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International Cooperation in Research and Innovation

Swiss National ERA Roadmap

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1. Introduction

On 20 April 2015, the European Research and Innovation Area Committee (ERAC) presented the “European Research Area (ERA) Roadmap 2015-2020”.¹ The document was developed by ERAC in consultation with the other ERA related advisory groups² and most of the organisations making up the ERA Stakeholder Platform. It points out six ERA Priorities aiming at the further strengthening of the European Research Area. The Roadmap is designed to implement the provisions of the Treaty on the Functioning of the European Union (TFEU) (Articles 179, 180 and 181), which stipulate that the European Union shall promote scientific and technological advance and establish a European Research Area in order to strengthen the scientific and technological bases of the Union and their industry, and to make them more competitive.

A. Switzerland in the ERA

The Swiss government considers the further development of the ERA as an essential step towards the transition to a knowledge-based economy and society. In the ERA Roadmap and the Council Conclusions on the 2012 EC Communication “A reinforced European research area partnership for excellence and growth” from December 2012³ as well as the Conclusions on the EC report on “Progress in the European Research Area” from February 2014⁴, the Council recalled the importance of maintaining a close cooperation with Associated Countries in the development of ERA, and pointed out that their contribution is of extreme value to the entire process.

Switzerland has a long tradition of cooperation in research and innovation with European countries and the European Union and has contributed in many ways to the ERA, such as active participation in the ERAC as well as in the ERA-related groups. Switzerland has taken part in numerous reporting and evaluation exercises as well as in several working groups of the ERA-related groups aiming at the development of best practices through mutual exchange of experience. Moreover, Swiss science institutions feature prominently among the five European Stakeholder Organizations which are members of the ERA stakeholder platform, i.e. the European University Association (EUA), Science Europe, the League of European Research Universities (LERU), the European Association of Research and Technology Organizations (EARTO) and the Conference of European Schools for Advanced Engineering Education and Research (CESAER). Within these Organizations, Swiss research institutions have become valued interlocutors for the European institutions on various research topics related to EU research policy.

The most important instruments at European level to further develop the ERA are the EU Framework Programmes for Research and Innovation (FP). Participation in these programmes is one of the priorities of Swiss science policy. Researchers from Swiss institutions of higher education as well as the public and private sector have been involved in the EU Framework Programmes since 1987, either as associated or third country partners. With regard to the current programme generation “Horizon 2020”, Switzerland is for the time being and until the end of 2016 considered as a partially associated country. Thus, the Swiss government funds Swiss project participations in those areas of Horizon 2020 to which Switzerland is not associated. The full association of Switzerland to Horizon 2020 remains the aim of the Swiss government.

¹ ERAC 1208/15, available at: <http://data.consilium.europa.eu/doc/document/ST-1208-2015-INIT/en/pdf>.

² The ERA advisory structure consists in ERAC, but also the European Strategy Forum for Research Infrastructures (ESFRI), High Level Group on Joint Programming (GPC), Strategic Forum for International Science and Technology Cooperation (SFIC), ERAC Working Group on Knowledge Transfer (KT), the Steering Group on Human Resources and Mobility (SGHRM), the Helsinki Group on Gender in Research and Innovation (HG).

³ Available at: http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/intm/134168.pdf.

⁴ Available at: http://ec.europa.eu/research/era/pdf/era_progress_report2014/era_progress_report_2014_communication.pdf.

B. The Swiss Research and Innovation System

The Swiss participation in the EU Framework Programmes brings great added value to the Swiss research and innovation system. The funding provided by the FP is complementary to the national funding of research and innovation. The Swiss Federal Council considers education, research and innovation (ERI) as a priority policy sector. ERI funding policy is based on the awareness that Switzerland can only maintain and further consolidate its very competitive position if it remains a knowledge-based society. Important characteristics of research and innovation (R&I) funding in Switzerland are competitive grant funding, the bottom-up process for defining the content of the research projects, and the absence of direct financial support for private R&I. Public research funding hinges mainly on the proactive work of researchers, the principle of competition and international cooperation. Befitting its status as a research and innovation nation, Switzerland invests around 3% of its GDP in R&I. It is thus among the countries with the highest spending on R&I in relation to their GDP. Political responsibilities for research and higher education are divided between the federal state (Confederation) and the regional authorities (the Cantons), as outlined in the Federal Act on Funding and Coordination of the Swiss Higher Education System (Higher Education Act) of 30 September 2011⁵. The Confederation is responsible for the direct funding of research and the coordination of research activities. The Confederation funds the two Federal Institutes of Technology in Zurich and Lausanne. The Cantons are responsible for their institutions of higher education, while the afore-mentioned Higher Education Act regulates federal support allocated to these institutions.

At the federal level, the Federal Department of Economic Affairs, Education and Research (EAER) is responsible for research and higher education. The Swiss government mandates and supervises two national funding agencies. The Swiss National Science Foundation (SNSF) is a foundation under private law, linked to the State Secretariat for Education, Research and Innovation (SERI, part of EAER) and mainly funded by the Confederation. Its main responsibility is the funding of basic research. The Swiss Innovation Promotion Agency (CTI) is the federal agency for innovation, which funds collaborative projects between universities and private companies as well as innovation activities. As the importance of the CTI, and the resources it has at its disposal, have grown in recent years, it was decided to transform the CTI, which is currently an extra-parliamentary commission, into a public-law entity. This will provide the new entity Innosuisse with more appropriate structures and greater scope for flexibility, thereby allowing it to better fulfil its tasks.

The Swiss research system and its strong adherence to the principles of autonomy, academic freedom and scientific excellence, allows Switzerland to position itself successfully with regard to the priorities set forth in the ERA Roadmap. The Swiss government is determined to secure this position and to promote further steps to strengthen the European Research Area in cooperation with the various European and national stakeholders.

C. The Swiss National ERA Roadmap

On 19 May 2015, the Competitiveness Council adopted Conclusions with regard to the European ERA Roadmap 2015-2020⁶. The Council invited Member States, Associated Countries and the European Commission to implement the ERA Roadmap through appropriate actions in their action plans or strategies.

In compliance with the Council's request, and even though it is not formally bound by Council decisions, Switzerland has drafted a Swiss National ERA Roadmap that is modelled on the European ERA Roadmap. The National ERA Roadmap was drafted by the SERI and is primarily aimed at illustrating the current situation in Switzerland regarding the ERA priorities and highlighting measures that are underway or envisaged in order to achieve the aims outlined in the European Roadmap. The document takes into consideration the various feedbacks provided by the Swiss stakeholders in the area of

⁵ Available at: <https://www.admin.ch/opc/en/classified-compilation/20070429/index.html> (SR 414.20).

⁶ Available at: <http://data.consilium.europa.eu/doc/document/ST-8975-2015-INIT/en/pdf>.

research and innovation, which are the SNSF, the CTI, the ETH Board⁷, the Rectors' Conference of Swiss institutions of higher education (swissuniversities), the Swiss Academies of Arts and Sciences, the Swiss Contact Office for European Research, Innovation and Education in Brussels (SwissCore, which is co-funded by SERI, SNSF and CTI) and Euresearch, the Swiss network providing targeted information related to European research and innovation programmes.

Subsequently to this introduction, the Swiss National ERA Roadmap reviews in the second chapter each of the priorities of the European ERA Roadmap. In doing so, it describes each priority and evaluates the related measures that are currently ongoing or that have already been decided at national level. The third chapter presents the monitoring system that was selected to oversee the implementation of the ERA in Switzerland. Finally, an outlook on the Swiss involvement in the ERA is provided.

⁷ The ETH Board is the strategic management body of the ETH Domain. The ETH Domain comprises the two Federal Institutes of Technology in Zurich (ETH Zurich) and Lausanne (EPFL), as well as the four research institutes: the Paul Scherrer Institute (PSI), the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), the Swiss Federal Laboratories for Materials Science and Technology (Empa), and the Swiss Federal Institute of Aquatic Science and Technology (Eawag).

2.1 ERA Priority 1: Effective National Research Systems

A. Aim

The ERA Communication 2012 states that the first priority is to implement effective national research systems, “including increased competition within national borders and sustained or greater investment in research”. Regarding efficiency, open national-level competition is “crucial to deriving maximum value from public money invested in research”.⁸

The first priority of the ERA Roadmap focuses on the implementation of effectively designed and efficiently functioning national research and innovation systems, that are responsive to the specific objectives of each country. Recommended actions include strengthening the evaluation of research and innovation policies and fostering complementarities between, and rationalization of, instruments at EU and national levels. Better alignment of national and European policies should be promoted, aiming at making optimal use of public investments in research and innovation. In particular, they should enhance competitive funding through calls for proposals and institutional assessments, respecting the need for a satisfactory balance between competitive and institutional funding.

B. Current Situation in Switzerland

Political and legal bases

The relevant political basis is the Bill on the promotion of education, research and innovation for 2013-2016.⁹ The relevant legal bases are the Federal Act on the Promotion of Research and Innovation (RIPA) of 14 December 2012¹⁰ and the corresponding implementing ordinance (V-FIFG)¹¹. The general federal subsidiary funding of the higher education system is regulated by the Higher Education Act 2011.

Relevant ongoing measures

National and international strategies for education, research and innovation: The core principles of the Swiss strategy for research and innovation are laid down in the Bill on the promotion of education, research and innovation for 2013-2016. Accordingly, Switzerland tries to secure its leading position in education, research and innovation. In particular, it consolidates competitive funding instruments and reinforces its international competitiveness. This ambition is accompanied by an average growth rate for expenditure on education, research and innovation of 4.2% foreseen between 2013 and 2016.¹² This national strategy is supplemented by a long-term international strategy¹³ according to which Switzerland reinforces its position as an attractive location for research and innovation. The association of Switzerland to the EU Framework Programmes is a central element of this strategy.¹⁴

Competitive funding through calls for proposals applying the core principle of international peer review: Competitive funding lies at the core of the Swiss research and innovation system: Both SNSF and CTI allocate competitive funding by evaluating projects through a peer review process in line with international standards. Increasing the amount of grant funding offered on a competitive basis for

⁸ [Communication from the Commission to the European Parliament, the Council, the European Economic and Social Council and the Committee of the Regions: A Reinforced European Research Area Partnership for Excellence and Growth](#), 17.7.2012, COM(2012) 392 final.

⁹ Available at: http://www.sbf.admin.ch/org/01645/index.html?lang=en#sprungmarke3_23.

¹⁰ Available at: <https://www.admin.ch/opc/en/classified-compilation/20091419/index.html>.

¹¹ Available at: <https://www.admin.ch/opc/fr/classified-compilation/20122266/index.html>.

¹² Expenditures dedicated to the participation of Switzerland in European Research and Innovation Framework Programmes are not included.

¹³ Switzerland's International Strategy for education, research and innovation is available at: http://www.sbf.admin.ch/themen/01370/01390/index.html?lang=en&download=NHZLpZeg7t,lnp6i0NTU042i2Z6ln1ad1IZn4Z2qZpnO2Yug2Z6gpJCDeoF9gWym162epYbg2c_JjKbNoKSn6A--.

¹⁴ Bill regarding the funding of the Swiss participation in European Framework Program for Research and Innovation (2014-2020), <https://www.admin.ch/ch/f/ff/2013/1759.pdf>.

research and innovation is part of the strategic goals of the federal government for the period 2013-2016.

SNSF research funding policy awards excellence. The evaluation of a project takes into account the scientific quality and relevance, originality and topicality, but also its broader impact for use-inspired projects, as well as the suitability of methods and feasibility. The applicant's scientific track record and expertise are also considered. Research project proposals are evaluated by means of a rigorous peer-review process involving domestic and international experts whose identity remains concealed.¹⁵ The CTI funding activities also rely on a peer-review process to evaluate and select R&D projects.

Institutional funding based on institutional assessment: The Higher Education Act commits the Swiss Confederation and the Cantons to safeguard and improve the quality of research in higher education. This Act regulates federal financial support to cantonal universities by defining the review of the quality of services offered by a university as a prerequisite for federal subsidies (Article 45, Paragraph 2, Letter a.). The amount of federal subsidies granted for research activities to each university depends on its performance in raising third party funding. Particularly for the research area, the funding principles of the Confederation and their funding agencies are defined in the RIPA act, including national research institutions, international organizations and research projects

Complementarity between Swiss and EU funding schemes: Complementarity between the national and EU levels is fostered through the balance between bottom-up and top-down funding schemes and the balance between competitive and institutional funding. First, while the largest part of the Horizon 2020 Framework Programme is characterised by a top-down approach, the Swiss research and innovation funding system prefers a bottom-up approach (project and career instruments represent 73% of SNF funding activities). Two instruments funded by the SNSF, the National Centres of Competence in Research (NCCRs) and National Research Programs (NRPs), are the only exceptions (representing 23% of funding activities). Second, a significant part of Swiss research relies on institutional funding, which contrasts with EU funding that is granted on a competitive basis. Beyond top-down and bottom-up complementarity, EU funding schemes provide a pan-European competitive environment that is obviously unachievable at national level.

Evaluation of research and innovation policies: Research and innovation in Switzerland is mainly characterised by a bottom-up approach with the result that there is no centralized policy except for governmental measures regarding framework conditions for research and innovation. The impact of these measures is indirectly evaluated at national level by several actors. SERI evaluates the performance of the Swiss research and innovation system by means of a multiannual report, bibliometric studies and surveys focusing on most-cited publications. It also monitors the participation of Switzerland in international research and innovation programmes and initiatives. The Federal Statistical Office monitors R&D expenses and their effectiveness. The research and innovation policy efficiency is indirectly evaluated through the annual reports of the national funding agencies dedicated to research, the SNSF, and to innovation, the CTI.

C. Conclusion

The above listed measures highlight the commitment of Switzerland to the development of an efficient system of research and innovation where competition for funding and actors' initiatives play a central role. Indeed, Switzerland's national research and innovation system belongs to the most efficient worldwide. In comparison with European countries, the Innovation Union Scoreboard 2015¹⁶ highlights the excellence of the Swiss research and innovation system, since Switzerland ranks first in that respect. This performance of Swiss research is also acknowledged in the OECD Science, Technology and Industry Scoreboard 2015.¹⁷

¹⁵ SNF evaluation policy is available at: <http://www.snf.ch/en/theSNSF/evaluation-procedures/Pages/default.aspx>.

¹⁶ Available at: http://ec.europa.eu/research/era/pdf/era_progress_report2014/era_facts&figures_2014.pdf.

¹⁷ Available at: http://dx.doi.org/10.1787/sti_scoreboard-2015-12-en.

D. Planned Measures

The strategy embedded in the Federal Bill on the promotion of education, research and innovation for 2013-2016 is currently implemented. The new Bill for 2017-2020 is for the time being discussed by the Swiss Parliament and will be adopted by the end of 2016.

2.2 ERA Priority 2a: Jointly Addressing Grand Challenges

A. Aim

Grand challenges such as climate change, sustainable future energy or secured food supply are global and can only be addressed efficiently through transnational cooperation and coordination. The objective of this priority is to improve transnational cooperation and collaboration in order to address collectively the grand societal challenges. Enhanced cross-border collaboration between national research actors reduces fragmentation and duplication of efforts and allows benefits of scale through a better allocation of resources. Further, common standards of Research Funding Organisations (RFOs) improve the interoperability between national research programmes.

At European level, Joint Programming is perceived as a promising process for intensifying transnational cooperation and aligning national strategies, research programmes and activities in order to address such grand challenges. Joint Programming refers in general to the alignment and joint implementation of research programmes. The European Council initiated the Joint Programming Process in 2008 as a research policy strategy to explore the potential of Joint Programming and ten Joint Programming Initiatives (JPIs) were established. On the other side, Joint Programming also refers to concrete bilateral or multilateral joint projects as in the case of COST and EUREKA. Both are longstanding and time-proven European initiatives, fostering bottom-up and network based research or collaboration in innovation projects. In the sense of this priority, such transnational initiatives should be strengthened, including other transnational activities as macro-regional initiatives and intergovernmental organisations.

B. Current Situation in Switzerland

Switzerland has a long tradition of participating in international programmes and transnational cooperation at European level. At present, around 11.4% of all annual federal resources for the promotion of research and innovation (GBAORD) go to international cooperation activities¹⁸, representing 0.87% of the GDP (2012).¹⁹ The Swiss RDI system is characterised by a strong international orientation and collaboration. For example, around 49% of researchers in Switzerland in 2012 were foreigners²⁰, contributing to an outstanding Europe-wide research network. It is also one of the top priorities of the international strategy of Switzerland in the field of education, research and innovation²¹ (ERI) to increase the already well-established Swiss participation in European RDI cooperation and its relevant programmes as well as the further improvement of mobility in research. For this purpose and for already more than 50 years, Switzerland has continually taken measures, whereof the most relevant ones are listed below. A more extensive overview of measures can be found in the annex.

- Switzerland is participating in 5 out of 10 ongoing JPIs (JPND, FACCE JPI, JPI MYBL, JPIAMR, JPI HDHL²²).
- Switzerland is also actively participating in ERA-NETs. Under the 7th EU Framework Programme Switzerland participated in over 40 ERA-Net and ERA-NET+ initiatives as a partner and is still

¹⁸ Namely consisting of international R&D programmes and research projects in foreign countries.

¹⁹ Swiss Federal Statistical Office (2015):

<http://www.bfs.admin.ch/bfs/portal/de/index/themen/15/09/key/ind2.Document.25516.xls>.

²⁰ Swiss Federal Statistical Office (2015):

<http://www.bfs.admin.ch/bfs/portal/de/index/themen/15/09/key/ind2.Document.25509.xls>.

²¹ Swiss Confederation (2010): Switzerland's International Strategy for Education, Research and Innovation; http://www.sbf.admin.ch/themen/01370/01390/index.html?lang=en&download=NHZLpZeg7t,inp6i0NTN042I2Z6ln1ad1IZn4Z2qZpnO2Yuq2Z6gpJCDeoF9gWym162epYbg2c_JjKbNoKSn6A--.

²² Alzheimer and other Neurodegenerative Diseases (JPND), Agriculture, Food Security and Climate Change (FACCE JPI), More Years, Better Lives (JPI MYBL), Antimicrobial Resistance (JPIAMR), A Healthy Diet for a Healthy Life (JPI HDHL).

actively participating in 20 of these initiatives. Under Horizon 2020 there is currently Swiss direct or indirect participation in 7 ERA-NET Cofund projects. Through project funding and the National Research Programmes (NRPs) the SNSF supports researchers' participation in JPIs or ERA-NETs.

- Horizon 2020 supplies Europe with an essential possibility for more cooperation and exchanges across national borders. Switzerland is actively involved in the EU Framework Programme and in the Euratom programme.
- European Cooperation in Science and Technology COST contributes to the reduction of fragmentation in European research investments through joint bottom-up research programmes also with a focus on grand challenges in all of Europe. COST is highly complementary and a door opener to major funding programmes. Switzerland is founding member and strongly involved in COST. In 2014, Swiss researchers participated in 315 of 365 ongoing COST actions.
- The Swiss Confederation is also a founding member of and participates in the transnational innovation initiative EUREKA, where Swiss participations are funded through the CTI. EUREKA brings together knowledge of market-oriented research, development and implementation. Currently, Swiss researchers are involved in 160 of all 730 ongoing EUREKA initiatives, including Eurostars (figures from January 2015).
- Switzerland participates in Art. 185 TFEU initiatives²³, such as the Active and Assisted Living Programme (AAL), the European and Developing Countries Clinical Trials Partnership (EDCTP), and the European Metrology Programme for Innovation and Research (EMPIR) as well as in the Joint Technology Initiatives (JTI) according to Art. 187 TFEU²⁴.
- The Swiss Confederation also participates in (and contributes to) other international cooperation initiatives such as the Human Frontier Science Programme Organisation (HFSP) and the Mediterranean Science Commission (CIESM).

As the main research-funding organisation in Switzerland, the SNSF ensures and supports transnational cooperation and coordination in various ways. The SNSF has defined an international cooperation strategy²⁵ and thereby it is committed to the realisation of the ERA, in cooperation with Science Europe and the Swiss Contact Office for European Research, Innovation and Education in Brussels (SwissCore) which connects Swiss and European knowledge institutions and supports the Swiss participation at European level. In this regard and among other initiatives, the SNSF has implemented the following measures.

The SNSF provides specific funding schemes, aiming at the facilitation of international cooperation. For example, the SNSF finances international short visits, the already mentioned participations in JPIs or ERA-NETs and concrete joint research projects with a large number of countries. The SNSF is committed to support international cooperation and networking activities in all its project funding instruments. The SNSF has already implemented some ERAC recommendations concerning the mutual recognition of evaluations, joint financing of transnational projects, and the mobility of researchers respectively research grants. Specifically, the SNSF established the so-called Lead Agency, Money Follows Cooperation Line and Money Follows Researcher procedures and corresponding multilateral agreements (e.g. D-A-CH cooperation), which are recognised as good practice examples in the ERA Roadmap²⁶.

Regarding macro-regional transnational cooperation initiatives, a good example is the European Confederation of Upper Rhine Universities EUCOR, founded by neighbouring universities in Germany,

²³ An Art. 185 initiative is a joint programme according to Art. 185 TFEU.

²⁴ Art. 187, or so called "Joint Technology Initiatives" (JTIs) are set up under Art. 187 TFEU to support transnational cooperation in key areas where research and technological development can contribute to European competitiveness and quality of life. These initiatives serve as a way to realize public-private partnerships at European level in the field of industrial research.

²⁵ Latest version of the strategy: SNSF (2012): SNSF Roadmap 2013-2016: International co-operation strategy, SNSF Bern, available at: http://www.snf.ch/SiteCollectionDocuments/int_international%20strategy_2012.pdf.

²⁶ Concerning these supplementary measures of the SNSF, see <http://www.snf.ch/en/funding/supplementary-measures/Pages/default.aspx>; concerning good practices of the SNSF see also pp. 48-49 in ERAC (2015): [ERAC Opinion on the European Research Area Roadmap 2015-2020: 1208/15](#).

France and Switzerland. It has a pioneering role in European cross-border cooperation in higher education and research. The new aim and strategic lighthouse project of EUCOR is the creation of a European university alliance, which will form a joint European Campus.

C. Conclusion

Switzerland is participating in all relevant European RDI programmes to foster transnational cooperation and is well integrated into the ERA. It can be seen from the extent and diversity of the actions and participations listed above that Switzerland has made considerable achievements already. These activities are providing an essential contribution to tackle jointly grand challenges in Europe. The good practices of the SNSF are important contributions to support the mobility of researchers and grants within the ERA and to enhance the compatibility and interoperability of national programmes and activities.

D. Planned Measures

Providing Swiss researchers an entire and best possible participation in all relevant transnational European RDI programmes, initiatives and projects, is a main objective of the Swiss Confederation, as well as establishing and maintaining an optimal transnational cooperation within Europe. Switzerland will continue its efforts in the future to reach this goal. Wherever possible, Switzerland tries to expand and promote the participation in such RDI activities. Therefore, the focus lays on the expansion of existing measures.

The SNSF endeavours to extend bi- and multilateral agreements, thereby including also the further development of common funding principles. In its Multi-Year Programme 2017-2020²⁷ the SNSF targets to improve support of international cooperation in all funding schemes through additional funds.²⁸

²⁷ SNSF (2015): Multi-Year Programme 2017-2020: Planning document for the Federal Authorities; SNSF Bern; http://www.snf.ch/SiteCollectionDocuments/mehrijahresprogramm_2017_2020_e.pdf.

²⁸ The budget therefore is constantly increasing from 5.9 million CHF in the year 2016 to 11.7 million CHF in 2018, resulting in 18.2 million CHF additional funding in total.

2.3 ERA Priority 2b: Make Optimal Use of Public Investments in Research Infrastructures

A. Aim

Research Infrastructures (RIs) are an integral part of the ERA and the Innovation Union. They represent long-term investments of up to multi-billion Euros and are available to tens of thousands of researchers in both academia and industry. Freely accessible RIs of high quality are at the heart of the knowledge triangle of research, education and innovation and therefore are a key asset for supporting Europe's ambition for global leadership in open, interconnected, data-driven and computer-intensive science.

Europe has developed a common RI approach that is represented by the European Strategy Forum on Research Infrastructures (ESFRI), making use of instruments such as the Framework Research Programmes or the European Research Infrastructure Consortium (ERIC) legal framework.

Member state consultations identified “Making optimal use of public investments in RIs by setting national priorities coherent with the ESFRI priorities and criteria taking full account of long term sustainability” as a top action priority.²⁹

B. Current Situation in Switzerland

The 2015 update of the *Swiss Roadmap for Research Infrastructures* (henceforth referred to as the “Swiss RI Roadmap”)³⁰ is a planning tool and serves as a basis for the Bill on the promotion of education, research and innovation for 2017-2020. The Swiss RI Roadmap also outlines future funding requirements at national and international level and relates them to medium- and long-term planning issues on the post-2020 time horizon. At the international level, it covers the already existing Swiss participation in all EIROforum research infrastructures (CERN, EMBL, ESA, ESO, ESRF, European XFEL, EUROfusion, ILL) as well as the European Spallation Sources and ITER. The Swiss RI Roadmap also identifies international research infrastructure projects in the process of being established that should be considered for Swiss participation (currently CTA, ELI, SKA and LBNF/DUNE). It is important to note that the Swiss RI Roadmap does not contain any decisions on funding or the distribution of national funding. However, it is an important national planning tool for the sustainable realisation of new RIs and for safeguarding the sustainable operation of existing RIs in the national, European and international context.

The impact of and need for large and internationally connected RIs is growing on the national, European and global scale. Accordingly, the Swiss RI Roadmap 2015 provides a general overview of newly planned and existing RIs on all scales whose funding is considered or to be continued in the upcoming 2017-2020 ERI Bill period.

To ensure complementary integration in the European RI landscape, projects aiming at being included in the Swiss RI Roadmap need to be included in the ESFRI roadmap or in the planning of international research organisations in which Switzerland participates, or they have to otherwise demonstrate European and international relevance. As participating in ESFRI Projects and ESFRI Landmarks usually requires commitment of national investments for subsequent cooperation on the European level, the Swiss RI roadmap primarily focuses on developing existing national RIs and on positioning them internationally, with special regard to the ESFRI environment.

The Swiss RI Roadmap procedure is coordinated by the State Secretariat for Education, Research and Innovation, based on its legal mandate outlined in the Federal Act on the Promotion of Research and

²⁹ ERAC 1208/15, available at: <http://data.consilium.europa.eu/doc/document/ST-1208-2015-INIT/en/pdf>

³⁰ In the Swiss RI Roadmap 2015 update process, a total of 23 new projects has been proposed for implementation by the responsible bodies. Available at: http://www.sbf.admin.ch/themen/01367/02040/index.html?lang=en&download=NHZLpZeg7t,Inp6l0NTU042l2Z6ln1ad1lZn4Z2qZpnO2Yug2Z6gpJCEd4N6e2ym162epYbg2c_JjKbNoKSn6A--.

Innovation. RIs applying to be added to the Swiss RI roadmap had to pass a two-phase evaluation. First, the SNSF assessed the scientific case of the RI proposals and prioritised them in three categories (A,B,C). Subsequently, the responsible funding entities (ETH Board, universities, universities of applied science, Confederation/SERI) evaluated the category A proposals with regard to their alignment with the relevant funding bodies' strategic and financial planning.

By joining the European Spallation Source ERIC as a founding member, Switzerland for the first time became a member of an international RI that is based on the ERIC legal framework. As in Switzerland, full membership in an ERIC requires parliamentary approval, the Swiss Confederation currently confines ERIC participations to large scale RIs that require substantial financial commitments and long-term engagement. However, Swiss funding organisations or research institutions can participate in smaller ERICs as observers if this is compatible with the respective ERICs' statutes. In such cases, the Swiss government may issue non-binding support letters to facilitate the application process. In the long run, a general solution for Swiss ERIC participations that does not require parliamentary approval might be achieved, yet this is linked to supranational institutional questions.

C. Conclusion

The Swiss RI Roadmap provides the national research community and decision-makers in charge with an overview of newly-planned and existing RIs in Switzerland. It also serves as a basis for the coordination of national, European and international RI planning in line with the ESFRI Roadmap procedure.

Positive experience gained during the last Swiss RI Roadmap procedure (2015 update) suggests to further develop and optimise the Swiss RI roadmap procedure with regard to its interaction and alignment with the ESFRI roadmap.

To date, joining ERIC-RIs as a Swiss member requires a legal procedure and approval on the Swiss Federal level. This implies considerable administrative and political efforts that only make sense for large-scale participations such as the one in the European Spallation Source (ESS-ERIC).

D. Planned Measures

Switzerland will continue and consolidate its commitment in coordinating the Swiss national RI roadmap procedure with Swiss strategic efforts such as inputs on the policy and governance level, financial commitments and active involvement in developing RIs on ESFRI and international scale.

This implies strong involvement of SERI, Swiss RI stakeholders and experts in ESFRI and other international organisations and panels. These strategic efforts aim at safeguarding optimal interplay between the Swiss RI Roadmap, the ESFRI Roadmaps and international decision-making with regard to RIs.

Switzerland is committed to its role as a reliable and dedicated ERA member for establishing new RIs and for achieving long-term sustainability of existing ones.

2.4 ERA Priority 3: An Open Labour Market for Researchers

A. Aim

The ERA Communication 2012³¹ identified as one of the most important barriers to an open labour market for researchers “the lack of transparent, open and merit-based recruitment, which makes research careers less attractive and hampers mobility, gender equality and research performance.” The Communication invited Member States to “remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers”.

The 2014 ERA Progress Report outlines, based on data from the Innovation Union Scoreboard 2014, that openness and innovation go hand in hand, i.e. countries with open and attractive research systems are strong performers in terms of innovation. This was confirmed by the findings of the latest Innovation Union Scoreboard 2015³².

B. Current Situation in Switzerland

In Switzerland, there is no national legislation regulating the recruitment of researchers, except for the Federal Act on the Promotion of Research and Innovation of 14 December 2012, which stipulates that equal opportunity between men and women shall be a paramount principle that all research institutions, and particularly all funding institutions need to take into consideration. The new Federal Act (2015) on Funding and Coordination of the Swiss Higher Education Sector of 30 September 2011 (Higher Education Act, HEdA, entering into force in 2017)³³ mentions the implementation of gender equality as a task linked to the institutional accreditation.³⁴ Beyond that, however, the Swiss Confederation respects the autonomy granted by sponsors to higher education institutions as well as the principles of freedom and the unity of teaching and research.³⁵ Thus, Swiss higher education institutions as well as other research institutions arrange for their own policies with regard to the recruitment of researchers.³⁶ These regulations concern mainly the recruitment of professors, and there are only few and rather general regulations with regard to the recruitment of other academic staff. Most of the statutes and regulations set forth that the recruitment procedure shall be transparent, the jobs be advertised publicly³⁷, and the institution must give the reasons when rejecting an application. Some of the regulations require in addition an expert opinion by independent and international experts. Only in exceptional cases regulations lay down explicitly that when a professor is recruited, a balance between national and international candidates should be envisaged.³⁸

The manifold rules governing the recruitment of researchers at Swiss institutions of higher education or research institutions make little or no distinction between Swiss and foreign applicants. In general, recruitment procedures ensure that participation is open to non-national applicants. Moreover, within the framework of the Swiss-EU Bilateral Agreement on Free Movement of Persons, 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.

³¹ Available at: http://ec.europa.eu/research/era/pdf/era-communication/era-communication_en.pdf.

³² Available at: http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/files/ius-2015_en.pdf.

³³ Available at: <https://www.admin.ch/opc/en/classified-compilation/20070429/201501010000/414.20.pdf>.

³⁴ For detailed measures implementing equal opportunity see chapter 4, “Priority 4: Gender equality and gender mainstreaming in research infrastructures”.

³⁵ Art. 5 of the [Federal Act on Funding and Coordination of the Swiss Higher Education Sector \(Higher Education Act, HEdA\) of 30 September 2011](#).

³⁶ This autonomy is laid down in most cantonal laws or ordinances on the universities, which confirm that the respective institutions of higher education are solely responsible for the recruitment procedure.

³⁷ Only in two cases the regulations state explicitly: “[...] shall be published nationally and internationally”.

³⁸ [Regulation of the University of Lucerne regarding the recruitment procedure](#).

Statistics³⁹ show that the percentage of foreign professors at Swiss universities (not including universities of applied sciences (UAS) and universities of teacher education (UTE)) has increased since 2006/07. At present 55% of the appointed professors are non-Swiss nationals. The percentage is even higher with regard to professors teaching engineering (78%) and natural and social sciences (64%). With regard to academic staff (excluding professors) at Swiss universities, the percentage of non-Swiss nationals amounts to 56.9%. With regard to doctoral students in Switzerland, less than half of the candidates have obtained their Master's degree in Switzerland. The situation at Swiss universities of applied sciences is similar and the percentage of foreign professors and academic staff increasing. The percentage of foreign teaching staff amounted to 33% between 2010 and 2012 and according to forecasts by the Swiss Federal Statistical Office the percentage might reach approximately 35% by 2023.

Furthermore, transparent, open and merit-based recruitment (OTM-R) is one of the pillars of the European Charter for Researchers and in particular of the Code of Conduct for the Recruitment of Researchers, launched in 2005. All Swiss universities and most of the other Swiss research institutions such as the Swiss National Science Foundation have signed the European Charter for Researchers and Code of Conduct for the Recruitment of Researchers and four institutions received the HR Excellence in Research logo. Besides, a great number of vacancies are published on the Euraxess website and several Swiss institutions of higher education have established procedures to facilitate applications from non-Swiss nationals by advertising vacancies in English or establishing application procedures that consider the particular situation of foreign applicants (e.g. e-recruitment or remote interviews by telephone or skype).

Another aim is to meet the needs and expectations of dual-career academic couples. Thus, the third module of the Federal Programme for Equal Opportunity at Universities 2000-2012⁴⁰ focused on "Dual-career couples". However, hiring dual-career academic couples still tend to be rather ad hoc and inconsistent across universities. Only in recent years, universities have begun devoting attention to dual-career issues, and institutions are undergoing transitions in hiring practices with respect to couple hiring.⁴¹

In order to welcome (non-Swiss national) researchers and facilitate their start of work, most of the Swiss universities have established "Welcome Centres" that provide valuable assistance.

Given the current refugee situation in Europe, Euraxess has launched the Science4Refugees initiative. Swiss universities examines measures to ensure that refugees have access to Swiss institutions of higher education.

Moreover, as a general rule, any scientist working in Switzerland, regardless of nationality, can apply for funding from the SNSF and other public funding sources.

C. Conclusion

Although the measures taken in Switzerland to tackle the issue of OTM-R are manifold and vary between the various institutions, the percentage of foreign academic staff employed at Swiss research institutions is rather high, demonstrating the openness of the Swiss job market for researchers.

³⁹ See Federal Statistical Office (FSO): <http://www.bfs.admin.ch/bfs/portal/de/index/themen/15/08/dos/blank/07/01.html>.

⁴⁰ Available (in German) at: http://www.swissuniversities.ch/fileadmin/swissuniversities/Dokumente/DE/UH/Chancen-gleichheit/Projektantrag_DCC.pdf.

⁴¹ See the [Report on "Dual Career Couples at Swiss Universities - Evaluation of the third phase of the Swiss Federal Equal Opportunity at Universities Programme \(2008 -2011/2012\)"](#). For example, the effects of the Dual Career Advice office at ETH Zurich are readily apparent: 77% of ETH professors and their partners received support – a number that is distinctly higher than the percentages at the cantonal universities, which range between 9% and 23%.

D. Planned Measures

Switzerland plays an active role within the Euraxess network and encourages the publication of jobs at the Euraxess Job Portal. Nevertheless, the number of advertisements published on the Euraxess website might still be higher and is thus encouraged by swissuniversities, the institution that takes care of Euraxess in Switzerland.

With regard to gender ratios among full and associate professors in Switzerland, measures undertaken or planned are presented under chapter 2.5 ERA Priority 4: Gender equality and gender mainstreaming in research.

Moreover, the Swiss institutions of higher education endeavour continuously to improve the application procedures in order to open the labour market. Improvements are underway with regard to job postings, training for committees, support of non-linear careers, management training and internal appointment regulations.

2.5 ERA Priority 4: Gender Equality and Gender Mainstreaming in Research

A. Aim

The EU Roadmap priority Gender equality and gender mainstreaming in research aims at translating “national equality legislation into effective action to address gender imbalances in research institutions and decision making bodies and integrating the gender dimension better into R&D policies, programmes and projects”. The proportion of woman at A grade in the higher education sector (female researchers of senior level positions in universities and higher education institutions) has been identified as the appropriate indicator to reach this goal.

B. Current Situation in Switzerland

Political and legal bases

The Federal Act on the Promotion of Research and Innovation should ensure that equal opportunity between men and women will be an important principle that all research institutions and particularly all funding institutions need to take into consideration to encourage equal opportunity and gender equality when fulfilling their tasks.⁴² Based on this Act, the Swiss Federal Council mentions prominently the principles of equity in its Bill on education, research and innovation (ERI) for 2013-2016.

Accordingly, the Federal Council expects that the SNSF continues its recent measures to increase the proportion of women in sciences and will implement further measures if needed. Moreover, the SNSF should systematically and continuously review the gender equality in all its funding activities as well as in its internal decision-making procedures.

The legal basis of the existing programmes and measures (described subsequently) is the former Federal Act on University Funding and Cooperation in the field of University Education of 8 October 1999⁴³ and the Federal Act on the Universities of Applied Sciences of 6 October 1995⁴⁴; both Acts are now replaced by the Higher Education Act.

Furthermore, the ETH Domain⁴⁵ aims to increase the proportion of women at all career levels, especially in STEM fields, to create attractive and family-friendly working conditions, promote equal opportunity and develop scientific talent. These objectives are included in the performance mandate of the Swiss government to the ETH Domain.

Relevant ongoing measures

Different funding programmes exist to increase the proportion of female researchers at A grade.

- *The Swiss Federal Equal Opportunity at Universities Program*⁴⁶ has been designed to promote gender equality at Swiss universities since the year 2000. The goal of the Federal Programme 2013-2016 is to implement gender equality in the university management, promotion of academic talent, teaching and research and to achieve a proportion of 25% female grade A professors at Swiss universities, and 40% 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

⁴² Available at: <https://www.admin.ch/opc/en/classified-compilation/20091419/201501010000/420.1.pdf>.

⁴³ Available at: <https://www.admin.ch/opc/en/classified-compilation/20070429/index.html>.

⁴⁴ Available at: <https://www.admin.ch/opc/de/classified-compilation/19950279/index.html>.

⁴⁵ The ETH Domain comprises the two Federal Institutes of Technology in Zurich (ETH Zurich) and Lausanne (EPFL), as well as the four research institutes: the Paul Scherrer Institute (PSI), the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), the Swiss Federal Laboratories for Materials Science and Technology (Empa), and the Swiss Federal Institute of Aquatic Science and Technology (Eawag).

⁴⁶ The budget of the current gender equality programme 2013-2016 at Swiss universities amounts to 9 million Swiss Francs. Information on the action plans and measures: <http://www.swissuniversities.ch/de/themen/chancengleichheit/suk-programm-p-4/>.

be increased. The programme covering the period 2013-2016 supports universities to implement gender action plans they have developed on the basis of fields of action and tailored to their specific needs. In addition, the programme 2013-2016 supports the structural implementation of Gender Studies at Swiss Universities.

- *The Swiss Federal "Equal Opportunity at Universities of Applied Sciences" Programme* has also been in force since the year 2000. The overall goals are: integration of gender equality in the policies of each institution; to reinforce gender equality in human resources policies and among young researchers, at student level and in teaching and research. The programme 2013-2016 will help universities of applied sciences to implement specific measures according to the main fields of action on gender equality.
- *Marie Heim-Vögtlin (MHV) grants* are aimed at female doctoral students and postdocs in Switzerland who have to interrupt or to reduce their research activities due to family commitments. Thanks to MHV grants, candidates can boost or re-start their career with a research project of their own and improve their scientific profile. In the next funding period the new programme PRIMA (promoting women in academia) will concentrate on talented women researchers at the late postdoctoral stage. The scheme plans to generate a strong network of contacts and training opportunities.
- The aim of the *120% support grant* by the SNSF is to help researchers to achieve a balance between their academic career and family life and thus make a career in academia more appealing for young scientists. The grant allows researchers to reduce their work-time percentage and hire a support person for the same period. This measure was initiated to the benefit of postdoctoral researchers who need to look after children during an important stage in their careers and who therefore need more flexibility for a limited period.
- *Gender equality grants* are aimed at young female researchers funded by the SNSF. It offers them additional individualized and flexible support for their career development. An eligible person receives CHF 1000 per 12 months' approved project running time. The grant may be used to finance career support measures but does not cover family support measures.
- In all the mobility grants of the SNSF, the amount of the fellowship is based on the applicant's family status and family obligations as well as cost of living in the host countries.
- From the beginning of the programme *SNSF professorship*, the target of 30% female scientists was set. This target has been reached over the last years. The proportion can vary, like in 2013 (23%). The SNSF will continue its efforts to increase the proportion of female scientists.
- COST's inclusiveness policy fosters the participation of female scientists in all COST activities and the Swiss participation in COST reflects this policy. COST is already a frontrunner in the ERA with an overall female participation of around 35% in all COST Actions⁴⁷ (2010).

C. Conclusion

The interim report⁴⁸ on the situation of the *Swiss Federal Equal Opportunity at Universities Programme* up to 31 December 2014 shows initial achievements: in terms of institutional anchoring of objectives, positive trends have been observed in terms of the proportion of women as well as in terms of cultural and structural change. In contrast, the overarching objective of reaching a 25% ratio of female grade A professors by the end of 2016 will most likely not to be reached.

Gender ratios among full and associate professors (2015 around 20% women; target 25%) and among assistant professors (2015 around 34% women, target 40%) are an indication that progress has been made. However, these ratios are no guarantee that the proportion of women in decision-making bodies will also increase. A robust proportion of women would nevertheless be desired. At most universities, the proportion of grade A professors 2015 varies between 18.3% and 23.7%. Three small universities with specialised fields of study constitute exceptions to this: Lucerne (LU) 28%, Saint-Gall (SG) 12.8% and Università della Svizzera italiana (USI) 16.3%. Despite the 30-40% new nomination recommendation, it is unlikely that – except of Lucerne – any university will reach the target of 25%

⁴⁷ Available at: <http://www.cost.eu/media/newsroom/gender>

⁴⁸ Available at: <http://www.swissuniversities.ch/de/themen/chancengleichheit/suk-programm-p-4/>.

grade A Professors. The average proportion of female professors for all categories in 2015 was reported at 22.3%.

With these figures, the situation of women scientist in Switzerland is often below the European average. The situation of women is, however, slowly improving. In 2013, the percentage of women in Switzerland found among junior and intermediate staff (research associates) was 38%. For senior researchers, the highest level, this figure was 19%. Between 2002-2012, the annual average growth rate in the number of new PhDs was 5% for women and 1% for men.

Monitoring reports by the two Swiss Federal Institutes of Technology and by some universities give a more detailed picture of the development, but they show in general a slow progress concerning the numbers of female grade A professors.

D. Planned Measures

The new Federal Act (2015) on Funding and Coordination of the Swiss Higher Education Sector (entering into force in 2017) mentions the implementation of gender equality as a task linked to the institutional accreditation.⁴⁹

Universities are thus obliged to implement further measures. The Confederation may also support measures to implement gender equality within the framework of project-linked contributions. Measures to enhance gender equality will still be necessary. It is up to the higher education institutions to implement measures for gender-sensitive careers and gender equality.

With additional measures, the SNSF proposes to promote actively the best female researchers and help to improve conditions for women in science in the period 2017-2020. For this purpose, the gender dimension should be considered and incorporated into all fields of research:

- The SNSF is launching a new opportunity for excellent female scientists in advanced postdoctoral phase in order to increase the number of candidates for professorships at Swiss universities. The new program will be called "*Promote women in academia*" (PRIMA and will replace the current MHV scheme).
- The support grant for postdocs with family will be extended to researchers at doctoral level. However, the reduction of the workload should be the exception and the SNSF will contribute to the cost of childcare.

⁴⁹ Available at: <https://www.admin.ch/opc/en/classified-compilation/20070429/201501010000/414.20.pdf>.

2.6 ERA Priority 5: Optimal Circulation and Transfer of Scientific Knowledge

A. Aim

Priority 5 aims at fully implementing knowledge transfer policies at national level in order to maximize the exploitation of scientific results. Research performing institutions (RPO) and research funding institutions (RFO) should make knowledge transfer second nature by integrating it in their everyday work. Open access to publications and data in an open science context should be fostered.

B. Current Situation in Switzerland

Political and legal bases

The Federal Act on Promotion of Research and Innovation sets the legal basis for the transfer of knowledge and technology from publicly funded institutions and for the open access to research data and results. The Swiss government supports research performing organisations and funding agencies to develop the necessary instruments and policies to comply with the legislation.

Relevant ongoing measures

Knowledge and technology transfer

Switzerland has developed and implemented various publicly funded programmes and instruments to boost knowledge transfer mainly between academia and industry, and to foster doctoral training in cooperation with industry. Main instruments are briefly described below.

The Commission for Technology and Innovation (CTI) is the federal innovation promotion agency. It encourages science-based innovation by providing funding, professional advice and networking opportunities. CTI devotes the biggest part of its budget (15.8 million Swiss Francs in 2014) to R&D projects.⁵⁰ It promotes knowledge transfer through cooperative applied research projects between higher education institutions and private companies, essentially small and medium enterprises (SMEs) that lack research capacity. Furthermore, the CTI has 12 regional operating innovation mentors that support and coach SMEs finding research partners and accessing know-how.

The Swiss National Science Foundation funds research with a clear orientation towards knowledge transfer. This particularly applies to the National Research Programmes (NRP)⁵¹ and the National Centres of Competence in Research (NCCR)⁵². NRPs have a duration of four to five years and an annual budget ranging from 5 to 20 million Swiss Francs. This program includes research projects that address topics of national significance (as specified by the Swiss government), are solution-oriented and close to the practical realm, interdisciplinary and transdisciplinary and place high value on knowledge transfer and the communication. NCCRs supports established researchers in Switzerland who wish to pursue a long-term research project on a theme of strategic importance. The budget for each series of NCCRs is determined by the Swiss parliament. In addition, NCCRs receive funding from higher education institutions and from third parties. NCCRs aim at improving the distribution of work among research institutions in Switzerland and their international integration, establishing a network of collaborations and partnerships between the academic and non-academic public and private sectors, maintaining links to the potential users of research results in order to contribute to knowledge and technology transfer, and supporting talented doctoral students and postdocs as well as improving the career prospects of women in research.

⁵⁰ Activity report 2014: CTI funding drives Switzerland forward. Main figures.

⁵¹ Available at: <http://www.snf.ch/en/funding/programmes/national-research-programmes-nrp/Pages/default.aspx>.

⁵² Available at: <http://www.snf.ch/en/funding/programmes/national-centres-of-competence-in-research-nccr/Pages/default.aspx>.

In order to speed up knowledge transfer in society and business and in collaboration with the CTI, the SNSF aims to supplement its existing knowledge and technology transfer measures with activities at the interface of research and innovation. With the planned Bridge programme CTI and SNSF aim to gain greater benefit from the innovation potential of pre-competitive research, before the development of market-oriented products. Bridge is geared to support young researchers in testing their application ideas so that they gain the confidence needed to step out into the business world. In addition, universities and universities of applied sciences will be able to conduct joint projects within the scope of Bridge.

Through its industry and SME participation in about 50% of all COST Actions and through its mandatory stakeholder involvement, COST contributes to the transfer of scientific knowledge to innovation on the national and international level, as well as to the elaboration of rules and regulations.

Operational since early 2016, the Swiss Innovation Park⁵³ contribute to the transfer of knowledge and technology. It intends to reinforce Switzerland's leading position as a location for innovation and to maintain its economic competitiveness. It is funded by the SERI and comprises two hub sites centred on the two federal institutes of technology in Zurich and Lausanne and three network locations in Aargau, Northwest Switzerland and Biel. The Swiss Innovation Park represents a valuable addition to the established funding instruments in Switzerland. The new approach seeks to make Switzerland attractive to international research and development players by providing space with expansion potential in the vicinity of existing higher education institutions and businesses.

Open access to publications and research data

Article 50 of the Federal Act on Promotion of Research and Innovation requires "that the results of research are available to the public in accordance with the legal provisions". In 2015, the Swiss government mandated swissuniversities and the SNSF to develop a national strategy on Open access and to analyse its financial flow.

Research performing institutions

The major governing bodies of Swiss academic research institutions, individual RPOs, the SNSF and the Swiss Academies of Arts and Sciences signed the Berlin Declaration in 2006⁵⁴. Open Access policies for scientific publications developed by some Universities are publicly available in the Registry of Open Access Repositories Mandatory Archiving Policies (ROARMAP). A list of the research institutions and corresponding repositories is available on the OpenAire's website⁵⁵.

The directory of open access journals (DOAJ) lists more than 200 Swiss Open Access journals. The majority are published by MDPI AG (Basel) and Frontiers (Lausanne). 160 retroactively digitalized journals are freely accessible at retro.seals.ch, a project conducted by the Consortium of the Swiss Academic Libraries. Furthermore, two other projects, e-codices and E-rara.ch, focus on providing digital reproductions of old manuscripts and antique prints held by Swiss libraries free of charge.

A national study funded by swissuniversities looked at the most suitable model for a central long-term preservation of digital primary and secondary research data. It revealed the need for a better infrastructure for research data. Currently, a national project⁵⁶ (SUC P-2 Scientific information: Accessing, processing and saving) is looking at measures for Open Access and Research Data developed by the different universities. It should define a system by 2020 to access, process and storage science-related digital content.

Swiss Academies of Arts and Sciences actively promote open access to publications.

⁵³ Available at: <https://www.switzerland-innovation.com/>.

⁵⁴ Available at: <http://openaccess.mpg.de/Berliner-Erklaerung>.

⁵⁵ Available at: <https://www.openaire.eu/university-of-zurich>.

⁵⁶ Available at: <http://www.swissuniversities.ch/en/organisation/projekte-und-programme/suk-p-2-wissensch-information-zugang-verarbeitung-speicherung/>.

Research Funding Organization (SNSF)

The SNSF requires researchers to provide open access to findings resulting from SNSF funded projects (Article 44 Funding Regulations⁵⁷). This includes also books and monographies. Furthermore, SNSF reimburses costs for publication in open access journals. The SNSF is matching the current funding policies to other European research funders and is in the process of setting up a monitoring system to measure compliance with their open access policy. Furthermore, SNSF requires that *“the data collected with the aid of an SNSF grant must be made available also to other researchers for secondary research and integrated in recognised scientific data pools”*. SNSF is defining an open access monitoring strategy and discussing how to best implement open research data requirements.

National Points of Reference (NPR)

The EC Recommendation on access to and preservation of scientific information⁵⁸ stipulates in Article 8 that each country should designate a National Point of Reference (NPR) with the task of coordinating the measures listed in the Recommendation and acting as an interlocutor with the Commission. Furthermore, Article 9 states that the NPRs also have the task of informing the Commission of the actions taken in response to the different elements of the Recommendation. By the end of 2013, all EU MS had nominated an NPR. Switzerland designated an NPR in 2015. The Swiss NPR is based at the SERI.

Open government data

The Open Government Data portal (opendata.swiss)⁵⁹ is managed by the Swiss Federal Archives. It contains around 2000 datasets made available to the public free of charge in machine-readable form that can be used for evaluations, combination or development of applications and visual representations. They include a vast array of data sets such as Swiss municipal boundaries, population statistics, current weather data, historical documents and a directory of Swiss literature. The Swiss open government data strategy is available online.

C. Conclusion

With the purpose of boosting knowledge transfer mainly between academia and industry, and of fostering doctoral training in cooperation with industry, Switzerland developed and implemented various publicly funded instruments and programmes mentioned above. The RIPA sets the legal basis to ensure availability of results from publicly funded project. Switzerland lacks a comprehensive national strategy on open access. However, research performing institutions, research funding institutions and governmental agencies are defining and implementing various measures to foster open access to publications and open research data. Instruments to support open innovation are not yet established.

D. Planned Measures

Different measures to strengthen knowledge transfer and enhance access to results from publicly funded projects as well as to monitor the compliance with the institutional policies are under development. On behalf of the SERI, swissuniversities is developing a national strategy on Open Access and an analysis of its financial flow. Furthermore, SNSF is defining an open access monitoring strategy and discussing how to best implement open research data requirements.

Research performing and research funding institutions are promoting the accessibility to research data. Furthermore, results from studies such as SUC P-2 Scientific information: Accessing, processing and saving might help define a system by 2020 to access, process and storage science-related digital content.

⁵⁷ Available at: http://www.snf.ch/de/derSnf/forschungspolitische_positionen/open_access/Seiten/default.aspx.

⁵⁸ Available at: https://ec.europa.eu/research/science-society/document_library/pdf_06/recommendation-access-and-preservation-scientific-information_en.pdf.

⁵⁹ Available at: <https://opendata.swiss/de/>.

2.7 ERA Priority 6: International Cooperation

A. Aim

The aim is to ensure that Europe as a whole, as well as the individual Member States and Associated Countries, are able to take maximum advantage of the best research and innovation opportunities on a global basis. To contribute to this objective, Member States and Associated Countries should define national strategies for internationalisation to foster stronger cooperation with key third countries. These should reinforce multilateral STI cooperation approaches in order to build critical mass and maximise impact, for example in tackling grand societal challenges (cf. chapter 2.2).

B. Current Situation in Switzerland

Switzerland's international strategy for education, research and innovation (ERI) was elaborated in 2010 and thereafter incorporated into the Confederation's general foreign policy and foreign economic policy. The aim is to further develop an internationally competitive education, research and innovation system in Switzerland and to reinforce it over time by setting priorities and clear objectives. For this purpose two conditions should be met. First, the existing international links of ERI players must be further strengthened to ensure continued participation in international programmes and organisations. Second, demographic changes at both global and national levels (such as an ageing Swiss population; the need to integrate younger second and third generation immigrants) require in-depth discussions on human capital and an increased cooperation in the field of mobility.

The EU Member States – particularly Switzerland's neighbours – as well as other countries in Europe are Switzerland's most important partners in ERI collaboration. Cooperation with these partners is established and often takes place in a multilateral context (EU framework programmes in research and education). The Federal Council has added a new component to this policy, with a strategic concentration on non-European countries with strong potential for scientific and technological development. There are currently seven non-European countries that have been identified as priority countries for developing and strengthening bilateral cooperation in research (see below). Occasional ERI cooperation also takes place in the light of the mutual interest in specific countries.

Cooperation with countries outside Europe

In addition to multilateral initiatives such as the EU Framework Programmes, specific instruments have been developed to encourage research cooperation with countries outside Europe. These include:

- a network of science and technology counsellors⁶⁰, based at Swiss embassies in strategically important regions;
- the "swissnex"⁶¹ platforms, which are located in scientific and innovation hubs abroad and help to implement this strategy, i.e. by raising the level of awareness of Switzerland as a location for education, research and innovation, and by supporting Swiss ERI stakeholders to establish contacts with foreign partners;
- bilateral programmes with selected countries (see below) to promote exchanges and joint research projects.

Network of science and technology counsellors

Swiss embassies and consulates represent Swiss interests abroad. As part of their general remit, they also support activities relating to education, research and innovation. The network composed of 20 science and technology counsellors supports the implementation of Switzerland's international ERI strategy.

⁶⁰ Available at: <http://www.sbf.admin.ch/themen/01370/01390/01391/index.html?lang=en>.

⁶¹ Available at: <http://www.swissnex.org/>.

swissnex

Located in some of the world's most innovative hubs (Boston, San Francisco, Shanghai, Bangalore and Rio de Janeiro), swissnex's role is to connect Swiss researchers, entrepreneurs and thought leaders with inspiring peers abroad, to strengthen the visibility of Switzerland's ERI landscape, to facilitate knowledge exchange and more generally to support and advise Swiss academic institutions and start-ups in their internationalization efforts. swissnex is a partnership-driven organization, adapting its services to the needs of its partners, which are in return expected to contribute substantially to the activities of swissnex.

Bilateral programmes

Bilateral research programmes have been established with Brazil, Russia, India, China and South Africa (BRICS) as well as Japan and South Korea. In addition, Switzerland supports two high-quality research institutes in Ivory Coast and in Tanzania, to gather data on topics such as regional illnesses and other relevant research fields (e.g. veterinary medicine and agronomy). All these collaborations are based on the principles of mutual benefit, equal co-funding and scientific excellence. In the 2008-2011/2012 ERI period, around 500 research collaborations received funding in these programs (budget: on average around CHF 11 million per year) and an equivalent amount has been planned for the 2013-2016 period.

In 2011, an external study⁶² has been conducted by the Science Service of the *Università della Svizzera Italiana* (USI), which positively assessed these programmes. Overall, the evaluation showed that bilateral programmes as a whole were perceived as a successful funding instrument. Both the researchers and the programme managers agreed that the programmes strengthened the scientific relationships with the partner countries. The reported results were promising, anticipating the production of valuable scientific outcome. As no reasons to modify fundamentally the overall setting of these programmes, the choice of countries, and the organizational structure were provided, the programmes have been continued over the 2013-2016 period. The Leading Houses have also been asked to look into which other countries might be suitable partners.

Swiss National Science Foundation (SNSF)

The SNSF encourages Swiss scientific activities abroad, establishes networks and provides support to foreign researchers at Swiss institutions and international associations. As part of its mandate agreement with the Confederation, the SNSF has the task to actively help shape Switzerland's international research policy. It maintains relations with research funding institutions in many countries, inside and outside of Europe, works with transition and developing countries as well as with selected non-European countries offering particular research potential. The SNSF's international commitment brings many benefits: its programme activities generate numerous international contacts. Its strategic objective is to optimize and facilitate the conditions under which international collaboration and scientific exchange can take place.

On behalf of the SERI, the SNSF manages several regional and bilateral programmes, as well as the calls for Joint Research Projects as part of the bilateral programmes established with selected countries. The SNSF is eventually expected to significantly develop its own international partnerships with sister organisations, especially in emerging and overseas countries listed above.

Besides, with the support of the Swiss Agency for Development and Cooperation (SDC), the SNSF implemented two programs (SCOPES⁶³ and r4d⁶⁴) with the objective of enhancing international scientific collaboration. The SCOPES programme supports collaboration between researchers in Switzerland and Eastern Europe or Central Asia. The Swiss Programme for Research on Global Issues for Development (r4d) supports partnership projects between researchers in Switzerland and researchers in developing and emerging countries in Africa, Asia and Latin America. r4d promotes development-relevant research

⁶² Available at: <http://www.sbf.admin.ch/themen/01370/01390/01420/index.html?lang=en>

⁶³ <http://www.snf.ch/fr/encouragement/programmes/scopes/Pages/default.aspx>.

⁶⁴ <http://www.snf.ch/fr/encouragement/programmes/programme-r4d/Pages/default.aspx>.

on global issues through new insights and innovative approaches, contributing to sustainable global development. The main focus is on reducing poverty and protecting public goods in developing countries. Finally, in the framework of Switzerland's contribution to the enlarged EU, bilateral research programmes are implemented with six new EU Member States.

The SNSF supports international cooperation activities with any country, given that all general funding instruments of the SNSF have an international component. From October 2016, funding of international networking activities and of research partners abroad in any country will be allowed in SNSF projects.

Swiss Government Excellence Scholarships⁶⁵

The Swiss government awards postgraduate scholarships to foreign scholars and researchers to pursue doctoral or postdoctoral research study at a public university or research institution in Switzerland. It also awards art scholarships to a limited number of countries. These scholarships are managed directly by the SERI.

Swiss representation in international organisations

Switzerland is represented in the education, research and innovation bodies of several international organizations (Council of Europe, OECD, UNESCO, etc.). It is to be noted that Switzerland's contribution to the work of the OECD Global Science Forum (GSF) has increased recently: Switzerland is in the lead of the GSF activity "Strengthening the effectiveness and sustainability of international research infrastructures" and the first GSF Meeting in 2016 will be hosted in Lausanne. Further measures need to be taken if the strengths of the Swiss ERI system are to be recognized and valued by international organizations.

Switzerland's participation in major International Research Organizations is a fundamental parameter of its international ERI policy. Thus, it actively participate in CERN, EMBL, ESA, ESO, ESRF, ILL, European XFEL and in the European Spallation Source ERIC. Its association to Euratom grants Swiss researchers the access to JET and to the ITER project. Switzerland invests approximately CHF 100 million annually in these organisations, i.e. 2.5% of the Confederation's annual budget for research promotion. SERI continuously evaluates the interest of Switzerland to participate in projects aiming at establishing new majors international research organisations.

C. Conclusion

Switzerland has a long tradition in international cooperation. Bilateral programmes, a network of science and technology counsellors and swissnex are specific instruments that have been developed to encourage research cooperation with countries outside Europe. The SNSF promotes Swiss researchers to engage in scientific activities abroad, establishes networks and provides support to foreign researchers at Swiss institutions and international associations. Furthermore, the SNSF actively help shape Switzerland's international research policy, maintaining relations with European research funding institutions, works with transition and developing countries as well as with selected non-European countries offering particular research potential. Finally, Switzerland is represented in various international organisations.

D. Planned Measures

Internationalization of the ERI system remains one of the key objectives of Switzerland. In the 2017-2020 period, it will therefore continue to support various instruments aimed at ensuring Switzerland's participation into international research infrastructures and at facilitating contacts between researchers or funding agencies with their counterparts in key countries.

⁶⁵ <http://www.sbfi.admin.ch/themen/01366/01380/02593/index.html?lang=en>.

3. Monitoring and Outlook

A. Monitoring of the ERA Roadmap Implementation in Switzerland

Until 2014, Switzerland based its evaluation of its own degree of compliance regarding the ERA priorities both on its own monitoring strategy regarding research and innovation and on the ERA Progress Report. According to the 2014 ERA Progress report⁶⁶, Switzerland appears to be highly ERA compliant, as a majority of its research and innovation organizations are identified as in line with ERA priorities.

From 2015 on, Switzerland intends to monitor progress regarding the implementation of the ERA Roadmap priorities based on the high-level indicators adopted by the European Research Area Committee (ERAC) in 2015 to that end⁶⁷. The indicators selection provides a single indicator per priority with a high informative value for decision makers. In order to compare crucial aspects of the Member and Associated States' research and innovations systems, it is important to monitor the progress made regarding the defined priorities with identical, or highly comparable, indicators.

The monitoring is conducted by SERI and will result in the periodic update of the relevant elements of the present Roadmap. The following list provides an overview of the foreseen monitoring strategy. For most of the following indicators, data for Switzerland is available on a national reference frame and data basis, but only in a few cases on a comparable European basis. For this reason, it is currently difficult to calculate reliable comparable indicators in a large part of the priorities listed below. As a consequence, Switzerland refrains for the moment from the presentation of such not normalized (and therefore incomparable) data, in order to avoid misinformation through such biased data. Quantitative data will be provided in an orchestrated way with other EU Member States and Associated Countries.

Priority 1	Effective national research system
Indicator	Revised version of the Research Excellence Indicator. This normalized indicator includes components with equal weighting, highly cited publications, PCT patents, ERC grants and Marie Skłodowska-Curie (MSCA) grants.
Data availability	Swiss data are available. In order to calculate the normalized version of the indicator, Switzerland relies on data delivered by the other Member and Associated States.

Priority 2a	Jointly Addressing Grand Challenges
Indicator	National GBARD allocated to Europe-wide, bilateral or multilateral transnational public R&D programmes.
Data availability	No Swiss data are available. Alternative indicators are currently under evaluation.

Priority 2b	Make optimal use of public investments in Research Infrastructures - RI's
Indicator	Availability of national roadmaps with identified ESFRI projects and corresponding investment needs.
Data availability	The Swiss Roadmap for Research Infrastructures in view of the ERI Bill 2017-2020 was adopted in 2015 and contains the required financial figures.

⁶⁶ Available at: http://ec.europa.eu/research/era/pdf/era_progress_report2014/era_progress-report_150521.pdf.

⁶⁷ Available at: <http://data.consilium.europa.eu/doc/document/ST-1213-2015-INIT/en/pdf>.

Priority 3	Open Labour Market for Researchers
Indicator	Researcher posts advertised through the EURAXESS Jobs portal per thousand researchers in the public sector per year.
Data availability	The data are available at Euraxess centers.

Priority 4	Gender Equality and Gender Mainstreaming in Research
Indicator	Proportion of women A grade in Higher Education Sector (HES)
Data availability	Official Swiss gender statistics rely on a different categorization of academic positions. The relevant data are published in the <i>She figures reports</i> ⁶⁸ , which include Swiss data.

Priority 5a	Scientific knowledge transfer
Indicator	Percentage product or process innovative firms collaborating with higher education institutions or with public research institutions for their innovation activities.
Data availability	The relevant data are available, although future data collection is at the moment uncertain.

Priority 5b	Promoting Open Access to scientific publications
Indicator	Proportion of Open Access papers (Gold and Green OA only) per country.
Data availability	Swiss data are unavailable. DG RTD shall provide in 2016 data that will be updated on a 6-month basis.

Priority 6	International cooperation
Indicator	International scientific co-publications per thousand researchers (FTE) in the public sector.
Data availability	Swiss data available. EU data shall be provided by DG RTD along the data for indicator 5b.

⁶⁸ She figures report 2015. Available at: http://ec.europa.eu/research/swafs/pdf/pub_gender_equality/she_figures_2015-final.pdf.

B. Outlook

As highlighted in this document, Switzerland is strongly committed to the ERA goals. As a traditional research and innovation partner of the EU, Switzerland is also committed to the ERA itself. It has participated in EU Framework Programmes since 1987 (officially associated since 2004). The country is also associated to the Euratom Programme since 1978. Switzerland is heavily involved in the ERA and its further development. It participates in ERA governing bodies, notably in ERAC and all ERA-related groups. As such, it actively contributes to the elaboration of ERA initiatives and policies, including the elaboration of the EU Roadmap.

Having participated in their elaboration, Switzerland intends in any case to pursue the implementation of the goals and priorities laid down in the European ERA Roadmap and described in the present document. With the adoption of a new Federal Council Bill for education, research and innovation for the period 2017-2020, the Swiss Parliament will also approve a new set of measures aimed at reinforcing the Swiss research and innovation sector. The new Bill is currently being discussed in the Swiss Parliament and will be adopted by the end of 2016 at the latest. Given that it has not been adopted yet, its content is not commented within the present document.

Annex: List of Existing Measures

A. ERA Priority 1: More effective national research systems

National measures contributing to ERA	Type of Initiative	Description	Source
Federal Council ERI Bill 2013 - 2016	<i>Policy</i>	Increases the amount of grant funding awarded on a competitive basis for research and innovation. The Federal Council aims for a growth rate of expenditures for education, research and innovation of 3.7% per year. Total planned federal expenditure for ERI over the 2013-2016 period stands at around 26 billion Swiss Francs.	SERI
Competitive funding as core principle with regard to the promotion of research and innovation	<i>Law</i>	Assures the high level of excellence in the selection of projects.	RIPA
Institutional evaluation involving international experts	<i>Law</i>	Increases the efficiency and effectivity of the institutional funding. Implemented by the SNSF.	SNSF
Funding of basic research offered on a competitive basis	<i>Programme</i>	Improved criteria for SNSF project proposal evaluation: majority of foreign experts, English proposal forms, international peer panels, co-evaluation with other countries. This maintains an independent evaluation up to international standards.	SNSF
Funding of applied research and innovation offered on a competitive basis	<i>Programme</i>	Applied research and innovation projects are evaluated by independent experts.	CTI
National Centres of Competence in Research (NCCRs)	<i>Programme</i>	Promotion of long-term research projects in areas of vital strategic importance for the development of science in Switzerland.	SNSF - NCCR
National Research Programmes (NRPs)	<i>Programme</i>	Generate scientific knowledge aimed at solving Switzerland's most pressing problems.	SNSF - NRP
Improved legal basis for direct funding of industry in international programmes	<i>Law</i>	Provides a simplified federal legal basis for cooperation in transnational European projects like PPP's, JTI, AAL, Eurostars II.	SERI - RIPA
Improvement of the federal law for R&I for transnational joint programming	<i>Law</i>	Enables a more efficient process process to conclude an agreement for transnational joint programming based on international binding laws in the field of research and innovation.	SERI - RIPA
Financial supplementary message on the promotion of energy research 2013-2016	<i>Programme</i>	Increases the amount of grant funding specifically awarded for energy research, however still on a competitive basis.	SERI - Energy research

B. ERA Priority 2a: Jointly addressing grand challenges

Current national measures	Type of initiative	Description	Source
Switzerland's International Strategy for	<i>Strategy</i>	It is one of Switzerland's top priorities of the international strategy in the field of education, research and innovation (RDI) to increase the already well-established Swiss participation in European RDI cooperation and its relevant programmes as	SERI

Current national measures	Type of initiative	Description	Source
Education, Research and Innovation		well as the further improvement of mobility in research.	
Increased funding of transnational cooperation	<i>Programme</i>	Around 850 million Swiss Francs per year are spent on international research cooperation. At present around 11.4% of all annual federal resources for the promotion of research and innovation (GBAORD) go to international cooperation activities, representing 0.87% of the GDP (2012).	Swiss Federal Statistical Office (2015)
Participation in JPIs	<i>Programme</i>	Switzerland is participating in the following 5 Joint Programming Initiatives JPIs of the 10 ongoing JPIs: Alzheimer and other Neurodegenerative Diseases (JPND), Agriculture, Food Security and Climate Change (FACCE JPI), More Years, Better Lives (JPI MYBL), Antimicrobial Resistance (JPIAMR), A Healthy Diet for a Healthy Life (JPI HDHL).	SERI
Participation in ERA-NET initiatives	<i>Programme</i>	<p>Switzerland is also actively participating in ERA-NETs. Under the 7th EU Framework Programme, Switzerland participated in over 40 ERA-Net and ERA-NET+ initiatives as a partner and is still actively participating in 20 of these initiatives. Under Horizon 2020 there are currently Swiss direct or indirect participations in 7 ERA-Net Cofund projects (Biodiversa3, ENSCC, ERA-NET SmartGridPlus, E-Rare-3, HERA JRP UP, ERA-Net NEURON, ERA-Planet).</p> <p>The objective of the ERA-NET scheme is to develop and strengthen the coordination of national and regional research programmes. ERA-NET initiatives are designed to support public-public partnerships, meaning the promotion and coordination of cooperation between national and regional research funding organisations and programme agencies to overcome the fragmentation of the ERA.</p> <p>In Switzerland, various public institutions, such as the SNSF, the Commission for Technology and Innovation CTI (future "Innosuisse"), federal departments and offices, are responsible for decisions (also on funding) with regard to ERA-NET project participation and joint calls.</p> <p>Through project funding and the National Research Programmes (NRPs) the SNSF supports researchers' participation in JPIs or ERA-NETs. For example, research groups in the NRPs 68 and 69 could also submit proposals for JPIs. In addition to their own budget of 13 million CHF each, NRP 68 and NRP 69 have together up to 4 million CHF available for participating in calls of JPIs, such as the FACCE JPI.</p>	SERI
Participation in COST	<i>Programme</i>	<p>The European Cooperation in Science and Technology COST contributes to reducing the fragmentation in European research investments, is complementary to the major research funding programs through joint bottom-up research programmes (Actions) with a focus on advanced multidisciplinary. Through its inclusiveness policy, COST supports the integration of all European research communities, as the new EU Member States, to address grand challenges in all of Europe.</p> <p>Switzerland is strongly involved in COST. In 2014, Swiss researchers participated in 315 of 365 ongoing COST actions. The State Secretariat for Education, Research and Innovation SERI provides and manages national funding opportunities for collaborations within COST Actions.</p>	SERI
Participation in EU Framework Programmes	<i>Programme</i>	<p>Horizon 2020 supplies Europe with an essential possibility for more cooperation and exchanges across national borders.</p> <p>Switzerland is actively involved in the EU Framework Programmes. This involvement is also one of the top priorities of the international ERI strategy.</p>	SERI
Participation in EUREKA	<i>Programme</i>	<p>The Swiss Confederation also participates in the European innovation initiative EUREKA, where Swiss participations are funded through the CTI. EUREKA brings together knowledge of market-oriented research, development and implementation. By having companies, research institutes and universities work together on transnational projects.</p> <p>Currently, Swiss researchers are involved in 160 of all 730 ongoing EUREKA initiatives (incl. Eurostars; data retrieved in Jan. 2015).</p>	SERI
Participation in European Research Organisations	<i>Research Organisations</i>	Switzerland contributes also to almost all big intergovernmental Research Organisations in Europe, such as the European Organisation for Nuclear Research CERN, European Molecular Biology Laboratory EMBL, European Space Agency ESA, European Organisation for Astronomical Research in the Southern Hemisphere ESO, European Spallation Source ESS, European Synchrotron Radiation Facility ESRF, Institut Laue-Langevin ILL, European XFEL Free-Electron Laser Facility, and is also associated in the fusion part of EURATOM, including the Joint European Torus JET, and the International Thermonuclear Experimental Reactor ITER.	SERI

Current national measures	Type of initiative	Description	Source
Participation in Art. 185 and 187 initiatives	<i>Programme</i>	Switzerland participates in and contributes co-funding to the Art. 185 and 187 initiatives. An Art. 185/187 initiative is a joint programme according to article 185/187 of the Treaty on the Functioning of the European Union TFEU. Switzerland is participating in the Art. 185 initiatives and in the Joint Technology Initiatives (JTI) according to the Art. 187 TFEU. These are based on public-private partnerships between businesses and the European Union.	Art. 185 : SERI Art. 185 : SERI Art. 187: SERI
Participation in other international cooperation initiatives	<i>Programme</i>	The Swiss Confederation also participates in (and contributes to) other international cooperation initiatives as the Human Frontier Science Programme Organisation (HFSP) and the Mediterranean Science Commission (CIEM - <i>Commission internationale pour l'exploration scientifique de la mer Méditerranée</i>), and it also participates in activities and programmes of the European Institute of Innovation & Technology (EIT), as the Knowledge and Innovation Communities (KICs).	SERI SERI
International cooperation strategy of the SNSF	<i>Strategy</i>	In 2012, the SNSF has defined its international cooperation policies in an international cooperation strategy paper (SNSF Roadmap 2013-2016: International co-operation strategy) and thereby is committed to the realisation of the ERA, in cooperation with Science Europe and the Liaison Office SwissCore in Brussels. The SNSF has defined an international cooperation strategy and thereby it is committed to the realisation of the ERA, in cooperation with Science Europe and the Swiss Liaison Office SwissCore in Brussels. See latest version of the SNSF strategy on international cooperation: Latest version: SNSF (2012): SNSF Roadmap 2013-2016: International co-operation strategy, SNSF Bern;	SNSF
Lead Agency Agreements	<i>Agreement</i>	The SNSF set up the D-A-C-H framework together with the German (DFG) and the Austrian RFO (FWF) concerning joint financing of bilateral or trilateral projects. So-called Lead Agency Agreements allow researchers to submit a joint proposal to only one of the involved funding agencies, namely in the country with the bigger part of the budget. The Lead Agency evaluates the whole proposal independently and if accepted, it funds the researchers based in its country, while the other agency recognises the outcome and funds the project partners in its country. Further bilateral Lead Agency agreements were signed with the RFO of Luxembourg (FNR) and France (ANR).	SNSF
Money Follows Researcher Process and Money Follows Cooperation Line Process	<i>Structural activity</i>	In order to reduce barriers for cross-border collaboration, the SNSF implemented the so-called "Money follows Researcher" and "Money follows Cooperation Line" principles. The "Money follows Researcher" process is aimed at researchers, who move abroad and would like to finish already granted projects. In principle, portability of the grant is possible to any country. The project can either continue in Switzerland, while being managed from abroad or the funds can be transferred to the new location, while reporting continues with the original funding agency. The "Money follows Cooperation Line" process is aimed at researchers in Switzerland, carrying out projects, in which a small subproject is conducted abroad. The sub-projects abroad are funded by the SNSF. This is currently possible in Germany and Austria (small sub-projects) and in the UK (only in humanities and social sciences).	SNSF
Internationality as evaluation criterion	<i>Structural activity</i>	International networks and cooperation is an important evaluation criterion for the approval of national programmes, such as new National Centres of Competence in Research (NCCRs) of the SNSF. Aimed at an increased number of Swiss research consortia within transnational networks.	SNSF
SCOPES 2013-2016	<i>Programme</i>	Scientific co-operation between Eastern Europe and Switzerland (SCOPES) is a programme run jointly with the Swiss Agency for Development and Cooperation SDC to fund projects aimed at promoting fair cooperation with scientists in Eastern European countries in transition and building the scientific capacity of their institutions. Joint Research Projects (JRPs) are providing funding for researchers from partner countries to carry out innovative projects at the Eastern European and Swiss research facilities involved and Institutional Partnerships (IPs), which contribute to the development and modernisation of institutional aspects of research and teaching institutions in Eastern Europe and the NIS.	SNSF
Other Joint Programmes and Research Initiatives	<i>Programme</i>	The SNSF provides direct funding through specific funding schemes, aiming at the facilitation of international cooperation. For example the SNSF finances international short visits, the already mentioned participations in JPIs or ERA-NETs and concrete joint research projects. The latter are either funded by the SNSF or co-funded by Switzerland and a partner country.	SNSF
EUCOR and its European Campus	<i>Macro-regional transnational</i>	A good example of a macro-regional transnational cooperation initiative is the European Confederation of Upper Rhine Universities EUCOR, founded by neighbouring universities in Germany, France and Switzerland. It has a pioneering	EUCOR

Current national measures	Type of initiative	Description	Source
	<i>al cooperation initiative</i>	role in European cross-border cooperation in higher education and research. The new aim and strategic lighthouse project of EUCOR is the creation of a European university alliance, which will form the core of a campus without borders on the Upper Rhine. This European Campus preserves the autonomy of the partner universities, while at the same time enabling them to submit funding proposals in Germany, France, Switzerland, and "Brussels" as an autonomous entity. A European Campus means joint professorships, joint administrative personnel, joint service departments, joint research projects, joint doctoral candidates, students and degrees, and it will also have common research infrastructures.	
Supportive measures	<i>Private organisation</i>	Under the terms of a mandate received from the State Secretariat for Education, Research and Innovation (SERI), two private organisations, Euresearch in Bern and SwissCore in Brussels, lend support to Swiss education and research institutions and stakeholders wishing to take part in European research cooperation endeavours.	Euresearch SwissCore

C. ERA Priority 2b: Make optimal use of public investments in research infrastructures

The Swiss RI Roadmap contains an exhaustive inventory of the existing national and international RIs in which Switzerland is involved (Annex B). It also details the newly-submitted national RIs (Annex A). The complete document is available at:

http://www.sbf.admin.ch/themen/01367/02040/index.html?lang=en&download=NHZLpZeg7t.lnp6l0NTU042l2Z6ln1ad1lZn4Z2qZpnO2YUq2Z6gpJCEd4N6e2ym162epYbg2c_JjKbNoKSn6A--

D. ERA Priority 3: An open labour market for researchers

As the measures in this area essentially consist of case by case actions that are decided at the RPO level rather than under state jurisdiction, no list is provided.

E. ERA Priority 4: Gender equality and gender mainstreaming in research

Current national measures	Type of initiative	Description	Source
Equal Opportunity of women and men at universities and universities of applied science 2013-2016 - Swissuniversities	Funding programmes	Federal government provides funding for gender equality actions on the basis of the universities' individual action plans, which must address the issue of gender equality on a structural level in all key areas of activity: teaching, research and community service. The aim is institutional and cultural change through gender equality.	Swissuniversities SERI
120% support grant - SNSF	Funding programmes	The aim of the 120% support grant is to help researchers achieve a balance between their academic career and family life and thus make a career in academia more appealing for young scientists. This measure was initiated for the benefit of postdoctoral researchers who need to look after children during an important stage in their careers and who therefore need more flexibility for a limited period. To be eligible for the scheme, researchers must have at least an 80% job in the project and assume family care duties. The 120% support grant will enable them to reduce their work-time percentage for a limited period and hire a support person at the same time.	SNSF
Marie Heim-Vögtlin MHV grant - SNSF	Funding programmes	Specific SNSF grant for women returning after a career break. Grants are aimed at doctoral students and postdocs with excellent qualifications.	SNSF
Gender equality grant - SNSF	Funding programmes	The gender equality grant is aimed at young women researchers funded by the SNSF. It offers them additional individualised and flexible support for their career development. An eligible person receives CHF 1000 per 12 months' approved project running time. The grant may be used to finance career support measures but does not cover family support measures.	SNSF
Mobility fellowships - SNSF	Funding programmes	The amount of the fellowship is based on the applicant family status and family obligations as well as cost of living in the host countries. Concerns Doc.mobility, EarlyPostdocMobility and Advanced PostdocMobility.	SNSF

Current national measures	Type of initiative	Description	Source
SNSF professorships	Funding programmes	From the beginning of the funding the target of 30% women scientist was set for the SNSF professorship. This target has been reached over the last years. The proportion can vary, like in 2013 (23%). The SNSF will continue its efforts to increase the proportion of female scientists.	SNSF
	Policy	Flexible age limit in all career funding instruments of the SNSF	SNSF
	Policy	Gender objectives are part of all performance of the Federal Council with the ETH-Domain, CTI and SNSF The performance agreement (Leistungsvereinbarung) of the Swiss Confederation with the ETH-Domain demands to enhance the participation of women on all levels, as well as to promote flexible working schemes to improve work-life balance of researchers.	ETH Board CTI SNSF
Gender Campus.ch	Schemes	National Platform for Gender equality, gender studies and the promotion of gender-sensitive careers in higher education Lists all national institutions, programmes, statistics, training offers and offers in the respective research fields.	Gender Campus
FEMDAT.ch	Schemes	Data collection of women experts and platform for women's career since 2005; (financing: public private)	http://femdat.ch/
Diversity@CTI	Schemes	Aims to increase the number of female experts and coaches used by the CTI; introduces mentoring and networking; establishment of best practices and benchmarking	CTI

F. ERA Priority 5: Optimal circulation and transfer of scientific knowledge

Existing measures are described under the respective priority.

G. ERA Priority 6: International Cooperation

Existing measures are described under the respective priority.