should provide evidence in their applications of published scientific work in these sources.

#### 33. Open innovation (OI) and knowledge transfer (KT) between public and private sectors

The measures for the implementation of EU policies in the field of Science-Technology-Innovations point to the need for strengthening the knowledge users sector. This also calls to development of further initiatives in connecting the public and private sectors, the possibility of strengthening the private sector, linking initiatives between researchers in the public and private sectors, as well as encouraging research in the private sector. Special efforts are aimed at building the national innovation systems and the efficiency that consists of successful exploitation and commercialization of knowledge and research results in the manufacturing and service sectors. Organizations that promote the association of scientific research and manufacturing sectors, such as the Directorate for Development of Small and Medium-Sized Enterprises, Investment and Development Fund, Chamber of Commerce, the Centre for Information and Innovation, Enterprise Europe Network (EEN), and other national and international agencies and funds, are especially important in Montenegro.

To encourage innovation a Centre of Excellence was awarded to the Faculty of Electrical Engineering, University of Montenegro in Podgorica, for the implementation of the scientific research project Centre of Excellence in Bioinformatics – BIO-ICT, which began on June 1, 2014. The first Centre of Excellence in Montenegro will be financed up to EUR 3.42 million. Implementation of the first Centre of Excellence in Montenegro will contribute to the establishment of

partnerships at national and international level. The Centre will provide funding for research through cooperation with businesses and train a new generation of young talented scientists, researchers and inventors, with a view to greater creativity and innovation. The Centre of Excellence will create long-term focused programmes and provide stable sources of financing and combine knowledge, research and innovation, that is, establish a close link between research and the economy. Through implementation of large research grants, support for larger and more impactful R&D subprojects that nurture international collaboration will be enabled, which ultimately will generate commercial innovations and strengthen the Montenegrin economy. The Ministry of Science has agreed to finance four projects over a contracting period of three years from June 1, 2014 to May 31, 2017, for a total of EUR 1.34 million.

On May 20, 2014, the Ministry established the second call for research grants with the deadline for submission on September 19, 2014, for a total of EUR 1.2 million.

Also, stimulating innovations will be enabled through the establishment of the first Science Technology Parks – a networking structure headquartered in Podgorica and three decentralized units (“Impulse Centers”) in Nikšić, Bar and Pljevlja, which will enable better connections between knowledge, research and innovation. STP will stimulate the development of entrepreneurship based on the new knowledge as a result of scientific research, encourage the exchange of new technologies between universities, scientific research institutions, companies and markets, and facilitate the creation and growth of companies based on superior scientific results turned into innovation, through the incubation processes and the establishment of spin-off companies. The establishment of the first STP in Montenegro will contribute to a significant change in the institutional framework for research, development and innovation.

Also, through the establishment of local and regional business incubators, clusters and using voucher schemes for innovation, the internationalization and commercialization of research will be promoted, and the demand for consulting services, innovation in manufacturing and services, organization and marketing will increase. These models will encourage the development of innovation and entrepreneurial activity as well as interaction with the academic community (universities, institutes, faculties).

In addition, the training of public administrators to provide advisory services to clients is required, as well as the development of internal regulations, and an adequate representation of the scientific community in the regulation of intellectual property rights at the national and international level. This type of support will be implemented through the HERIC project, and it is necessary to consider the possibility of using technical assistance of the European Commission (e.g. TAIEX programme). All the scientific research institutions in which knowledge products, that is, intellectual property is created, should establish bodies, procedures and regulations to regulate the management of intellectual property – from the issue of author’s rights in a project, the right to register and check the feasibility of patents, technology transfer (transfer of

rights to a third party, contracting technology licenses) to the provision of funding for the protection of intellectual property rights, especially patent rights.

Moreover, through the call for co-financing of scientific-research activities, the Ministry of Science stimulates the natural and legal persons from Montenegro who during 2014 realize and protect patents or develop innovative solutions that are applied in practice.

The Ministry of Science in cooperation with the Ministry of Economy will prepare a Law on Innovation Activities and submit it to the government for adoption in 2015, as well as an Innovation Strategy that will be prepared for adoption in 2016.

#### *Harmonise policies for public e-infrastructures and associated digital research services*

Computer infrastructure (e-Infrastructure), as a part of the research infrastructure, has developed significantly in Montenegro in the previous period.

As the basis for national research and education in IT infrastructure, the Montenegrin Research and Education Network (MREN) was established in 2005, with the aim to build, develop, maintain, and allow for the use of broadband ICT infrastructure to all the scientific research and educational institutions in Montenegro included into MREN, to interconnect them, and connect them with related institutions included in the pan-European research network – GEANT. It primarily provides users with internet access, information services and a connection to other national and international networks. MREN is a full member of the Trans-European Research and Education Networking Association – TERENA, and it has been connected to GEANT since October 2010.

The Research Information System of Montenegro, E-CRIS.CG, contains information about researchers and research institutions in Montenegro. In addition, business automation and networking of libraries into a single library and the information system COBISS.CG has continued.

In accordance with the National Library Digitization Programme adopted at the end of 2008, the National Library of Montenegro “Đurđe Crnojević” in Cetinje is developing a digital library. The library has so far scanned the most important Montenegrin periodicals and old and rare books, while the digital library is in the form of a web presentation.

In order to improve the system of support and better availability of information to the scientific and wider community, a modern researchers’ registry portal, “Scientific Network” was developed in 2014. The portal was developed on the platform of E-CRIS universal application, which is a sophisticated information system on the research activity that belongs to the generic information system – CRIS (Current Research Information Systems). Establishment of the “Scientific Network” will allow for more intensive cooperation and communication of domestic researchers and



institutions, both in the country and abroad and provide information on the scientific diaspora as well. Currently, the “Scientific Network” contains information about 1343 researchers and 56 research institutions in Montenegro.

## **Structure for the contribution of Associated countries to the ERA Progress Report 2014- Norway**

### **Priority: More effective national systems**

#### **1. Research and Innovation structure**

The Research Council of Norway (RCN) serves as the Government's major advisory body on research policy issues. It is responsible for the development and implementation of national research strategies and for promoting basic and applied research and innovation policies. The RCN is also responsible for evaluating research in Norway.

Approximately 30 per cent of all public R&D funding is channelled through the RCN. The remaining is directly allocated to the research institutions and to the Norwegian contribution to the EU Framework programmes.

The RCN's 2012 evaluation exercise found that the RCN is an effective and efficient research funding organisation, ensuring cost-effective competitive allocation of R&D funds in Norway. The evaluation concluded that more effort and funding should be allocated to prospective studies and research projects to counterbalance the inherently conservative tendencies stemming from stakeholder consultation and the peer review process.

The evaluation also found that the RCN made little systematic use of its evaluation and prospective studies. Evaluations should be embedded in the programming cycle and more effort should be devoted to better understanding the impacts of RCN's activities.

The evaluation findings were taken into account in the development of the RCN's new evaluation policy of 2013. In 2014, the RCN established an evaluation group with the objective to give advice and develop a systematic process to enable the RCN to make more strategic choices and systematic use of evaluations.

The newly adopted government strategy on research and innovation cooperation with the EU requests that the RCN increases its focus on the integration of national and international schemes internally and externally. Similarly, the Norwegian Research and Innovation System, Statistics and Indicators (2012) suggests that it may be necessary for Norway to rethink its approach to an integrated framework programme for research and innovation, with priorities and measures allocated in accordance with the Innovation Union, thus also strengthening the country's relevance for participating in the internal market. As a response to this a new project was launched to align national and international activities and instruments of the RCN. The project will run throughout 2014 and lay the foundation for a permanent set-up which more systematically involves integration of national and international schemes. Objectives of the project include closer cooperation between NCP's, R&D program coordinators and boards as well as developing a tool kit for the optimal alignment of international calls and strategic research and innovation agendas with national calls and agendas.

## 2. National strategy for Research and Innovation

Erna Solberg's government was appointed on 16 October 2013. It succeeded Jens Stoltenberg's Second Government (2005–2013). The main STI priorities announced by the Solberg government are to:

- Continue building the knowledge society through an ambitious education policy (including higher education), and increased investments in research and the development of world-class research capabilities.
- Strengthen the international dimensions of research in Norway and focus on the ERA and Horizon 2020.
- Better coordinate and strategically prioritise R&D-investments with predictability and transparency, through a long-term national plan for research and higher education.
- Enhance the competitiveness of Norwegian businesses, by investing in innovation, knowledge, research and technology, providing favourable framework conditions for businesses (including strengthening the Norwegian tax credit scheme for R&D – Skattefunn) and ensuring diversification of the Norwegian economy.

*A new strategy for research and innovation cooperation with Europe* was launched under the Solberg government by the Minister of Education and Research in June 2014. The strategy sets out clear objectives and priorities for research cooperation through the Horizon 2020 Framework Programme for Research and Innovation and the European Research Area.

A long term national plan for research and higher education was proposed during Stoltenberg's Second Government in the 2013 white paper on research entitled «Long-term perspectives – knowledge provides opportunity», Meld. St. 18 (2012–2013). The plan aims to ensure that public investments in research and higher education are long-term and well-coordinated, with clear priorities. The Solberg government adopted the plan for research and higher education, which will set out political priorities and a roadmap for public investments in key research areas, building research infrastructure, fellowships and expanded student enrolment capacity. The long term plan will be a tool for targeting efforts towards areas in which Norway has a strategic advantage, such as in marine research.

An important competitive advantage is that employee-driven innovation is more common in Norway than elsewhere, a trend which coincides with unique opportunities for cooperation and flow of knowledge between stakeholders in research, industry, trade and society at large. Policy that facilitates such flow and helps to integrate international cooperation more closely into it will be high on the agenda.

The plan will be launched in fall 2014; it has a timeframe of 10 years and will be updated every four years.

## 3. Research and Innovation funding

The Norwegian government officially adopted in 2005 the Barcelona target of the EU (2002), i.e., a three per cent allocation of (GDP) on R&D by 2010 (later by 2020 within H2020). The Solberg government confirmed its commitment to the target in 2013, but introduced a new target date of 2030 to achieve the goal.

Public budgets for R&D increased in real terms in four of the five past years, with annual real growth of two per cent from 2009 to 2013. This includes contributions to the EU framework programme and the SkatteFUNN R&D tax incentive, the latter of which allows businesses and enterprises that are subject to taxation in Norway to apply for a tax deduction of up to 30 per cent of their R&D costs. Public R&D funding growth was lower than in the preceding five year period (2005 - 2009), when annual real growth was five per cent. Important drivers behind the increase in public budgets for R&D over the past 10 years include governmental commitment to increased investments in R&D, as well as increased contributions to multinational research programmes such as the EU framework programmes for research.

Norway ranks below the EU average in terms of R&D expenditure as a share of GDP: 1.66 per cent in Norway compared to 2.06 per cent in the EU28 in 2012. The difference is partly due to Norway's high GDP (i.e. high denominator), the second highest GDP per capita in Europe. Norway maintains a high R&D expenditure per capita which is almost 60 per cent higher than that of the EU28, but significantly lower than the total R&D expenditure per capita in Sweden (3.41 per cent), Finland (3.55 per cent) and Denmark (2.99 per cent).<sup>6</sup>

The business sector expenditure (BERD) on R&D as a share of GDP was also lower than the EU average in 2011 (0.86 per cent in Norway compared to 1.29 per cent across the EU-28). The low BERD as a share of GDP is partly the result of the profile of the Norwegian economy which is to a large extent based on raw materials and natural resources. Firms within these sectors tend to have low R&D-intensity, although Norwegian firms invest more in R&D than their international counterparts in these areas. Norway also does not have large firms within R&D intensive sectors, such as pharmaceuticals or ICT. Large firms in these sectors traditionally invest heavily in R&D and consequently they often make the difference between countries with high and low BERD figures.

The business sector carried out R&D totalling €2.7b (NOK21.2b) in 2012 including tax credits, which represents 44 per cent of the total R&D expenditure in Norway. The higher education sector, including university hospitals, carried out 26 per cent, and the research institute sector carried out 23 per cent of total R&D expenditure. Over a ten-year period the most important growth in R&D expenditure was in the Higher Education Institutions (HEI) sector, followed by the research institute sector.

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<sup>6</sup> Eurostat (2012):

[http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/R\\_%26\\_D\\_expenditure](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure)

Funding from abroad has remained stable at around eight per cent of R&D expenditure since 2005. Close to 20 per cent of the funding from abroad stems from the EU framework programmes.

4. Competitive funding through calls for proposals applying the core principles of international peer review

Proposals to ECN programmes are evaluated using scientific peer review. A 2001 background report (No1) explains that in 2001, the use of peer review and other evaluation measures for RCD programmes were found to be inadequate; measures have been undertaken since then to improve and develop peer review principles since that time.

5. Institutional funding based on institutional assessment

In Norway, the annual allocation of institutional funding (block-funding) to the HEIs, the research institute sector and the four national health trusts is made partly on the basis of research performance indicators.

Performance-based funding in HEIs

About 80 per cent of government funding for R&D in HEIs is channelled directly from the Ministry of Education and Research, mainly as institutional funding. Since 2003, a funding structure has been in place for these funds, which consists of three core components:

- Basic funds without detailed specifications of its use. This component initially amounted to about 60 per cent of institutional funding (on average for all HEIs), but has decreased somewhat.
- A teaching component, in which funds are distributed on the basis of reported student performance. This component initially amounted to about one-quarter of institutional funding and has increased somewhat.
- A research component, which amounts to about 15 per cent of institutional funding. This component is divided into two parts, a performance-based part and a strategic part, within which earmarked funds are allocated to specific institutions for positions for PhD students and for scientific equipment.

The changes in the structure of core funds, although minor, indicate nevertheless a shift to more emphasis on performance- and strategy-based core funding of research by HEIs. In the 2014 budget, the block grant funding of HEIs was increased by NOK 100 million, an increase which will be placed in the funding portion that depends on research performance.

In April 2014, the Solberg government initiated a thorough review of the entire system of direct institutional funding in the HEI-system in Norway. The review of the funding model will be carried out by an independent expert group. According to its mandate, the expert group is expected to hand over its recommendations to the government by the end of December 2014.

Performance-based funding in the research institute sector

A system for block grant funding from the government ministries to the research institute sector has been in place since 2009, and about 50 institutes are covered by the system. A share of the block grants is allocated on the basis of the institutes' performance on selected indicators over the previous three years. The performance-based share varies between 2.5–10 per cent for different groups of institutes.

The evaluation recommended simplifying the performance-based component of the funding system, by reducing the number of indicators in the system, as well as removing the system for determining the weights between the indicators. These recommendations were followed in a 2013 revision of the funding system. The indicators that were retained (and their weights) include: scientific publications (30 per cent), number of awarded doctoral degrees (five per cent), international research revenue (20 per cent) and revenue from national contract research (45 per cent).

## Priority: Transnational Cooperation

### 6. Implement joint research agendas

#### a. FRAMEWORK PROGRAMME

##### i. Joint programming initiatives

Norway participates in all Joint Programming Initiatives (JPIs) and in the EU Strategic Energy Technology Plan (SET-plan), as these represent topics of national importance. The JPIs target distinct social challenges and often require involvement from several policy sectors, that is, several ministries. To be able to participate in a successful manner requires harmonisation between the JPI's research agenda and the national agenda for the particular field. In Norway this implies coordination within and between ministries: that is, between the ministries and the RCN and between different research programmes in the RCN. And last but not least, it also implies communication with the scientific community and other relevant stakeholders. For each JPI, one responsible ministry is appointed and this ministry appoints the delegate and the expert to the governing board, and defines the role of RCN in the JPIs and in the SET-plan. In RCN each JPI is organized as separate programmes with a committed JPI coordinator, as well as an advisory board or network that supports the Norwegian representatives in the governing board. The JPI coordinators in RCN meet regularly to discuss management of JPIs, and are closely connected to relevant national research programmes.

Eight of the ten JPIs Norway participate in have finalised their strategic research agendas. Two further JPIs are in progress and will be finalised in 2014.

JPI Oceans, JPI Climate, JPI for Agriculture, Food security and Climate Change (JPI FACCE), JPI for Healthy Diet for a Healthy Life (JPI HDHL) and JPI for Urban Europe represent areas of national importance with recently developed governmental research agendas / white papers.

JPI Oceans, JPI FACCE, JPI HDHL, JPI on antimicrobial resistance (JPI AMR) and JPI Urban Europe have inter-ministerial groups coordinating their activities.

The Commission supported the JPIs in 2013/2014 with networking projects to develop the JPIs and joint calls with the MS/AC (ERA-NET Co-fund). Norway participated in the following projects:

- For JPI Climate, JPI FACCE, JPND, JPI Water Challenges, JPI Urban Europe, JPI on Cultural Heritage (JPI CH), JPI HDHL, Norway participated in several calls.
- Participation in JPI CH, JPI Water challenges and JPI AMR.
- JPI Urban Europe and JPI Oceans related to several research programmes in RCN and have established cooperation with these.

JPI participation contributes to the Norwegian priorities and goals both nationally and internationally. In particular, the JPI Oceans is a research area of high national priority.

Norway was one of the main countries initiating this topic as a theme for a JPI, and now leads the secretariat administrating JPI Oceans. A new pilot action «Intercalibration for the coastal and transitional waters of the EU Water Framework Directive» was approved at the last JPI Oceans Management Board. This action is also of considerable policy importance for Norway. And, in cooperation with other initiatives the JPI Oceans established a new database on Marine Research Infrastructures.

**b. Other joint research agendas**

In addition to JPIs, Norway participates actively in all transnational research and innovation at the Nordic level. Nordic collaboration has been and still is an important part of the overall Norwegian policy for internationalisation of Norwegian research is a central platform for the wider national efforts to develop ERA.

**7. Openness of Member State/Associated Country (MS/AC) for international cooperation**

Norway engages in international research cooperation for three main reasons:

- To address global challenges,
- To increase the quality and relevance of Norwegian research, and
- To increase the competitiveness of Norwegian businesses.

The White Paper entitled *Long-term perspectives – knowledge provides opportunity (Report to the Storting, 2012-2013)* identifies eight countries outside the EU that are prioritized for strategic research cooperation. These are China, Brazil, India, Russia, Canada, USA, South-Africa and Japan. The Minister of Education and Research recently decided to develop a national strategy on how international cooperation in higher education and research with the BRIC countries could be further strengthened. The strategy is expected to be finalized in 2015.

To promote international research cooperation with strategic partners, Norway initiates bilateral cooperation with other countries in various forms and participates in a number of multilateral initiatives. These are usually initiated or supported at a European level.

To improve national understanding of international research cooperation and enable Norway to develop better priorities and informed decisions, the RCN commissioned an extensive bibliometric analysis of all research publications by Norwegian authors and their cooperation (co-authorship) with more than 50 other countries. The results of this analysis will also feed into an RCNs initiative to develop road maps for priorities in future cooperation with eight prioritized third countries. The roadmaps are expected to be finalized in 2014.

Norway is an active participant in the Strategic Forum for International S&T Cooperation (SFIC) which is becoming increasingly important for the country's strategic approach to international research cooperation. There is strong overlap between priorities in SFIC and Norway.



## Priority: Research Infrastructures

8. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest
  - a. Participation in the development and operation of Research Infrastructures included in the ESFRI Roadmap

The first version of the Norwegian Roadmap for Research Infrastructures (RI) was published in 2010. It presented large-scale projects of national importance that had achieved very high ranking in the first call for funding after the establishment of a new *National Financing Initiative for Research Infrastructure* in the White Paper '*Climate for Research*' (2008-2009) (Norwegian Ministry of Education and Research, 2009). The roadmap was updated in 2012 and was updated again in April 2014. Operational costs for using RI are eligible in all of RCN's funding schemes.

Research infrastructures include advanced scientific equipment, large-scale research facilities, scientific databases and collections, and electronic infrastructure (e-infrastructure).

The RCN is responsible for developing a Norwegian roadmap for investments in RI and for updating the national RI roadmap on a bi-annual basis. The roadmap is restricted to projects found to be ready for investment through a two-step quality assessment procedure based on international evaluation committees. These investments must be selected on the basis of stringent criteria in terms of quality as well as relevance and benefit to society. RCN has to assess grant applications for RI involving investment costs starting at NOK 2 million upwards, and can grant a maximum of NOK 200 million in project funding. Recommendations for allocations of over NOK 200 million must be submitted by the RCN to the relevant ministry for special consideration and, possibly, final allocation of funding.

There is no national scheme available for RI with investment costs less than NOK 2 million. RI of this magnitude is the responsibility of the research performing organisations (PROs and HEIs), which are free to finance whatever scientific equipment they judge appropriate.

The Ministry of Education and Research is responsible for following Norwegian participation in projects on the ESFRI Roadmap to the RCN. Projects in the ESFRI roadmap in which Norway participates in the preparatory phase have to undergo a thorough review by RCN and have to be considered by RCN to be of major strategic importance for Norwegian research, *before they are included in the Norwegian roadmap*.

Norway is currently participating in the construction phase of 12 different ESFRI projects with funding from the national financing initiative for research infrastructure. Norway hosted the CESSDA AS meeting in Bergen, held in December 2013. Norway also offered to host SIOS and ECCSEL which are being planned with broad international participation. Norway will also contribute to the construction of the European Spallation Source (ESS) in Sweden with 2.5 per cent of the total construction costs.

The Ministry of Education and Research and other relevant ministries have, on the basis of the Research Council recommendations and funding through the national infrastructure road map, committed Norway as a member of the pan- European research infrastructures ELIXIR (bioinformatics) and as an observer in CLARIN ERIC , ESSurvey ERIC , BBMRI ERIC and Euro Argo ERIC. The Research Council also allocated funds for UNINETT Sigma, a subsidiary of the UNINETT<sup>7</sup>, for their participation in Partnership for Advanced Computing in Europe (PRACE). Norway also participates in planning EISCAT\_3D radars in Northern Scandinavia.

In addition, Norway takes part or participated in 12 other preparatory phase projects of the ESFRI Roadmap. Decisions on Norway's commitments to these ESFRI-projects will be taken based on the outcome of open, competitive calls in the national financing initiative for research infrastructure.

In general, there are no legal barriers to cross-border access to RI in Norway.

#### **b. Participation in ERICs**

With regards participating in the European Research Infrastructure Consortium, Norway is observer in three out of the nine consortia which adopted the legal framework designed by the Commission to facilitate the establishment and operation of research infrastructures of European interest involving several European countries, namely ESS ERIC, BBMRI ERIC and EURO-Argo ERIC.

### **Priority: Open labour markets for researchers**

#### **9. Open, transparent and merit based recruitment of researchers**

There is a long tradition of meritocracy and open and transparent recruiting processes in Norwegian academia. All vacant positions over one year in length must be publically announced and all are evaluated by a peer review committee. In recent years, compulsory international announcement of vacancies, combined with a cultural change towards internationalisation at most Norwegian HEIs has improved international recruitment substantially.

In 2012, 20 per cent of academic personnel in Norway were non-Norwegian citizens. This is a 150 per cent increase in 10 years. To continue the positive trend, the Government and the HEIs will cooperate further to improve routines and practices for open international recruitment of researchers.

#### **10. Researchers careers**

Given the increase in international staff at Norwegian HEIs, the next step is to improve practices for better career policies. The RCN and The Norwegian Association of Higher

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<sup>7</sup> UNINETT AS develops and operates the Norwegian national research and education network, a high-capacity computer network interconnecting about 200 Norwegian educational and research institutions and more than 300 000 users, as well as giving them access to international research networks.

Education Institutions (UHR) concluded that the HEIs do not have robust and systematic career policies in place, and that there is a demand for this, not least by younger staff.

Here, formal structures (regulations, national and local strategies, Charter & Code, etc) and traditions and cultural dimensions both among leaders and the individual researchers have to be combined. The present government has therefore included Researchers Careers as one of its seven main points for better quality in the Norwegian knowledge sector. Parallel to this, UHR has established a working group on the same topic. The Research Council, the Ministry and the UHR are working closely to coordinate and combine efforts to improve the situation.

A significant number of HEIs have signed the contract for HR excellence in research, and five out of eight Norwegian universities have so far obtained the logo.

#### 11. Cross-border access to and portability of national grants

Researchers of any nationality can apply for research funding to the Research Council of Norway. They do not need any employment contract with a national research institution, however all submissions to the Research Council must be submitted through a national research institution. The regulations of the Research Council allow for funding on research and innovation projects to be spent by partners abroad. The requirement is that the activity supports the purpose of the call. The regulation also allows for researchers at national research institutions, with projects funded by the Research Council, to take the grant with her/him to a foreign research institution in the case of change of employment. As the funding contract is between a national research institution and the Research Council, this requires consent from the national research institution.

#### 12. Support structured innovative doctoral training programmes

PhD education in Norway has since 2003 had a compulsory course programme (30 ECTS). Courses include academic as well as generic and transferable skills. Norwegian PhD education was evaluated in 2012. Among the conclusions were the need to strengthen the supervisor's competence in general and importance of supervision practices in developing candidates' generic skills. The *Recommended Guidelines for the Doctor of Philosophiae Degree* made by UHR also underlines the responsibility of the supervisor.

UHR has established a group to look at researchers' careers, also outside the HEI sector. The IDT-principles are a basis for this discussion. UHR also cooperates with the research institute sector and the RCN to identify and deal with challenges between the two sectors. The research institutes have a great potential as partners/resources in PhD education.

UHR is about to establish a new national working group with a mandate to identify and resolve a set of challenges related to joint PhD degrees. Among other things, the group will deal with quality assurance, challenges related to legislation/regulations and funding and joint degrees as a component of internationalisation.

A scheme for industrial PhDs has been established to increase the recruitment of researchers to Norwegian industry, boost long-term competence-building, increase research efforts in business and industry, and enhance interaction between academia and industry. Currently there are 162 candidates in the scheme. This year a similar scheme for public sector PhDs was established.

A scheme of National Research Schools provides funding to 15 national researcher schools across the country. The schools are managed by the RCN. The aim of the scheme is to improve the quality of PhD training, and increase the rate of PhD students completing the program, and shorten the time to degree.

### **13. Support mobility between private and public sector**

There is significant mobility of researchers between sectors in Norway. A survey (SIM-ReC) showed that 34 per cent of researchers in the HEI sector had experience from working in other sectors, the average among the participating countries in the survey was 23 per cent. Of the PhD candidates, 60 per cent found employment outside the HEI sector.

There remains a challenge, however, to increase mobility and knowledge sharing across sectors. The introduction of industrial PhDs is one important tool. Another tool is to encourage the establishment of professor II/associate professor II positions among HEIs and private sector/industry. These are positions where researchers hold a position in one institution in addition to their full-time permanent position in another institution.

## **Priority: Gender balance and gender contents in research**

### **14. Foster cultural and institutional change on gender**

#### **a. National policies on gender equality in public research**

The government implemented several measures to strengthen gender balance in the higher education sector. In 2004 the Ministry of Education and Research appointed the Committee for Gender Balance in Research (<http://eng.kifinfo.no/>). The current KIF-committee started up in January 2014 for a new three year period. The mandate of the committee will now include diversity and gender in the content of research in addition to gender balance.

All state higher education institutions are expected to adopt action plans for gender equality, and the Ministry has established a gender equality prize that is awarded to the university, the university college or the research institute with best results on improving the gender balance within the institution.

Gender equality is implemented in legislation, requiring a minimum of 40 per cent of each sex in the composition of boards, panels and committees. Practising gender balance as a standard requirement has successfully brought Norway and other Nordic countries to a European lead position of the share of women on scientific boards and in management

positions. However, Norway is at the European average when it comes to the total share of women faculty and women in grade A positions.

Experience shows that a proactive policy has significant effect. One example is the University of Tromsø, which has shifted from being the Norwegian university with the lowest share of women professors (9 per cent in 2002), to the university with the highest share (30 per cent) ten years later. This progress is a result of concrete actions and dedicated leadership. Another example is the Norwegian Centres of Excellence (CoE) scheme. When the Research Council introduced a set of «soft push» measures to counter gender imbalance at the second CoE call in 2005, the results were satisfactory. The same results have been also achieved in the last call of the CoE-scheme in 2011/2012. These experiences are examples of *good practice* on how to significantly increase the involvement of women in schemes of excellence in science.

In 2013 the RCN launched a new policy on gender equality and gender perspectives in research and innovation. Building on former policies, the Research Council wants to be a driving force, both nationally and internationally. The Director General of RCN states that Norway must aspire to become one of the leading countries in Europe in this area.

To boost gender balance at the highest levels in Norwegian research, the Research Council in 2013 initiated a new program on Gender Balance in Senior Positions and Research Management, called BALANSE. This new program funds innovative measures and supports mutual learning between different parts of the research system, both in the public sector and in private industry.

The RCN is also involved in a new policy-oriented ERA-NET GENDER-NET, set up in October 2013. GENDER-NET is led by CNRS in France and consists of 12 different partners from 11 countries. The overall objective is to promote gender equality in research institutions and the integration of the gender dimension in research content, by sharing best practice, optimizing transferability and proposing joint initiatives and indicators for monitoring and progress.

The information centre KILDEN systematically disseminates research-based knowledge on gender in Norway. KILDEN has the national responsibility for promotion and information about Norwegian gender research nationally and abroad and promotes the documentation of resources and activities within gender research in Norway. KILDEN's target groups are gender researchers, the academic communities in general, journalists, politicians, public administrators, students and the public in general.

### **Priority: Knowledge circulation**

#### **15. Open access for publications and data resulting from publicly funded research**

Productive cooperation and use of R&D depends on access to research results. In principle, all research that is wholly or partially funded by public sources must be made openly accessible. This is stated in the White Paper '*Climate for Research*' (2008-2009).

This was followed by the establishment of CRISTin, a public open access database for research publications. In 2012 and 2013, CRISTin focused on the following areas:

- The Ministry of Education and Research's project on Open Access,
- Infrastructure related to institutional repositories, and
- Networking and information.

There is also ongoing work in the RCN to implement these policy goals and to develop national policies on both open access to publication and to scientific data.

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

Both open innovation and knowledge transfer have been issues in government policies for higher education and research of considerable importance for years. Since the change of the University Act and the Employee Invention Act in 2003, Norway has undertaken a large number of activities promoting knowledge transfer, such as:

- Coordinating IP policies for universities,
- Launching several research programs aimed at commercialization, and
- Innovation and co-operation between research communities and actors within the business sectors, NGOs and public sector.

The increasing policy focus on open innovation issues does not undermine current IP policies. On the contrary, insights from the open innovation perspective make policy makers more conscious about when and how IP policy measures should be appropriately applied.

The Government commissioned in 2014 an assessment of the policy instruments for knowledge transfer and commercialisation of publicly-funded research in Norway. The results of the evaluation are expected by June 2015.

## **Switzerland**

### **Priority: More effective national systems**

#### 34. Research and Innovation structure

Swiss research policy is characterised by continuity and stability, including the level of R&D spending. Important characteristics of R&D funding in Switzerland are the high priority of competition in selecting organisations for funding, the bottom-up principle in defining the content (i.e. no thematic programmes), and the absence of instruments to directly support private R&D.

Political responsibilities for research and higher education are divided between the federal state (Confederation) and the regional authorities (the Cantons). The Confederation is responsible for the direct funding of research and the coordination of research activities. The Confederation is responsible for the two Federal Institutes of Technology (FITs) in Zurich (ETHZ) and Lausanne (EPFL). The Cantons are responsible for their universities, while a national act regulates federal support to these institutions.

At the federal level, as of 2013 responsibilities for research and higher education are concentrated in the State Secretariat for Education, Research and Innovation (SERI), which is part of the Federal Department of Economic Affairs, Education and Research (EAER).<sup>8</sup>

At the intermediary level, the main actors are the two project funding agencies – the Swiss National Science Foundation (SNSF) and the Swiss Innovation Promotion Agency (CTI)- and an advisory body, the Swiss Science and Innovation Council. The Swiss National Science Foundation (SNSF) is a private foundation, overseen by the State Secretariat for Education and Research and Innovation (SERI, part of EAER) and funded by the Confederation, responsible for the funding of basic research. Moreover, it manages the programme aiming to create ‘National Centres of Competence in Research’ (NCCR) at the national level as well as National Research Programmes (NRP). The Swiss Innovation Promotion Agency (CTI) is the federal agency for innovation, which supports joint projects of universities and private companies as well as innovation activities.

#### 35. Research and Innovation funding

The parliamentary bill ‘Message on the promotion of education, research and innovation for 2013-2016’ increases the amount of grant funding awarded on a competitive basis for research and innovation.

#### 36. Competitive funding through calls for proposals applying the core principles of international peer review

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<sup>8</sup> The Federal Departments are ‘super-ministries’ that encompass a number of so-called Offices and State Secretaries. Offices and State Secretaries are more like ministries in other countries.

Competitive funding lies at the core of the Swiss research and innovation system: both SNSF and CTI allocate their competitive funding by submitting projects to a thorough peer review in line with international standards.

With regard to the SNSF's project funding, which is the SNSF's main instrument<sup>9</sup>, external reviewers assess the applications on the basis of the criteria specified by the SNSF such as the scientific quality of the research proposal, the scientific value and relevance of the project, the originality of research objectives, the adequacy of methodical approach, the feasibility of the project, the scientific track record of the applicants and the applicants' expertise in relation to the project. The reviewers work independently of each other and their assessments are made available to the applicants in full on the mySNF platform. The reviewer's identity remains concealed. Decisions are based on clearly defined procedures and rules. Researchers receive clear and useful information concerning the evaluation of their applications and the respective decisions of the SNSF.

In the context of the SNSF's career funding schemes, the transmission of external reviews is mandatory for all applications within the scope of Ambizione and SNSF professorships which reach the second stage as well as for Assistant Professor Energy Grants. For all other career funding schemes, an external review is possible but not mandatory. The referee and the co-referee decide whether an external review is required.

The CTI promotes applied research and development projects involving both universities and industry. While it is open to any discipline, the main focus of its promotional activities is on life sciences, engineering, nanotechnologies, microsystems technology and enabling sciences. The promotional activities of the CTI are based on the "bottom up" approach. Similar to the SNF, the CTI uses a peer-review process to evaluate and select projects. Only universities and universities of applied sciences are eligible for funding.

### 37. Institutional funding based on institutional assessment

Political responsibilities for research and higher education are divided between the federal state (Confederation) and the regional authorities (the Cantons). The Confederation is responsible for the direct funding of research and for the coordination of research activities. The Confederation is responsible for the two Federal Institutes of Technology (FITs) in Zurich (ETHZ) and Lausanne (EPFL). The Cantons are responsible for their universities, while the Federal Law on Financial Aid to Universities (UFG) regulates federal support to these institutions. The Federal Law on Financial Aid to Universities obliges the Swiss Confederation and the cantons to safeguard and improve the quality of teaching and research in higher education (Article 7); furthermore, the UFG defines the review of the performance quality of a university as a prerequisite for federal subsidies (Article 11, Paragraph 3, Letter a.). The requirements in respect of quality assurance of universities and the conduct of the audit by the Swiss Center of Accreditation and Quality Assurance in Higher Education (OAQ) are laid down in the 'Quality Assurance Guidelines'. These are compatible with the

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<sup>9</sup> In 2013, the SNSF allocated slightly more than half (51%) of its funds to its main funding scheme, project funding, see [http://www.snf.ch/SiteCollectionDocuments/por\\_fac\\_sta\\_kurz\\_jb13\\_e.pdf](http://www.snf.ch/SiteCollectionDocuments/por_fac_sta_kurz_jb13_e.pdf)



‘European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)’, which were developed by the European Association for Quality Assurance in Higher Education (ENQA).

## **Priority: Transnational Cooperation**

Switzerland has a long tradition of participation in international programmes at European level. At present around 12 per cent of all federal resources for the promotion of education, research and innovation go to international cooperation activities.

### 38. Implement joint research agendas

#### a. FRAMEWORK PROGRAMME

##### i. Joint programming initiatives

Cooperation between countries is fostered by the EU Framework Programme. The share of participation of Switzerland in total participation under FP 7 was 3.31 per cent, and Switzerland received 4.4 per cent of total EC contributions.<sup>10</sup>

Switzerland also participates in the Cooperation in Science and Technology in Europe (COST), where the State Secretariat for Education, Research and Innovation provides additional funding for research in COST actions with Swiss participation.

##### ii. ART. 185 initiatives

Switzerland is also involved in four Art. 185 Initiatives: Active and Assisted Living Research and Development Programme (AAL), Eurostars, European Metrology Research Programme (EMPIR) and European Developing Countries Clinical Trials Partnership (EDCTP).

##### iii. ERA-Nets

At present Switzerland is taking part in some 25 ERA-NET initiatives (ERA-NET and ERA-Net plus) covering several areas of research as well as in 5 JPIs. Through project funding or the National Research Programmes (NRPs) the SNFS supports researchers' participation in Joint Programming Initiatives or ERA-NETs. For example, research groups in the NRPs 68 and 69 can submit proposals for EU Joint Programming Initiatives. In addition to their own budget of 13 million Swiss Francs each, NRP 68 and NRP 69 have together up to 4 million Swiss Francs available for participating in calls of JPIs, such as FACCE – JPI. Moreover, since the activities coordinated by the European Science Foundation (ESF) are scheduled to end by 2015 and Joint Programming Initiatives are taking time to get off the ground, ERA-NETs are becoming increasingly important.

#### b. Other joint research agendas

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<sup>10</sup> The acceptance of the mass immigration initiative on 9 February 2014 by Swiss voters has resulted in Switzerland being (temporarily) excluded from European research funding and led to non-association in the European research programme Horizon 2020. For the time being, Switzerland therefore has third country status in Horizon 2020.

Switzerland further participates in the European technology initiative EUREKA, where Swiss participations are funded through the CTI. Switzerland holds the EUREKA Chairmanship from July 2014 until June 2015.

Switzerland also maintains membership in the following international research organisations and initiatives: ESA, CERN, ESRF, EMB, ESO, ILL, CIESM and HFSP.

In general, Swiss participation in international programmes and opening of national programmes reflects the decentralised nature of Swiss research policy and less focus on grand challenges. Research funding organisations are generally both willing and adequately funded to participate.

### 39. Openness of Member State/Associated Country (MS/AC) for international cooperation

Whereas in the past, federal policies on bilateral research cooperation were strongly geared towards cooperation with Europe and North America, the Federal Council has added new geographical regions since 2008. The strategic focus is currently on new countries that offer significant scientific and technological development potential. Eight non-European countries have been identified as potential partners: China, India, Russia, South Africa (including research institutes in Côte d'Ivoire and Tanzania) as well as Japan, South Korea and Brazil. Corresponding framework agreements have either already been signed with the governments of these countries or are currently in the pipeline. In the eight federal bilateral research programmes launched so far, a total of 150 Joint Research Projects (JRPs) are currently underway and around 400 exchange projects (Faculty Exchange, Student Exchange and Joint Utilization of Advanced Facilities) have been sponsored. Finally, funding has been provided for over 40 partnerships between higher education and research institutions. These developments are also supported through the establishment of Swissnex offices, science consulates promoting and supporting Swiss science in key locations around the globe.

Through their joint programme, SCOPES, the Swiss Agency for Development and Cooperation (SDC) and the SNSF support scientific collaboration between researchers in Switzerland and their colleagues in Eastern Europe and Central Asia. In Eastern European countries the programme is designed to strengthen individual research capacities, promote the institutional development of research and teaching, and improve integration into the international scientific community. Swiss researchers have already come to appreciate their partners in Eastern Europe for their high levels of scientific competence, specialisation and creativity. In addition, collaborative projects for which the Eastern European partners have virtually no resources at their disposal permit comparative studies or access to research objects such as ecosystems or patient pools. SCOPES contributes to further increasing the performance and competitiveness of Eastern European partners, in preparation for future collaboration in EU Framework Programmes for Research.

Through the Swiss Programme for Research on Global Issues for Development (r4d) the SDC and the SNSF jointly support partnership projects between researchers in Switzerland and in developing and emerging countries in Africa, Asia and Latin America. r4d promotes

development-relevant research on global issues which through new insights and innovative approaches contributes to sustainable global development. The focus is on reducing poverty and protecting public goods in developing countries. There are five main topics: poverty reductions, food security, supply and financing mechanisms in health care, sustainable use of ecosystems and the mechanisms underlying causes and solutions in social conflicts. Resources are also available for projects on topics freely chosen by researchers.

Regarding bi- or multilateral agreements or programmes among EU-MS and AC, the SNSF reached an agreement with Germany (DFG) and Austria (FWF) concerning joint financing of bilateral or trilateral projects. Moreover, bilateral Lead Agency agreements were signed with the National Research Fund (FNR) of Luxembourg and the French National Research Agency (ANR).

#### 40. Interoperability, mutual recognition of evaluation results and other schemes

The mutual recognition of evaluations is becoming more and more important. For instance, the SNSF developed procedures with Germany (DFG) and Austria (FWF) concerning joint financing of bilateral or trilateral projects, where submission and evaluation takes place in one of the three countries, while funding is on national basis (lead agency procedures) or from the country where most of the research is performed (money follows cooperation line procedure). Moreover, bilateral Lead Agency agreements were signed with the National Research Fund (FNR) of Luxembourg and the French ANR. With some other countries discussions with regard to the mutual recognition of evaluations are underway.

#### *Common funding principles to make national research programmes compatible, interoperable (cross-border) and simpler for researchers*

International integration and mobility are increasingly fundamental to researchers. In many areas of specialisation international contacts are a precondition for excellent research. Through the association Science Europe, which groups together its sister organisations, the SNSF as part of the Grant Union is working to improve the institutional framework conditions for international research. Existing agreements serve to promote mobility within Europe (the Money Follows Researcher scheme) and to facilitate joint research projects with specific countries (Lead Agency or Money follows Cooperation Line). The SNSF is working to extend these agreements, also to G8 countries.

As mentioned above, the SNSF has signed a trilateral agreement with the Deutsche Forschungsgemeinschaft (DFG) in Germany and the Austrian Science Fund (FWF). A bilateral agreement has been signed with the National Research Fund (FNR) of Luxembourg. The agreements allow researchers in these countries to submit a joint proposal to only one of the funding agencies, the "Lead Agency". The Lead Agency is the funding agency that, in case of approval, will fund the largest part of the project. It evaluates the entire proposal independently. The partner organisation accepts the outcome of the evaluation and, in case of a positive result, each organisation funds the part of the project that is conducted in its country.

Moreover, an other agreement allows Swiss researchers and their French partners to jointly submit an application to a single organisation, the "Lead Agency". The SNSF and the ANR have agreed to take turns as the Lead Agency on a yearly basis.

For researchers moving abroad, it is possible to transfer Swiss National Science Foundation (SNSF) funding to finalise the project. SNSF funding for stays abroad is not restricted to the European Union, allowing outward mobility to third countries as well.

Regarding the Money follows Cooperation Line, this is currently possible in Germany and Austria (very small sub-projects) and in the UK (only in the humanities and social sciences).

The Money follows Researcher process is aimed at researchers who move abroad and would like current SNSF funding to continue. In principle, a continuation of the project is possible in any country. The project can either continue in Switzerland while being managed from abroad or transferred to the new location.

### **Priority: Research Infrastructures**

#### 41. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest

In October 2013 the Federal Council approved Switzerland's participation in ELIXIR and authorised the State Secretariat for Education, Research and Innovation to sign the international ELIXIR Consortium Agreement.

##### a. Participation in the development and operation of EIROs

Moreover, Switzerland successfully participates in all of the eight EIROforum organisations which have extensive expertise in the areas of basic research and the management of large, international infrastructures, facilities and research programmes. These research infrastructures are the European Laboratory for Particle Physics in Geneva (CERN), European Space Agency in Paris (ESA), European Southern Observatory in Garching and Telescope in Chile (ESO), European Synchrotron Radiation Facility in Grenoble (ESRF), European X-ray Free-Electron Laser in Hamburg (European XFEL), Institute Max von Laue - Paul Langevin in Grenoble (ILL), the European Molecular Biology Conference in Heidelberg (EMBC), and EUROfusion (Swiss fusion research).

##### b. Participation in the development and operation of Research Infrastructures included in the ESFRI Roadmap

On the basis of the Swiss Roadmap for Research Infrastructures (update of March 2012), in the parliamentary bill on the promotion of education, research and innovation for 2013-2016 ('Message on the promotion of education, research and innovation for 2013-2016' - ERI) the federal government confirmed its financial commitment to the construction and operation of regional, national and international research infrastructures of pan-European interest. The SERI can mandate the SNSF to finance research infrastructures in particular subject areas relating to the Swiss roadmap for research infrastructures and to the ESFRI Roadmap

(European Strategy Forum on Research Infrastructures). In the period 2013 to 2016, according to the ERI bill, the SNSF will support Switzerland's participation in the European Social Survey (ESS), the Survey of Health, Ageing and Retirement in Europe (SHARE) and the Integrated Carbon Observation System (ICOS), as well as in the Biobanking and Biomolecular Resource Research Infrastructure (BBMRI), and the European Clinical Research Infrastructures Network (ECRIN).

c. Participation in ERICs

ESFRI has introduced a new legal framework (ERIC) for European Research Infrastructures of the ESFRI Roadmap which is based on European law. Switzerland intends to participate in several of these research infrastructures. However, some legal issues of the ERIC framework do not correspond with Swiss Law, which leads to the situation that Switzerland currently lacks the legal basis for participation in these projects. Enabling the Swiss participation in ERIC research infrastructures means adapting the Swiss law on research and innovation, which needs the approval of the Federal Parliament. Currently, the issue is in inter-ministerial discussion. The decision concerning the Swiss participation in ERICs will be known by the beginning of 2015 at the latest.

42. Access to Research Infrastructures of pan-European interest

Switzerland also invests funds in national top research infrastructures accessible to foreign partners such as Swissfel, Swiss Light source, CSCS (Centro Svizzero di Calcolo Scientifico/Swiss National Supercomputing Centre) and others. Swiss research infrastructures are generally accessible to foreigners, also through funds granted by EU research programmes. Nationals from EU/EFTA States can benefit from the agreement on the free movement of persons to establish themselves in Switzerland.<sup>11</sup>

**Priority: Open labour markets for researchers**

43. Open, transparent and merit based recruitment of researchers

All universities and most of the other research institutions have signed the Charter for Researchers and the Code on Conduct for the Recruitment of Researchers of which Switzerland was an early adopter. Rules concerning academic staff at Swiss universities make little or no distinction between Swiss and foreign applicants. There are no recruitment procedures that may hinder the openness or discourage participation of non-national applicants. Within the framework of the Swiss-EU Bilateral Agreement on Free Movement of Persons<sup>12</sup>, Switzerland has adopted the EU's system of mutual recognition of foreign qualifications issued by EU member states. Third-country nationals are also entitled to apply for recognition of their foreign qualifications in Switzerland.

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<sup>11</sup> The acceptance of the mass immigration initiative on 9 February 2014 by Swiss voters has put the Swiss-EU Bilateral Agreement on Free Movement of Persons in question. The initiative requires the re-introduction of fixed quotas for immigrants, and thus a suspension of the Free Movement of Persons.

<sup>12</sup> See footnote above

As a general rule any scientist working in Switzerland, regardless of their nationality, can apply for funding from the Swiss National Science Foundation (SNSF) and other public funding sources.

#### 44. Cross-border access to and portability of national grants

With respect to the portability of grants, the main principle for most European countries is Money Follows Researcher: researchers who move abroad can ask for ongoing SNSF funding to continue. All SNSF grants are portable to other countries (worldwide) under the EUROHORCS ‘Money follows researcher’ scheme if the project leader moves to another country during the grant period. The project leaders can either manage the project from abroad or take the funds – including employees – to their new institution. In 2013, 16 SNSF grants were transferred in this way (compared to 15 SNSF grants in 2011), with a total transferred amount of CHF 1.9 million (some EUR 1.54 million; compared to CHF 2.2 million in 2011). Funding of whole research groups based abroad is generally not allowed, though the Sinergia instrument allows funding of a single research group based outside Switzerland but within a consortium of Swiss-based research groups.

Switzerland has also been active in the EURAXESS initiative since 2008. Swiss universities act as country coordinator and has also issued Euraxess Zurich the mandate to participate in the Euraxess TOP 2 project (Enhancing the Outreach and Effectiveness of the Euraxess Network). More detailed information can be found in the country profile for Switzerland in the Researchers’ Report 2013.<sup>13</sup>

#### 45. Support structured innovative doctoral training programmes

The Swiss University Conference Programme “Doctoral Programmes” (2012/2013-2016) run by the Rectors’ Conference of the Swiss Universities (CRUS) is the successor to the former ProDoc Programme (2008-2011). The Programme supports universities in the creation and development of interuniversity doctoral programmes in order to strengthen research networking and improve the integration of doctoral students. The long-term objective of the Programme is to offer appropriate training schemes to all doctoral students, including those in humanities and social sciences and, in this way, to strengthen doctoral education and the career prospects of doctorate holders.

At the same time, the skills and competencies of researchers are increasingly becoming an explicit part of doctoral training. This aspect is given special consideration in the development of new doctoral programmes. All Swiss universities share the same objectives in relation to doctorates. These are laid down in the joint position paper by the Swiss universities on the Doctorate: “Excellence through Research”<sup>14</sup>. These are in line with the position of European countries within the Bologna framework.

It defines the purpose of the doctorate as being to:

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<sup>13</sup> <http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies>

<sup>14</sup> Available at: <http://www.crus.ch/dms.php?id=6872>, version of 17 January 2014.

- develop academic skills, especially the ability to carry out independent scholarly research;
- acquire subject-specific (disciplinary and interdisciplinary), methodological and transferable knowledge and skills;
- promote academic collaboration and networks with other doctoral candidates as well as with researchers and specialists in Switzerland and abroad.

The doctorate qualifies candidates for research-based professions at universities or other institutions (public sector, private enterprise, administration) and enables them to take on diverse high-level responsibilities and functions.

The mentoring programmes of the Swiss University Conference Sub-programme Equal Opportunity at Universities 2013-2016 offer structural courses to improve the necessary skills of young (women) academics.

#### 46. Support mobility between private and public sector

In general, Swiss Universities (not considering Universities of Applied Sciences) focus on basic research whereas the private sector mainly undertakes applied research. This division guarantees a complementarity between Universities and the private sector, where proximity between both sectors is sought. For instance, the pharmaceuticals industry collaborates closely with Universities throughout Switzerland (notably in Basel, Zurich, Geneva), and there are e.g. common research labs of IBM and the ETH Zurich. Mobility between the private sector and Universities takes thus place on an ad-hoc basis.

More established programmes exist with regard to the Swiss Universities of Applied Sciences: Researchers working in the Universities of Applied Sciences have gained experience in higher education teaching and in the private sector ('double profile'). Thus, almost all researchers have moved at least once from business to the public sector and vice versa during their career. Moreover, researchers maintain close contacts with the business sector and the labour market in general, as most research projects are carried out in collaboration with external partners (both industrial and in areas such as health or social work).

The following key programmes have been designed to boost collaboration between academia and industry, and to foster doctoral training in cooperation with industry:

- Commission for Technology and Innovation (CTI): The CTI supports R&D projects, and encourages entrepreneurship and the development of start-up companies. It runs a coaching scheme that leads to the award of the CTI Start-up Label, which is to help start-ups attract venture capital. Moreover, it helps optimise knowledge and technology transfer through the use of thematic and regional networks and platforms with a budget of some EUR 125 million. The CTI funds the Universities of Applied Sciences in the execution of research projects in close



collaboration with industrial partners. 51.1 per cent of CTI project funding went to Universities of Applied Sciences in 2013<sup>15</sup>.

- KTT Initiative (CTI) : This fosters the transfer of Knowledge and Technology Transfer (KTT) between the Universities and regional businesses. KTT consortia support SMEs and the Universities in establishing contacts and developing projects.
- National Research Programmes (SNSF): The National Research Programmes promote innovative solutions aimed at solving Switzerland's most pressing problems in collaboration with industrial partners.
- Venturelab (IFJ Startup support) : Venturelab was launched in 2004 as a national training program for innovative high-tech startups. Working in close partnership with the CTI, Venturelab organises venture ideas and venture challenge training modules at universities all over Switzerland. In addition, Venturelab provides high level training programmes for industry partners and corporate clients. Venturelab is run by IFJ (Institut für Jungunternehmen/Institute for Start-ups)
- BREF Programme (Gebert Rüt Foundation + Rectors' Conference of the Swiss Universities of Applied Sciences (KFH)): The BREF Programme promotes collaboration between Switzerland's business sector and/or society and the Universities of Applied Sciences.

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<sup>15</sup> CTI Activity Report 2013, <http://www.kti.admin.ch/dokumentation/00077/index.html?lang=en>

## **Priority: Gender balance and gender contents in research**

### 47. Foster cultural and institutional change on gender

#### a. National policies on gender equality in public research

The Swiss Federal Equal Opportunity at Universities Programme has been designed to promote gender equality at Swiss universities since the year 2000. For the years 2013-16, the Swiss federal government has allocated CHF 9.8 million to support the universities in their work to promote and ensure gender equality. Pending decisions by the Swiss University Conference (SUC) and the Federal Parliament, the State Secretariat for Education, Research and Innovation (SERI) oversees the disposition of the funds to the universities through the Rectors' Conference of the Swiss Universities (CRUS). Universities receiving federal funding must dedicate matching funds to gender equality work (usually 50 per cent over the four-year period).

The goal of the Federal Program is to achieve a quota of 25per cent female professors at Swiss universities, and 40per cent women at the level of assistant professor; in addition, the proportion of women in leading academic positions and management bodies at universities and related institutions should be increased. At present, however, these goals have not yet been reached.

For the years 2013-16 the federal government only provides funding for gender equality work done on the basis of the universities' individual action plans. The plans must address the issue of gender equality on a structural level in all key areas of activity: teaching, research and outreach.

The document Standards for Action Plans 53/11 defines the following areas as eligible for funding:

- Establishment of gender equality in university structures and as part of the quality management
- Increasing percentages of women professors (including assistant professors), women in academic decision-making positions
- Training for PhD students and postdocs
- Work-life balance with respect to studying at university, pursuing an academic career, family and personal/private responsibilities
- Women and STEM (science, technology, engineering, mathematics)
- Human resources and organisational development
- Integrating gender aspects into teaching and learning (education) as well as research.

More detailed information can be found in the country profile for Switzerland in the Researchers' Report 2013 at <http://ec.europa.eu/euraxess/index.cfm/services/researchPolicies>.

Furthermore, the SNSF has adopted the principle of gender mainstreaming and defined gender equality as a target for all its bodies and across all its activities. It is closely monitoring developments both in Switzerland and abroad and adjusting its funding schemes to meet the changing needs of researchers.

#### b. Careers – Working conditions in public research

The SNSF has implemented a range of measures to increase the share of women in its funding schemes. This includes mentoring programmes offering personal support as well as specific schemes and measures to promote the research careers of women.

##### 48. Gender balance in decision making process

With appropriate measures, the SNSF aims to contribute to gender equality in research funding. It has adopted the principle of gender mainstreaming and defined gender equality as a target for all its bodies and across all its activities.

The Swiss National Science Foundation promotes a representative gender balance in the election of researchers in SNSF's evaluation committees. A decision by SNSF bodies not to include female researchers must be explicitly justified. The SNSF has defined its commitment to gender equality in a mission statement. Apart from the principles, the document also sets out gender equality standards and measures for research funding and the Administrative Offices.

With a view to finding new approaches to old challenges, the SNSF appointed a new Gender Equality Commission at the beginning of May 2014. This independent body composed of international experts will advise the SNSF on gender equality issues and help in developing new strategies.

##### 49. Gender dimension in research content / programmes

A National Research Programme (NRP) on gender equality is on-going in Switzerland.<sup>16</sup> The NRP "Gender Equality" (NRP 60)<sup>17</sup> aims to analyse gender equality policy and measures in Switzerland and to investigate the reasons for persisting inequalities between men and women. The research findings should inform the development of a sustainable gender equality policy. The research projects started in autumn 2010.

#### **Priority: Knowledge circulation**

##### 50. Open access for publications and data resulting from publicly funded research

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<sup>16</sup> <http://www.snf.ch/en/researchinFocus/nrp/nrp60-gender-equality/Pages/default.aspx>

<sup>17</sup> <http://www.nfp60.ch/E/Pages/home.aspx>

Research funded by the public should be publicly accessible as far as possible and, what is more, free of charge. The SNSF is has therefore formulated a policy striving to help establish open access, i.e. free access to scientific publications. It expects researchers to self-archive their publications and supports publication in OA journals.

With regard to Open Access, researchers funded by the SNSF are obligated as before to, at least, self-archive their work in addition to having it published for the first time in a journal (Green Road to OA). In line with the policy of the European Research Council, the SNSF is recommending solutions that involve short embargo periods of no more than six months. If there is an option to publish directly in an OA journal, the SNSF encourages researchers to choose this Gold Road through a new supporting measure: as of October 2013, researchers will be able to cover the corresponding publication costs through their project budgets. Along with most other European research funders, the SNSF continues to reject the option of OA of already published articles in a journal against a fee (hybrid OA) as it involves double payment for the same service.

As of 1 July 2014, researchers can also request funding for digital book publications when submitting their project proposal. Book publications resulting from projects submitted before 1 July 2014 or already approved ongoing projects can be funded through the scheme "publication grants" till the end of 2017.<sup>18</sup>

## 51. Open innovation (OI) and knowledge transfer (KT) between public and private sectors

### a. National support to KT and OI, TTOs and Private Public interaction

Several parliamentary motions were introduced in the past years to ensure greater transparency and cooperation in the area of research policy. The Federal Law on the Promotion of Research and Innovation (FIFG) specifies that research institutions must take care that their research results are available for the public. They also must support analysis and utilisation of research work.

To ensure greater transparency and cooperation in the area of research policy, the ARAMIS information system for government research ("Ressortforschung") makes information on research projects and assessments contracted or conducted by the federal administration accessible to the general public and project managers. The Federal Statistical Office (FSO) and the State Secretariat for Education, Research and Innovation (SERI) are able to use this detailed information for statistical and other assessment purposes.

Swiss universities, the Swiss Confederation, cantons with universities and the federal bodies responsible for education policy are cooperating, through the SWITCH Foundation, to

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<sup>18</sup> While the SNSF received numerous positive responses from the research community with regard to its new publication funding model, it also received more critical feedback, mainly from the humanities. The latter feared that the new model would make it more difficult to have scientific books printed. In addition, publishing houses in the humanities and social sciences felt that it threatened their core task. As a result, the SNSF reviewed its new publication funding model and adjusted it in certain points. It now envisages slightly higher financial contributions for guaranteed publisher services and a pilot project with the publishers. With the slightly increased grants and lump sums for publications, the SNSF aims to accommodate the interests and needs of the humanities:

promote optical fibre interconnection of universities, universal login procedures, the digital repositories library and applications of e-identity to academia.

The Swiss National Science Foundation (SNSF) fosters cooperation among researchers by using it as an evaluation criterion. Furthermore, it provides instruments explicitly requiring cooperation, notably the interdisciplinary instruments National Centres of Competence in Research (NCCR) and National Research Programmes (NRP). Most of the budget of the Commission for Technology and Innovation (CTI) is devoted to projects promoting cooperative research between higher education institutions and private companies, especially those without their own research capacity, essentially small and medium enterprises (SMEs). As of 2013, Swiss companies received additional long-term support for innovative activities when national thematic networks (NTNs), innovation mentors (IMs) and physical and web-based platforms for Knowledge and Technology Transfer (KTT platforms) were introduced. NTNs help establish contacts between businesses and public research institutes. Following a multi-stage assessment procedure in 2012, eight national thematic networks were recognised by the CTI: ‘Carbon Composites Switzerland’, ‘Inartis’, ‘Inno-vative Surfaces’, ‘Swiss Biotech’, ‘Swiss Food Research’, ‘Swiss Wood Innovation Network’, ‘Swissphotonics’ and ‘Logistics Network Association’.

#### b. Harmonise policies for public e-infrastructures and associated digital research services

The SWITCH foundation is the Swiss partner in the Géant Project and is connected to a number of important international internet organisations where there are particularly close links with DANTE, which operates the European research network. Furthermore, the Swiss National Grid Association SwiNG collaborates with the European Grid Initiative (EGI) . This collaboration is also reflected by the participation of SwiNG in the FP7 project „EGI-InSPIRE“.

#### 52. Federated electronic identities

Switzerland participates in the STORK 2.0 project that aims to take further steps for wider uptake of eID in Europe.

## Turkey

### Priority: More effective national systems

#### 1. Research and Innovation structure

The most important change in the political context and the Research and Innovation (R&I) structure is the establishment of Ministry of Science, Innovation and Technology (MoSIT) which replaces the existing Ministry of Industry and Trade (MoIT) with a decree law published in the Official Gazette on 3 June 2011. The science, technology and innovation-related duties of the MoSIT are defined as the development, implementation and coordination of the S&T and innovation policies, and the promotion of the R&D and innovation projects, activities and investments. All main actors in the system, including the Scientific and Technological Research Council of Turkey (TUBITAK) and the Turkish Academy of Science, are connected to the MoSIT. The Turkish Patent Institute (TPE), the National Metrology Institute (UME), the Turkish Accreditation Agency (TURKAK), the Turkish Academy of Science (TUBA) and the Turkish Standards Institute (TSE) which are government institutions related to R&D polices, are also affiliated to the MoSIT<sup>19</sup>.

The recent amendment promulgated in TUBITAKs legislation<sup>20</sup> in July 2012, aims to increase the functionality of TUBITAK in commercialization of R&D output in TUBITAK's research centres. Moreover, the amendments aim also at supporting venture capital funds<sup>21</sup>.

#### 2. National strategy for R&I

The National Science, Technology and Innovation Strategy 2011-2016 adopted in December 2010 by the Supreme Council for Science and Technology (BTYK) focuses on human resources development for science, technology and innovation, transformation of research outputs into products and services and enhancing interdisciplinary research, highlighting the role of SMEs, R&D infrastructures and international cooperation<sup>22</sup>.

Furthermore, the new decisions taken on the 24<sup>th</sup> BTYK held in August 2012 focus on increasing the quality of primary and secondary education, restructuring of abroad graduate scholarship programmes, of university entrance system and on the preparation towards participation to Horizon 2020. Furthermore, two additional decisions related to the previous ones were taken, namely the establishment of a coordination committee for integrity, harmonization and target orientation in R&D, innovation and entrepreneurship support mechanisms and improvement of public

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<sup>19</sup> Turkey ERAWATCH Country Report 2012

[http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report\\_0006?tab=reports&country=tr](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report_0006?tab=reports&country=tr)

<sup>20</sup> [http://www.tubitak.gov.tr/tubitak\\_content\\_files/mevzuat/yonetmelik/KANUN\\_278\\_temmuz-2012.pdf](http://www.tubitak.gov.tr/tubitak_content_files/mevzuat/yonetmelik/KANUN_278_temmuz-2012.pdf)

<sup>21</sup> Turkey ERAWATCH Country Report 2012

[http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report\\_0006?tab=reports&country=tr](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report_0006?tab=reports&country=tr)

<sup>22</sup> Ibid.

procurements to support innovativeness. The new decisions of the 25th BTYK are focused mainly on the e-government related issues. Furthermore, health becomes a priority area in S&T policies<sup>23</sup>.

### 3. R&I funding

Between 2000 and 2011, Turkey's total gross expenditure on R&D (GERD) has increased by more than 10 times on TL basis reaching €4,535m (TL11,154m) in 2011 according to the Turkish Statistical Institute (TURKSTAT). In 2010, GERD was €4,657.08 (TL9,267m). GERD/GDP ratio which is around 0.85 in 2010-2011. One of the reasons is Turkey's is the higher GDP growth rate. The average GDP growth rate between the last two years (2011-2012) is 8.85%. In order to increase the GERD/GDP, the growth rate of GERD should be higher than the GDP growth rate. Also, another reason is that the increase in GDP is not correlated with an increase in GERD.. In Turkey, higher education institutions (HEIs) still have higher share in performing R&D. 46% of R&D is done by HEIs in Turkey

The government earmarked an amount of €1.2b<sup>24</sup> (TL2.8b) for funding R&D in 2013<sup>25</sup>. The 2023 national R&D targets were set during the 23rd BTYK meeting held on the 27<sup>th</sup> of December 2011. The main R&D objective for 2023 is to reach the 3 % of GDP which is set by the Lisbon/Barcelona objectives. Moreover, the goal for the business R&D expenditures is to increase 2% of GDP. The target for the FTE researchers is to increase their number to 300,000 and for to private sector, to 180,000.

In 2011, 45.8% of R&D expenditures were funded by business enterprises, 29.2% by government sector, 20.8% by higher education sector, 3.4% by other national sources and 0.7% by foreign funds<sup>26</sup>.

### 4. Competitive funding through calls for proposals applying the core principles of international peer review

Turkish STI Policy and instruments have been recently reformed in order to reach national economic and social targets and gain competitiveness at international arena. Existing implementation mechanisms are being revised and new tools are being developed in order to increase the knowledge production and utilization capacity of Turkish Research Area (TRA) in general terms. Mainly Turkish STI policy aims to strengthen the institutional and legal structure of National Innovation System (NIS) to achieve its well-functioning as the initial step of the reform process in Turkey. A more competitive and performance based approach is built upon those attempts. In this vein, research funding modalities are also being revised in order to increase efficiency of the

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23 Turkey ERAWATCH Country Report 2012

[http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report\\_0006?tab=reports&country=tr](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report_0006?tab=reports&country=tr)

24 €1=TL2.3363 (Central Bank of Turkey's effective sale rate for 30.10.2012)

25 [http://www.tbmm.gov.tr/butce/2013/konusma\\_30\\_Ekim\\_2012.pdf](http://www.tbmm.gov.tr/butce/2013/konusma_30_Ekim_2012.pdf)

26 Turkey ERAWATCH Country Report 2012

[http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report\\_0006?tab=reports&country=tr](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report_0006?tab=reports&country=tr)

funding allocated to research and to utilize research results for social and technological problems Turkey faces.

a. Project-based funding in the country

Both institutional and project-based funding is available for universities and public R&D centres. For project-based funding, universities and public R&D centers apply to the programmes carried out by the Scientific and Technological Research Council of Turkey (TUBITAK). These programmes finance ‘bottom-up’/ ‘free funding’ projects. Nearly half of the state funding is allocated for competitive programmes. In 2011, nearly 37% of the state budget for R&D was allocated to project-based subsidies, while 25% was earmarked for public research institutes and 38% was allocated for universities (BTYK 23, 2011).

b. Use of core principles of international peer review

For the assessment of the projects TUBITAK uses external experts. The main selection criteria include the quality of the scientific, technological and economic aspects of the project; quality of the project planning, and quality of the applicant. External national experts are appointed for the assessment of the projects. With similar selection criteria, KOSGEB applicants are assessed by external experts together with experts from KOSGEB<sup>27</sup>.

5. Institutional funding based on institutional assessment

In this respect, there is a shift to competitive, target based, thematic approach in funding research. Traditionally TÜBİTAK follows a bottom up model in funding research; research groups who meet the criteria receive funding. Within competitive approach, new Research and Innovation funding programmes are launched; those are mission-oriented, thematic ones targeted to produce solutions to specific social and technological problems. They are opened in some prioritized topics such as electrical vehicles, mechatronics, energy storage, solar energy, coal technologies, underground water, erosion, and desertification. Competitive approach aims to fund the best research groups in those thematic, mission oriented, newly launched programmes. Funding goes to groups offering best methodologies and solutions as identified in the call topic. Those targeted calls also aim to enhance/realize coordination among previously funded R&D projects in Turkey.

Participation of international experts to evaluation panels is both legally and practically open and perceived as critical to assess the international competitiveness and novelty of the research and innovation projects. Peer reviews for allocating project-based funding may be carried out by national and/or international experts. TÜBİTAK can base funding decisions on the results of international peer review

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27 Turkey ERAWATCH Country Report 2012

[http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report\\_0006?tab=reports&country=tr](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/reports/countries/tr/report_0006?tab=reports&country=tr)



carried out by other organisations and those carried out under the responsibility of organizations other than hers. Thus international peer review process is both legally and practically accepted in the organization. Mostly the international peer review results are accepted while allocating national funds to ERA-NET projects, projects funded under JPIs and international S&T agreements. TÜBİTAK handles engagement of international experts as processes helping to carry towards internationalization and promotion of excellence at international standards. It helps to reach internationally accepted research norms, values, quality and it is deemed highly important for improving excellence in TRA.

For a more effective NIS, TÜBİTAK is planning a monitoring and impact assessment process concerning national research programmes. Those initiatives are directed towards elaborating and understanding the main results, output and in a broader perspective the impact of the research and innovation projects funded nationally. Impact assessment studies are designed to provide feedback for revising the existing mechanisms and devising new tools and policies for better results. Thus, it is believed to increase the efficiency of allocation of R&D funds.

### **Priority: Transnational Cooperation**

#### **6. Implement joint research agendas**

Framework Programmes (FPs) appear as the main tool for international cooperation in S&T. Turkey makes huge investments and efforts to make TRA actors exploit the benefits proposed by FPs such as networking, knowledge and technology transfer, joint innovation activities, access to new markets, etc. Other than FPs, TÜBİTAK carries out project based bilateral cooperation with 28 organizations from 24 countries, and it is in cooperation with 90 global and regional organizations through specific S&T agreements by the end of 2013.<sup>28</sup>

Moreover, between the years 2007-2012 TÜBİTAK participated in total 41 ERA-NETs in which 107 Turkish institutions participated through around 15.6 Million €. In 2012, 7.4 Million € are spent through bilateral cooperation and ERA-NETs which makes approximately 0.12% of R&D expenditure realized in 2012. Turkey participates in 9 Joint Programming Initiatives (JPIs) except Cultural Heritage JPI. Turkey also participates to Article 185 initiatives namely; Eurostars and EMPIR on European research on metrology in FP7 and its participation continues under Horizon 2020.<sup>29</sup>

Strategic Research Agendas SRAs are implemented jointly with JPI partners and joint research priorities are built within ERA-NETs and Article 185 initiatives. Common funding and evaluation principles applied in ERA-NET, JPIs and Article 185 initiatives together with partner countries add on further enhancement of cooperation among researchers from applicant countries.

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<sup>28</sup> TÜBİTAK Database

<sup>29</sup> TÜBİTAK Database

Turkey is represented in European Research Area Committee (ERAC) and its subcommittees as High Level Group for Joint Programming (GPC), Strategic Forum for International cooperation (SFIC), Knowledge Transfer Group, Steering Group For Human Resources and Mobility (SGHRM).

Besides, COST and EUREKA are critical tools for international cooperation in STI. Turkish research actors participate to 194 ongoing COST<sup>30</sup> actions and have 44 EUREKA projects and Turkey ranked as 4<sup>th</sup> most successful country out of 32 countries in EUREKA due to the statistics by the end of 2013. Turkey also participated to other cooperation programmes and activities like European Space Agency (ESA), European Molecular Biology Conference (EMBC), Black Sea Economic Cooperation, NATO, OECD, etc.

FPs and other international cooperation activities have the potential to contribute to structural reform process. Possibility to share best practices, enable policy learning, learn new methodologies in funding and evaluation processes. ERA-NETs and JPIs provide a valuable basis for programme and policy level coordination and learning. Thus, TÜBİTAK attach importance to those kind of collaboration possibilities especially with European partners.

### **Priority: Research Infrastructures**

7. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest

Research Infrastructures gradually gained weight in Turkish STI Policy agenda parallel to the encompassing reform process in recent years. Strategy of funding and developing Research Infrastructures (RIs) is mainly dealt with Development Plans.

During the Ninth Development Plan period from 2007-2013, a 2.4 billion TL (around 1 billion €) is spent for development of research infrastructures in universities and public bodies in priority technology areas identified by the above mentioned Development Plan and Supreme Council for Science and Technology. Currently there are 108 research infrastructures activated, 65 thematic RIs are being developed, and 97 advanced research center projects are underway. Those research centers are mainly on the areas of materials science, life sciences including biotechnology, aviation and space, information and communication technologies, defence industry and nanotechnology. On the other hand, research center laboratories are accomplished in 20 universities and in 62 university laboratories are being developed in order to enhance research capacity of universities.<sup>31</sup>

Ministry of Development is working on ESFRI Roadmap in order to build linkage between nationally funded Research Infrastructures and the platform. There is also an on-going preparation for ERIC regulation in Turkey.

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<sup>30</sup> TÜBİTAK Database

<sup>31</sup> 10th Development Plan of Turkey (2014-2018), pp. 96, 97

Under the Research Infrastructures scheme of the 7<sup>th</sup> Framework Programme (FP7) 38 projects are funded from which Turkish partners could get 8.8 million € 300 researchers from Turkey could get access to leading European research infrastructures and 12 research institutes did get 10.9 million € direct infrastructure and capacity building support under Research Potential (RegPot) Programme.<sup>32</sup>

### **Priority: Open labour markets for researchers**

#### **8. Open, transparent and merit based recruitment of researchers**

According to the Council of Higher Education (HEC) regulations, all open research positions in public universities must be announced on the website of the universities at least 15 days prior to the application deadline<sup>33</sup>.

TÜBİTAK is the EURAXESS Network coordinator in Turkey. Interested researchers can find online information<sup>34</sup> regarding accommodation, day care and schooling, intellectual property rights, language courses, recognition of qualifications, salaries and taxation, social and cultural aspects, social security, pension rights and healthcare, visas and work permits<sup>35</sup>.

Although Charter and Code (C&C) is not binding for Turkey, in the light of integration with Europe, C&C principles are applied in most of the institutionalized research organizations in their recruitment process.

A new legal arrangement is realized to enable foreign researchers or experts to easily come, get residence permit and work in Turkey for certain periods of time for projects funded under European Union Programmes. This special residence permit rescues researchers from red tape to apply for a work permit and facilitates the process for researchers coming to Turkey in EU funded projects including Framework Programmes.

To support brain gain, TÜBİTAK also put in use new research funding and fellowship programmes similar to Marie Curie funds. This national programme is specially targeted to Turkish researchers in USA, Japan, Canada and other countries and became very successful in bringing these researchers to TRA, thus ERA. Under this programme “2232-Brain (Incoming Research Fellowships for Turkish Citizens) additional financial support provided to researchers besides their salaries for 4 years, those returned to Turkey from abroad.

TÜBİTAK also launched a new process with universities, academic organizations and leading industrial organizations to attract researchers from USA, Canada and Japan. Leading Research institutes in Turkey are negotiated to create job opportunities for qualified Turkish researchers in those developed countries. TÜBİTAK demands those kinds of job advertisements in every three months and shares job opportunities with

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<sup>32</sup> TÜBİTAK Database

<sup>33</sup> EURAXESS Turkey country profile [http://ec.europa.eu/euraxess/pdf/research\\_policies/country\\_files/Turkey\\_Country\\_Profile\\_RR2013\\_FINAL.pdf](http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Turkey_Country_Profile_RR2013_FINAL.pdf)

<sup>34</sup> <http://euraxess.tubitak.gov.tr/euraxess-turkey>

<sup>35</sup> Ibid.

the targeted researchers. Currently an online platform is being prepared to widely distribute those kinds of job opportunities to a wider community. Platform will be finalized at the end of this year. It will greatly enhance the brain gain process for TRA.

In order to strengthen quantitatively and qualitatively the human potential in research and technology in Turkey, the Scientific and Technological Research Council of Turkey (TÜBİTAK) encourages researchers worldwide to come and visit the Turkish Research Area.

To achieve the aim of making Turkey more attractive for top researchers, TÜBİTAK provides various fellowships as well as coordinating the dissemination of EU Framework Programmes funds. Moreover, Research Performing Organizations including, Universities, Research Institutes and Industrial Organizations located in Turkey provides special research positions only for the researchers having international research experience.

This website, giving information about the “National and European Funding Mechanisms”, presents attractive research vacancies for researchers, living and conducting active research abroad, who wish to be integrated into the Turkish Research Area, to spend his/her sabbatical in Turkey, to spend the summer in Turkey, or to collaborate with Turkish Research Area.

With the help of this online platform, researchers looking for a position or a fellowship will reap the benefit of being able to find them in a proper portal as well as the Research Performing Organizations will take advantage of this website, by publishing vacancies for the specific research group who has international research experience.

In FP7 Marie Curie Programme 293 project could get 38.9 million € from Turkey. Those projects helped to build career perspectives for researchers, enhance their intellectual capabilities and international visibilities. Through FPs, international agreements or brain circulation activities, internationalization in R&D is perceived as a profound process to enhance national STI capabilities, reach to global knowledge and provide access to networks and follow up latest technological developments. Internationalization in STI mostly with Europe attached great importance to reach national economic and social objectives in mid to long term.<sup>36</sup>

## 9. Researchers careers

According to TURKSTAT (2012), 58% of researchers are employed in universities, 33% in the private sector and 9% in government.<sup>37</sup>

Turkey has bilateral social security agreements with 21 countries. Citizens of countries which have signed social security agreement with Turkey based on the principle of reciprocity can certify that they are subject to insurance in their own country<sup>38</sup>.

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<sup>36</sup> TÜBİTAK Database

<sup>37</sup> EURAXESS Turkey country profile [http://ec.europa.eu/euraxess/pdf/research\\_policies/country\\_files/Turkey\\_Country\\_Profile\\_RR2013\\_FINAL.pdf](http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Turkey_Country_Profile_RR2013_FINAL.pdf)

<sup>38</sup> Ibid.

#### 10. Cross-border access to and portability of national grants

In the past, foreign researchers conducting projects funded by TÜBİTAK were at a disadvantage compared to Turkish researchers, as they were not entitled to obtain the 'Project Incentive Bonus'. The relevant regulation was recently amended<sup>39</sup>.

#### 11. Support mobility between private and public sector

The support schemes for incoming; outgoing and reintegration fellows are coordinated in TÜBİTAK by BİDEB (The Science Fellowships and Grant Programmes Department). BİDEB implemented more than 25 science fellowships and grant schemes for research careers. Nearly half of these Programmes are national grants for Turkish citizens. Within these programmes, undergraduate, graduate and postdoctoral studies of the researchers and scientific events are supported by TÜBİTAK.

#### **Priority: Gender balance and gender contents in research**

National policies do not address specifically the gender equality in research. Therefore, there are no direct support programmes for the gender equality, nor a special set of rules for regulating the working conditions of female researchers.

## **Priority: Knowledge circulation**

### 12. Open access for publications and data resulting from publicly funded research

Turkish Academy network and Information Center (ULAKBİM) under TÜBİTAK aims to build research and education networks among research organizations and universities, and enable linkage of those institutes with their national and international counterparts. It aims to provide information technologies support as well as necessary documentary services including access to knowledge to foster production of scientific knowledge in Turkey. TÜBİTAK provides digital services as scientific publications repository, research data repository and computing services. Some of the scientific publications provided by TÜBİTAK is available online and free of charge and the institution also makes research data online and free of charge.

#### **ULAKNET**

The Turkish Academic Network and Information Centre (ULAKBİM) was founded as a R&D Facility Institute in 1996. ULAKBİM's main objectives have been set as operating a high speed computer network enabling interaction within the institutional elements of the national innovation system, and providing information technology support and information services to help scientific production. ULAKBİM consists of National Academic Network (ULAKNET) Unit, which undertakes the task of formation and operation of research and education network infrastructure in Turkey. The number of users of ULAKNET has reached to approximately 3 million in 2012.<sup>40</sup>

#### **Cahit Arf Information Center (CABİM)**

Cahit Arf Information Center provides information and document delivery services nationwide, using traditional and electronic means, in order to meet the information needs of academia, public and industrial sectors, and to contribute to the production of scientific information in Turkey. In 2012, approximately 125.000 people benefitted from the services of the Center.<sup>41</sup>

To create equal opportunity of access to academic information resources for researchers within Turkey, TÜBİTAK EKUAL (Electronic Resources National Academic Licence) Project is implemented in the center. Within this project 17.739 electronic journals are accessed from databases together with 51 million bibliographical records and 1.2 million conference proceedings etc.<sup>42</sup>

#### **Turkish National e-Science e-Infrastructure (TRUBA)**

Turkish National e-Science e-Infrastructure (TRUBA) Strengthening Project mainly aims to meet the needs of researchers who carry out the studies in Turkey, ongoing national and international projects on high performance computing, distributed computing and

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40 ULAKBİM Activity Report 2012: [http://ulakbim.tubitak.gov.tr/sites/images/faaliyet\\_oz\\_12.pdf](http://ulakbim.tubitak.gov.tr/sites/images/faaliyet_oz_12.pdf), p. 1.

41 ULAKBİM Activity Report 2012: [http://ulakbim.tubitak.gov.tr/sites/images/faaliyet\\_oz\\_12.pdf](http://ulakbim.tubitak.gov.tr/sites/images/faaliyet_oz_12.pdf), p. 7

42 Ibid., p. 8

scientific data warehouse. The project is the continuation of the developed project TR-Grid Research e-Infrastructure Strengthening (TR-Grid ReIS). During this project, administrative and technical motivation which was generated in TR-Grid ReIS project will be maintained increasingly and TRUBA computing and storage resources for national researchers will be increased to be equivalent as resources available at few centers in Europe. In 2010, this e-infrastructure provided services to 78 different public institutions.<sup>43</sup>

### 13. Open innovation (OI) and knowledge transfer (KT) between public and private sectors

In 2012, TÜBİTAK launched a programme<sup>44</sup> which offers grants of up to 1 million TL per year to universities to encourage them to establish new Technology Transfer Offices (TTO) and to develop existing ones. The programme aims to facilitate collaboration between universities and industrial enterprises and allow industry to benefit from new information-based technologies. The TTOs supported under the programme receive a grant of up to 1 million TL per year from TÜBİTAK. Based on results of yearly evaluations, the support period can be extended up to 10 years. The scope of the grant covers personnel expenses, transportation, subsistence and accommodation costs, tools, equipment, software, purchase of publications, service fees, meetings, presentations and organisational expenses, certified financial consultancy fees, and general expenses.

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<sup>43</sup> Ibid., p. 1

<sup>44</sup> [http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country\\_pages/tr/supportmeasure/support\\_0045?tab=template](http://erawatch.jrc.ec.europa.eu/erawatch/opencms/information/country_pages/tr/supportmeasure/support_0045?tab=template)

## **ERA Progress Report 2014 SERBIA**

### **Priority: More effective national systems**

#### **53. Research and Innovation structure**

The Serbian research system consists of three operational levels. The first level of governance and the highest legislative authority is the Serbian National Parliament. The Committee for Science and Technological Development (Nacionalni komitet za naučni i tehnološki razvoj) is in charge of proposing laws that regulate the area of science, technology and innovation. At the ministerial level, the Ministry of Education, Science and Technological Development (Ministarstvo prosvete, nauke i tehnološkog razvoja - MESTD) governs the functioning and development of science and technology in Serbia.

The National Agency for the Regional Development (NARD) and Innovation Fund (IF) of the Republic of Serbia are to a limited extent also relevant innovation policy institutions, although their main activities are in funding innovation activities on the operational level.

Policy formulation and implementation institutions include the National Council for Science and Technological Development (NCS) and the National Council of Higher Education (NCHE) which are the highest advisory bodies in their respective fields.

The operational level consists of intermediary and funding organisations. Research performers are private and public research organisations in the government, higher education and the business enterprise sector. R&D organisations in the public sector form a block which comprises seven public universities with 78 faculties, the Serbian Academy of Sciences and Arts with its 10 scientific institutes, 28 other scientific institutes, a centre of scientific excellence, 30 research institutes, 65 innovative organisations, five business associations for support of innovation and 107 registered innovators. It also includes scientific and technical infrastructure that encompasses: the academic intranet, a gene bank, an accelerator, libraries of the institutes and faculties, the University Library and the National Library of Serbia, which boasts the KoBSON network that provides access to scientific and technological information worldwide. R&D organisations in the private sector include seven private universities with 45 faculties, research resources of foreign companies in Serbia and research and innovation resources of domestic firms.

The Science Law as well as the Innovation Law in the Republic of Serbia defined MESTD as the main and the only governing institution in the country, responsible for R&D and Innovation activities. Research governance was transferred to the level of Autonomous Province of Vojvodina (APV) to a limited extent, as it was defined by the law on the regulation of jurisdictions of the APV, adopted by the Parliament of the Republic of Serbia on November 30, 2009. According to this regulation, the creation of the Strategy for technological development of the APV must be harmonized with the national S&T strategy. Additionally, (co)funding for establishment of high-tech installation, building homes for young scientists, and for international S&T cooperation, as well as (co)funding of R&D activities was regulated. The law introduced a definition and enabled funding of programmes important for APV in the area of S&T and regulated the establishment of the innovation fund based on local revenues, as well as establishment of local R&D centres and popularization of S&T activities. Finally, the law directed financial support to the Academy of Sciences and Arts of the APV.



#### **54. National strategy for R&I**

The Strategy for Scientific and Technological Development 2010-2015 is the key policy document which provides a vision of scientific and technological development for the Republic of Serbia by defining four main points: focus, partnership, innovation and investments. Measures for implementation of the Strategy are specified in the corresponding action plan. The main framework of the strategy encompasses focus and cooperation, thus with these two main topics the government wants to regulate S&T nation focus and priority areas and encourage cooperation on the national and international level in different aspects (i.e. universities, knowledge transfers, industry-academia collaboration, joint research endeavours, etc.). The restructuring of the public R&D system together with harmonised efforts toward recognition and integration of the business R&D sector into the national innovation system is a key objective of government strategy for S&T development in the Republic of Serbia until 2015.

Another important document for the scientific and technological development is the Strategy for Higher Education 2020. Additionally, a new Strategy for Scientific and Technological Development for the period 2016-2020 titled “Research for Innovation 2020” is in preparation.

#### **55. R&I funding**

The Government budget appropriations or an outlay for research and development (GBAORD) as a share of Gross Domestic Product (GDP) was 0.34 per cent in 2013. This percentage has increased to 0.5 per cent through additional investment of credit funds in infrastructure and scientific and research equipment, donations and IPA funds. The ambitious 2015 target, set by the Strategy, to reach a 1.05 per cent of GDP will not be achieved. The adjusted 2015 target is 0.56 per cent of GDP.

The Serbian budget allocations for science grew significantly, from the sum of €28m in 2001, to about €100m in 2008 and 2009. During that eight-year period, there was a substantial growth in salaries of researchers, and almost €30m were invested in capital equipment for scientific research work (SSTDRS, 2010). The Project of Infrastructural Investments, worth EUR 400 million started in January 2010 and will last until the end of 2015 (SSTDRS, 2010). According to the data provided by the national statistical office, in 2011 the share of higher education sector expenditures for Research and Development (HERD) was 56.71 per cent of GERD (24.14 per cent in EU27), much higher than the BERD share (9.38 per cent) of GERD (62.07 per cent in EU27). Governmental expenditure for R&D was 33.77 per cent (12.81 per cent in EU27), whereas the private non-profit (PNP) sector amounted to 0.13 per cent, a negligible share of GERD in the same year (0.99 per cent in the EU27).

Despite the economic crisis, the overall public R&D expenditure in Serbia has been increasing over the past years. The biggest jump was seen in 2011 when the budgetary allocations increased by 22 per cent in comparison with 2010, following the government obligations which are the research infrastructure through financial agreements with the European Investment Bank and the Council of Europe Development Bank with a total value of €305m to be implemented in 2010-2015.

Investments in R&D and innovation in Serbia from public sources are prioritised and budgeted in the framework of multi-annual plans. Project financing is based on open competition for R&D and Innovation projects. There is no institutional, or block funding for R&D activities in Serbia.

The main challenge for funding research in Serbia in 2014 is increasing the R&D and innovation activity in the business enterprise sector (BES). Official figures show that BERD share in GERD in 2012 was only 24.97 per cent, which is very low compared to the EU average of 62.96. R&D activities in the Higher Education Sector are mostly financed from the government budget (69.51 per cent in 2012), with a small share from the industry (only 2.51 per cent) and surprisingly small share of financing from abroad (3.12 per cent in 2012 compared to 11.27 per cent in 2008). The private-non-profit sector makes the smallest contribution to R&D and was estimated to be 0.06 per cent in 2012.

#### **56. Competitive funding through calls for proposals applying the core principles of international peer review**

On the country level, there is no official information about the budget allocations of the MESTD budget. According to the yearly reports of the MESTD half of the budget share in 2009 was allocated to basic research and a 39.1 per cent was spent on applied research. Small proportions of 5.1 per cent and 5.3 per cent were distributed to developing human resources in science and international cooperation. Data for the more recent years are not yet available.

##### **a. Project-based funding in the country**

Investments in R&D and innovation in Serbia from public sources are prioritised and budgeted in the framework of multi-annual plans to ensure predictability and long-term impact. Project financing based on open competition for R&D and Innovation projects is decade's long practice in Serbia. There is no institutional, or block funding for R&D activities in Serbia. Programmes for the support of R&D and innovation activities co-financed by the MESTD, the Ministry of Economy and Regional Development (MFE) and the National Agency for the Regional Development (NARD) are not sector-specific.

The allocation of public research funding is competitive and implemented through open calls for proposals (project-based funding). Independent experts, two international and one domestic for each proposal, carry out evaluation of research proposals. Peer review is based on transparent evaluation criteria communicated in advance including adherence to international principles, research team competence, excellence, impact, quality and efficiency of the project implementation.

The adoption of the national R&D strategy brought several changes in budgetary commitments. A new grant programme for interdisciplinary and integral research has been introduced, taking up almost a third of national R&D financing addressed to realisation of the R&D and Innovation projects. The programme is designed to bring together teams from different institutions in addressing Serbia's R&D priorities.

##### **b. Use of core principles of international peer review**

There is no official data collected and calculated for GBAORD figures in Serbia. Figures used in different publications are estimations and calculations of experts and authors of different publications and reports. Calculations are based on the data provided by the Statistical Office of the Republic of Serbia. For 2011 GBAORD as per cent of GDP was 0.493 (EU average is 0.73), which is less than in 2009 (estimated 0.578 in ERAWATCH Country Reports 2012: Serbia, Kutlaca, 2014).

## **57. Institutional funding based on institutional assessment**

There was no significant funding for innovation activities in Serbia from any source other than MESTD, MFE and NARD. Additional to this, there is neither institutional nor block funding for R&D activities in Serbia. Public universities have the access to institutional funding but only for teaching and not for R&D activities.

In 2011 financial scheme for supporting the Innovation fund activities was negotiated with the World Bank, the European Investment Bank, and the European Commission. Preliminary negotiations were estimated at a total sum of €75.5m for the period 2011-2014. Initial funding is provided through the Innovation Serbia Project with €8.4m (Component 2: Support Human Capital Development and Research) and it is funded by the EU pre-accession funds (IPA) allocated for Serbia in 2011, and implemented with expert support of the World Bank. The IPA project will provide funding for capacity building of the Innovation Fund and implementation of financial instruments supporting enterprise innovation (MINI GRANTS and MATCHING GRANTS Programmes) by the Innovation Fund. Public call for MINI GRANTS programme has been launched in December 5th, 2011. Public call for the MATCHING GRANTS programme is launched in spring 2012. The aims of the Innovation fund of Republic of Serbia include development of innovative enterprises, creation and development of innovation system in Serbia, which is of key significance in gaining competitiveness of the economic sector, and contributions to the overall awareness of the role of technological development and innovation.

Programmes for the support of R&D and innovation activities co-financed by the MESTD, the Ministry of Finance and Economy (MFE) and the National Agency for the Regional Development (NARD) are not sector-specific.

In the area of institutional assessment, two independent bodies are carrying out the evaluation procedures such as initial accreditation, re-accreditation and thematic evaluations. These are the Commission for Accreditation and Quality Assurance (CAQA), which is a member of ENQA (European Association for Quality Assurance in Higher Education), and the Commission for Accreditation of Research Institutions.

### **Priority: Transnational Cooperation**

The most important instrument of transnational cooperation in the previous period was the Framework Program. Serbia has had the status of an associated country since 2007. Researchers from Serbia have achieved significant results in FP7 calls for proposals and, according to the latest statistics, participated in 317 projects of which 49 were SME grants. Achieved success rate was 15.2 per cent, which is lower than the EU average, but higher than in many of the countries in the Western Balkan (WB) region. Serbia expressed interest for association to Horizon 2020 and signed the Agreement with the European Union on July 1, 2014. Serbia participated in several ERA-NET Initiatives and is active in ERA governance bodies and in the FP Programme Committees.

Serbia participates in international large-scale research programmes and infrastructures, such as European Organisation for Nuclear Research (CERN). Serbian research groups are currently active in four CERN collaborations.

Serbia conducts international cooperation through bilateral and multilateral programs such as COST, EUREKA, NATO, etc. At the moment more than 400 experienced and young Serbian researchers participate in over 170 COST actions in 10 Domains. There are 16 active Eureka projects, and so far Serbian researchers have participated in 84 Eureka projects overall, involving 172 organizations. Related to the NATO-SPS program, Serbian researchers are involved in 22 running projects.

Related to the regional initiatives, Serbia has actively participated in the design of a Regional Strategy aiming at strengthening R&I cooperation at regional level with its Balkan neighbours.

Serbia has signed bilateral agreements for scientific cooperation with almost all WB countries and other EU countries. Serbian researchers are involved in 228 bilateral projects with 10 countries.

#### 58. Implement joint research agendas

The Serbian Ministry has recognised the need and is working towards ensuring an adequate supply of human resources for research and an open, attractive and competitive labour market for male and female researchers.

##### **a. Joint research**

Bilateral cooperation is implemented with a number of countries including Germany, Hungary, France, Slovakia, Slovenia, Croatia, Switzerland and Italy. In 2011 a call for S&T cooperation was launched with number of countries such as Spain, Portugal, Greece (new cycle), China, India, Croatia, Switzerland. Additional to that, framework agreements were drawn up with several other countries such as Austria, the Czech Republic, Portugal, Spain, Russia, and the USA.

##### **b. FRAMEWORK PROGRAMME**

###### **i. Joint programming initiatives**

Serbia participates in several international programmes, including 11 Framework Programme Seventh projects, COST, Eureka, NATO Science for Peace and Security and International Atomic Energy Agency (IAEA).

###### **ii. ERA-Nets**

Serbia participates in six ERA-nets, two of which are currently active. Serbia is a partner on ERA-CAPS: ERA-NET for Coordinating Action in Plant Sciences, started in 2011 with expected end in November 2014, and SAFERA: Coordination of European Research on Industrial Safety towards Smart and Sustainable Growth, from 2012 to 2015.

The network that ended include EUPHRESCO: European Phytosanitary Research Coordination II (2011-2014), SEE-ERA.NET: South East European ERA-NET (2004-2009), SEE-ERA.NET Plus: South East European ERA-NET Plus – joint call for European Research projects in September 2009 in order to enhance the integration of the Western Balkan countries into the European Research Area (2009-2013), and SEERA-EI: South East European Research Area for eInfrastructures (2009-2012).

#### 59. INTEROPERABILITY, MUTUAL RECOGNITION OF EVALUATION RESULTS AND OTHER SCHEMES

Serbia recognised the need to create and improve evaluation standards and principles as this was identified as one among the key challenges R&D and Innovation system. The instruments and mechanisms were also described as obsolete, making the internal system less credible. Work has been done with that regard. The accreditation procedure is obligatory for R&D, HE and registered innovation organisation: under the HE Law, for teaching competence: under the Science Law, for R&D competence; under the Innovation Law for innovation capacity.

Orientation on foreign programmes and projects (EU, WB, OECD, etc.) for support of innovation activities in the Republic of Serbia is acknowledged by the domestic governing institutions, but there is still work to be invested in harmonising the national innovation performance, priorities, needs and challenges with goals and activities of these international projects.

### **Priority: Research Infrastructures**

Serbia is a member of ESFRI and participates in two ERICs. In order to provide a strategic approach and policy support, it is planned to define a national Roadmap on Research Infrastructures as a part of IPA2013 project "Support to Innovation and Technology Transfer in Serbia" which also includes development of the National Strategy "Research for Innovation 2020". Through landing operations with EIB and CEB, Serbia has initiated significant investments in scientific equipment and infrastructure in support of R&I activities, such as the formation of Science and Technology Parks in university centres, establishment of Centres of Excellence, support for the Centre for talented pre-university students in Petnica, and the Centre for the Promotion of Science.

Under the Science and Innovation Law (2010), all research institutions in Serbia are obliged to acquire an accreditation. This requirement was set in order to improve the quality and excellence of knowledge production. The accreditation process is mandatory requirement for all organizations, institutions and companies that intended to apply for government support for R&D activities.

Serbia has 2 centres of excellence. The Centre for Mathematical Research of Nonlinear Phenomena is a research unit at the Department of Mathematics and Informatics, at the Faculty of Science, University of Novi Sad. The other one is the Centre for Solid State Physics and New Materials of the Institute of Physics Belgrade. Centres of excellence have for it main aim to act as disseminators of excellence in their surroundings and to contribute to the development of society and economy in Serbia. The future development should see opening of several new centres of excellence, as well as the creation and support of excellent research institutions engaged in effective public-private cooperation and partnerships, which will form the core of research and innovation 'clusters'.

One of the great challenges for Serbia is working towards the full utilisation of the research as well as full connectedness of the research and development with the social surroundings. The aims to that end are to have the Universities and research institutions embedded in the social and economic life where they are based, while competing and cooperating across Europe and beyond.

Another structural challenge that Serbian R&D and innovation landscape faces is the undeveloped infrastructure for innovative entrepreneurship and lack of culture for technological entrepreneurship in the higher education sector and public R&D laboratories and institutes (PRO – Public Research Organisations). Crucial steps forward in order to create an environment to support technological entrepreneurship are the changes in HE Law and Innovation Law that will stimulate and legally approve creation of university and PROs spin-offs. There are just few examples of spin-offs initiatives, such as within University of Novi Sad - Faculty of Technical Sciences and Mihajlo Pupin Institute in Belgrade. Until 2010 there are two only Technology Transfer Offices established in Serbia, one at the University of Novi Sad and the other at University of Belgrade. Since then, University of Niš opened a Centre for Technology Transfer to help in commercialisation of the research results, and University of Kragujevac developed a Centre for Knowledge Transfer with an overall objective to identify, protect and exploit intellectual gains of the science community. There are several science and

technology parks that are in different projecting and development phases (such as the ones in Zvezdara, Zemun, Indija, Vršac).

Overall assessment is that most of the private HE institutions are so-called “teaching” faculties/universities, with transmission of knowledge (teaching) as primary and only activity. Other two main missions: generation of new knowledge (research) and the 'third mission' (contribution to local or regional wealth and economic development) are mostly present in some of public HE institutions (ERA Serbia report, p.22).

#### 9. Financial commitments for the construction and operation of ESFRI, national, regional Research infrastructures of pan-European interest

MESTD announced a plan for other investments in R&D in Serbia in the period 2010-2015. The main sources of financing of the infrastructural projects which demonstrate and enable development of priority research fields in the next five years will be international financial institutions, and particularly the European Investment Bank, European Bank of Reconstruction and Development, the World Bank, Development Bank of the Council of Europe and various international donors, specifically EU pre-accession funds.

The Project of infrastructural investments, worth €400m started in January 2011 and will last until the end of 2015. Projects selected for this investment were those conducive to the development of priority disciplines, likely to ensure successful development and identification of scientific talent, prevent brain drain, and finally, projects which will make up for almost twenty years of scarce investment into scientific infrastructure. Main projects within the “Serbian R&D infrastructure investment initiative” are (SSTDRS, 2010):

- Serbian R&D infrastructure investment initiative comprises investments in upgrading existing capacities, for adaptation of existing buildings and laboratories and new capital equipment for research (app. €70m);
- Development of Excellence centre and academic research centres (app. €60m);
- Development of ICT infrastructure, for Campus for faculties of technical sciences of the University in Belgrade and Infrastructure for supercomputing initiative "Blue Danube" (app. €30m to €80m);
- Creation of a knowledge-based economy through the construction of science parks in Belgrade, Novi Sad, Nis and Kragujevac (app. €30m);
- Basic infrastructure projects, such as apartment buildings for researchers in Belgrade, Novi Sad, Nis and Kragujevac (app. €80m).

##### **a. Participation in the development and operation of EIROs**

Serbia has an industrial relations country profile on EIROnline database ([http://www.eurofound.europa.eu/eiro/country/serbia\\_1.htm](http://www.eurofound.europa.eu/eiro/country/serbia_1.htm)).

##### **b. Participation in the development and operation of Research Infrastructures included in the ESFRI Roadmap**

Serbia has signed a Memorandum of Understanding in 2006 for DARIAH – Digital Infrastructure to Study Materials in Cultural Heritage Institutions.

##### **c. Participation in ERICs**

Serbia is a part of CERIC-ERIC. The specific scope of this ERIC concerns the offer as an integrated service to external researchers of the access to synchrotron light and other microscopic probes for analytical and modification techniques notably for materials preparation and characterization, structural investigations and imaging in Life Sciences, Nanoscience and Nanotechnology, Cultural Heritage, Environment and Materials Sciences and to their various technological and industrial outcomes ranging from energy to biomedical and of interest to most manufacturing industries.

## 2. Access to Research Infrastructures of pan-European interest

There is no specific regulation to facilitate the integration of foreign researchers in the national research labour market, such as social security access, health insurance, compatibility of pension schemes, etc.

### **Priority: Open labour markets for researchers**

In 2014 the number of researchers full time equivalent (FTE) in relation to the total number of employees was 5.4 per 1000, while the number of new doctoral graduates is 0,19 per 1000 inhabitants.

From the legislative point of view, labour market in Serbia is open and recruitment process is transparent. In practice, open positions are often not published in a centralized way, but rather in local newspapers or institutional web sites in Serbian language. Serbian EURAXESS job portal is fully operational and ready to accept open positions data.

Five research and higher education institutions have signed the Declaration of Commitment to the Principles of the Researchers Charter and Code, out of which one was granted with the European Commission logo for the 'HR Excellence in Research'.

National grants and fellowships for researchers and PhD students are not open to non-residents. National funded grants or fellowships are not portable to other countries. However, there are special calls dedicated to foreign nationals. In 2013, the Ministry for Education, Science and Technological Development granted 29 scholarships for foreign postdoctoral students and support for 120 students and professors for international inter-university collaboration. In order to accelerate the acceptance of foreign researchers the procedure for faster recognition of foreign diploma or training qualifications has been implemented.

In 2013 MESTD funded participation of 4,177 young researchers in national projects, and additionally provided 596 scholarships for doctoral training programmes.

A great challenge for the Serbian scientific community is the extensive brain drain and ageing of research population. This issue is placed highly on the agenda and it is planned for the new Strategy to tackle these problems.

### **Priority: Gender balance and gender contents in research**

Serbia made a significant step toward improving the status of women. A set of legal and policy documents was adopted: Law on Gender Equality (adopted 11th December 2009), National Strategy for Improved Status of Women and Gender Equality Promotion (adopted 13th February 2009) and the Action Plan for Implementation of the National Strategy for Improved Status of Women and Gender Equality Promotion, for the period 2010-2015 (adopted on 26th August 2010).

In 2008 the Gender Equality Directorate is established within the Ministry of Labour and Social Affairs of the Republic of Serbia. Directorate provided trainings to the employees in civil service for the implementation of gender equality principle into programs, plans and operation of state institutions as well as program development and training for media representatives. Additionally, Directorate implemented various projects topics relevant for gender equality (the combat against sexual and gender-based violence, Project inception, Programme for implementation of NAP priority activities). Moreover, Directorate is involved in analysis of the gender dimensions of textbooks (from primary school to university), organizing conferences and debates on issues of gender equality, support the collection and presentation of gender analysis.

There are no special regulations for career breaks (i.e. parental leave) and this applies for any sector not only R&D. Restoration of the same position is guaranteed by the law and a fixed-term contract must be extended due to maternity leave.

### **Priority: Knowledge circulation**

The Serbian Government encourages Open Access (OA) to the results of publicly funded research. Leading R&D actors support the principle of OA described in the Berlin Declaration, e.g. University of Belgrade has signed the Berlin Declaration in November 2011.

Serbia has an active scientific publishing environment. Most of 400 active national professional journals have accepted OA as the publishing model. Full texts are available from Digital Repository of National Library of Serbia, where digital forms of all issues are deposited. Eight data repositories exist in Serbia, containing 10,200 deposited items, out of which 2,503 have OA.

The new Law on Higher Education, currently in the adoption process, will stipulate mandatory OA to all PhD theses promoted in Serbian universities. Several universities already have such repositories, such as Digital Archive of the University of Belgrade, PHAIDRA.

Regarding knowledge transfer between public and private sector, MESTD supports the creation and development of new small and medium-sized innovative companies, business incubators, science and technology parks, centers for technology transfer, organization for the encouragement of innovation activities in the priority areas of science and technology, research and development centres, innovation centres and technology companies.

Legal framework for innovation activities in Serbia is provided by the Law on Innovation Activity (Official Gazette RS, no 110/05, 18/10 and 55/13) and bylaws. The law regulates framework for formation of organizations for support of innovation activities and technology transfer centers. By this Law the Register of Innovative Companies was established, as well as the Innovation Fund. The main goal of the Innovation Fund is to encourage innovations and the provision of funding for innovation activities, primarily through cooperation with international financial institutions, organizations, donors and private sector. Currently, the Fund is implementing IPA 2011 Innovation Serbia project. A new IPA 2013 - Support for Innovation and Technology Transfer in Serbia project is under preparation.

Additionally, during the last 10 years, MESTD has been supporting The Best Technological Innovation Competition, in cooperation with the University of Novi Sad, Faculty of Technical Sciences, the Serbian Chamber of Commerce, the Intellectual Property Office of the Republic of Serbia, and the national Public TV broadcasting company.

In the area of intellectual property rights MESTD, in cooperation with the Intellectual Property Office, prepares and sends to the Government draft legislation on intellectual property rights, or suggested by-laws in this area. The Government has approved Strategy of



the Intellectual Property Development for the period of 2011 to 2015 with the corresponding action plan.

The most developed public e-infrastructure in Serbia is Serbian NREN (AMRES), which operates as a separate legal entity since 2010. The network infrastructure is fully integrated into the GEANT network, complying with the GEANT architecture and common services (such as eduroam). At the policy level AMRES, has, in 2014, developed Membership Agreement and Technical Service Agreement providing well defined framework for further collaboration with clear definition of obligations and responsibilities of all parties.

AMRES is responsible for development and operation of identity federation at the national level, which is already identified as one of the basic infrastructure for advanced digital services including further e-Science services. The existing AMRES infrastructure already supports eduroam federation with 41 connected institutions as Identity Providers (the biggest universities and faculties).

The most popular digital research service is KoBSON, which provides free academic access to scientific journals. It provides access to more than 35.000 scientific journals, 90.000 electronic books and its available 24/7. Also, on KoBSON website users can find links to books and journals from OA services like: DOAB (1614 titles), DOAJ (9967 journals), OAPEN books, FreeBooks4Doctors, CLC Disease Management Project etc.

The work on Web SSO (Single Sign-On) federation is continued through GEANT project and eduGAIN activity. Two institutions are included in the local pilot project, while establishing a national policy is the next priority on the roadmap of integration into pan-European eduGAIN federation. Promotion and establishing of digital identities in individual institutions, acting as Identity providers, and its inclusion into identity federation is an ongoing activity.