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"SLOVENIAN ERA ROADMAP"

SLOVENIAN STRATEGY FOR Strengthening the European Research Area 2016–2020

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Abbreviations used in the text:

ARRS	Slovenian Research Agency
MS	Member States
EEN	Enterprise Europe Network
EFSI	European Fund for Strategic Investment
EC	European Commission
ERA	European Research Area
ERAC	European Research and Innovation Area Committee
ERC	European Research Council
ESFRI	European Strategic Forum for Research Infrastructure
ESIF	European Structural and Investment Fund
EFSI	European Fund for Strategic Investments
ERDF	European Regional Development Fund
EU	European Union
FP6	EU's 6th Framework Programme for activities in the field of research, technological development and demonstration (2002–2006)
FP7	EU's 7th Framework Programme for activities in the field of research, technological development and demonstration (2007-2013)
GBAORD	Government budget appropriations or outlays for research and development
GPC	High level group for joint programming
HR	Human resources
IUS	Innovation Union Scoreboard
JPI	Joint programming Initiatives
JPP	Joint Programming Process
PRO	Public research organisations
JU	Joint undertaking
MEDT	Ministry of Economic Development and Technology
MIRRIS	FP7 Project: Mobilising Institutional Reforms in Research and Innovation Systems
MESS	Ministry of Education, Science and Sport
MSCA	Marie Skłodowska Curie Actions
NCP	National Contact Points
NRRI	Research Infrastructure Development Plans for 2011–2020
Horizon 2020	8th Framework Programme for Research and Innovation 2014–2020
TFEU	Treaty on the Functioning of the European Union
ReNPEOWM	Resolution on the National Programme for Equal Opportunities for Women and Men 2015-2020
RISS	Research and Innovation Strategy of Slovenia 2011-2020
RDI	Research, development and innovation
S4	Slovenian Smart Specialisation Strategy
SFIC	Strategic Forum for International Science and Technology Cooperation
SICRIS	Slovenian Current Research Information System
SIP	Slovenian Industrial Policy
SRIA	Strategic Research and Innovation Agendas
SSH	Social Sciences & Humanities
TTO	Technologies Transfer Office
RDA	Research and Development Act

1 EUROPEAN RESEARCH AREA

At the end of the 1990s, the lack of coordinated policy in the field of research and development in Europe became evident. National policies in research, development and innovation (RDI) and RDI activities in the European Union (EU) did not complement and build on each other. The possibility for coordinated joint European research had not yet been established.

To overcome this, the European Commission (EC), at the turn of the millennium, proposed to establish the European Research Area (ERA) - an "internal knowledge market" in the EU. In accordance with the EC vision to reduce obstacles for the exchange of ideas, synergies and the optimisation of research, the new ERA strengthening process would prevent the dispersion and isolation of national research and the lack of coordination between regulative and administrative systems. ERA as "a unified research area open to the world based on the Internal market, in which researchers, scientific knowledge and technology circulate freely and through which the Union and its Member States strengthen their scientific and technological bases, competitiveness and capacity to collectively address grand challenges", was defined in March 2000 at the meeting of the European Council in Lisbon. Thus, ERA became the essential component for realising the main Lisbon objective – to enhance European competitiveness – and the key reference for research policy in Europe.

With the adoption of the sixth EU Framework Programme (FP6) covering activities in the field of research, technological development and demonstration for the period 2002 to 2006, the framework programme became the main thematic and financial instrument for achieving the objectives of ERA. The seventh Framework Programme for research, technological development and demonstration activities (2007-2013) (FP7) further strengthened this mission, which continues to be pursued by the eighth Framework Programme for research and innovation – Horizon 2020, covering the 2014-2020 period. At the start of FP7, the EC together with the Member States (MS) decided to re-establish momentum for the formation of ERA. It published the Green Paper on ERA, calling for greater synergies and convergence within ERA. As a result, in 2008 MS and the EU launched a new and strong political partnership called the "Ljubljana Process", which was to represents a key milestone in overcoming dispersion and building a strong ERA. The main objective of the process was to establish the "fundamental role of ERA as a primary pillar for the Lisbon objectives and as an engine for driving the competitiveness of Europe". The 2020 Vision for ERA was adopted in 2008 and was denoted by the Competitiveness Council as the decisive first phase of the "Ljubljana Process". At the end of 2009, the EU Council requested the EC to continue and strengthen joint governance of ERA through systematic, structured and transparent consultations with MS and other suitable interested stakeholders.

In 2012, the European Council called for ERA to be established by the end of 2014. Based on

a SWAT analysis of European research systems and the general objective, i.e. to introduce long-term gradual changes in the effectiveness and success of European research until 2014, the EC together with MS identified the areas in which activities to establish a strong ERA were required to be taken. **Six priorities** were identified:

1) **An effective national research and innovation system** – including increased competition within national borders and sustained or greater investment in research;
2) **Optimal transnational cooperation and competition** – defining and implementing common research agendas on grand challenges, raising quality through Europe-wide open competition, and constructing and effectively running key research infrastructures on a pan-European level;
3) **An open labour market for researchers' mobility** – to ensure the removal of barriers for researcher mobility, training and attractive careers;
4) **Gender equality and gender mainstreaming in research** – to sustain the potential of talented individuals needed in scientific research, to support the development of new models and approaches in research, and to foster excellence;
5) **Optimal circulation, access to and transfer of scientific knowledge** – also via the digital ERA – to guarantee the access to and the uptake of knowledge by all.
6) **Strengthening the internationalisation of ERA.**[1]

In February 2014, the Competitiveness Council invited MS to develop in close collaboration with the EC an ERA Roadmap on the European level and devise concrete measures until mid-2015. The proposed ERA Roadmap 2015-2020 was adopted by the Competitiveness Council in May 2015. It identified key tasks in priority areas (and the mechanisms for their implementation) that will, if efficiently implemented in individual MS, most likely have the greatest impact on European science, research and innovation systems.

It is of crucial importnance that MS and regions structure their research systems based on their advantages in accordance with smart specialisation. At the same time their national systems should become more open, interconnected and interoperable, if the globally competitive ERA, where all MS collaborate, should have a leading role in tackling major challenges. This will enhance competitiveness and improve collaboration. While competitiveness ensures the allocation of funds to the best researchers and research groups, collaboration enables excellent researchers to research together, expedite discoveries and prevent the unnecessary duplication of investments in national research and infrastructure.

A faster development of ERA will bring efficiency, quality, greater influence and new opportunities to all MS. At the same time, it is an opportunity for countries to assume responsibility for transforming their own research systems, to continue smart specialisation procedures and to contribute to the bridging of the research and innovation gap.

[1] The sixth priority, i.e. *Strengthening the internationalisation of ERA*, was added by the European Council subsequently, in September 2012.

2 THE SLOVENIAN VISION OF ERA

By 2030, Slovenia will join the group of countries, which are according to the Innovation Union Scoreboard[2] innovation leaders.

According to the Innovation Union Scoreboard performance indicators for monitoring innovation trends in MS, Slovenia is currently an innovation follower. When it comes to investment in RDI, Slovenia places above the EU average and is part of the group of seven countries with the largest share of GDP invested in RDI. The investments of the Slovenian business sector in RDI are among the highest and Slovenia achieves excellent results in human resources (HR) development.

The development of ERA depends on complementing the advantages and excellence of individual national systems and on joint efforts for overcoming their deficiencies. Closer collaboration among national policy makers and the EC in this area is the key to an improved and more competitive ERA. Small countries like Slovenia can play an important role in this process, since they can be more dynamic and faster in the implementation of reforms in comparison to large countries.

Despite its relative smallness Slovenia is in the geopolitical sense, the only European country spanning over three European regions or macro regions: the Danube, Alpine and Adriatic-Ionian region. Furthermore, it is located at the doorstep of South East Europe with which it closely collaborates in all areas. Its crossroad position largely determines its strategic interests, advantages, possibilities and deficiencies. Similar educational, scientific, research and innovation tradition brings Slovenia strategically closer to the developed countries of Central Europe in the Alpine region that belong to the group of the most developed and competitive countries in the world. Therefore, Slovenia strives to strengthen strategic cooperation with these countries and transfer their practices in its own national system.

In synergy with European Cohesion policy instruments the Horizon 2020 programme can enable faster development of the Slovenian national research and innovation infrastructure as well as excellence in RDI, with focused funding of priority areas being the key to success. An improved and more efficient national research and innovation system will allow Slovenia to contribute significantly within the scope of ERA to the competitiveness of the EU on a global level.

[2] The Innovation Union Scoreboard (IUS) stipulates annual comparable assessment of success rate for research and innovation in EU Member States and relative advantages and weaknesses of their research and innovation systems.

3 THE STRATEGY FOR STREGNTHENING ERA

3.1 Priority area 1 EFFECTIVE NATIONAL RESEARCH AND INNOVATION SYSTEM

BACKGROUND

An effective national research and innovation system is the basis for a successful and competitive European Research Area (ERA). The national system is integrated in ERA by finding complementarities and not replacements for national funds that are, following strategic guidelines, distributed along the entire research and innovation chain.

The establishment of a responsible research and innovation system that will be formed in close collaboration with stakeholders and will be open to the world is the focal point of the Research and Innovation Strategy of Slovenia 2011-2020 (RISS). Democratic and economic governance of all stakeholders, free flow of knowledge and technologies among sectors, strategic, financial, managerial autonomy of research institutions, independent external institutional assessment and appropriate financial support from the state (1.5% of GDP until 2020) are the foundations for its realisation. Slovenia has made numerous steps in the direction of implementing RISS, but the economic crisis and the resulting uncertainties have slowed down the process.

RISS represents a redirection to a more target-oriented governance of research, development and innovation (RDI), and is supplemented by the Slovenian Smart Specialisation Strategy (S4) adopted in 2015. In terms of content RISS is also complemented by the Slovenian Industrial Policy (SIP), adopted in 2013. The revised strategic documents, including the National Higher Education Programme 2011-2020 adopted in 2011, represent a good basis for structural change; however, to realise a successful and effective national RDI system exceeding the currently insufficiently integrated management of research and innovation is necessary. This is manifested in the lack of collaboration among all stakeholders in the knowledge triangle (education-research-innovation) and consequently in the underexploited potential of Slovenia in the field of RDI. Although some indicators, e.g. those in the field of HR development and business sector expenditures for RDI, position Slovenia above EU average, the IUS ranks it below EU average. As the only country in the informal group of EU-13, Slovenia is one of the innovation followers, with most indicators, also those with bellow average results, e.g. income from patents/licences, showing a positive growth trend.

On national level, the result may be attributed to a comparably intensive RDI policy in the past 15 years, good RDI capacities in the public sector and high RDI intensity in the private sector. The later results at least in part from changes in legislation, providing tax relief for RDI investment and the collaboration of the industry in instruments co-funded with European

cohesion funds (e.g. centres of excellence and competence centres). Positive developments in RDI can to a greater extent also be contributed to a well-developed but dispersed research infrastructure and its internal accessibility, some areas of excellence in academic and industrial research, and the integration of Slovenian researchers in a wider European landscape with successful cooperation in FP7 and Horizon 2020, including ERA-NET and SME instruments.

Slovenia's starting position is relatively good, but further development, greater efficiency and success of its RI system primarily require appropriate financial support of the state and the establishment of a modern legal framework, that will support the establishment of a clear and effective RDI managerial structure following trends of increased transnational collaboration.

The current Research and Development Act from 2002 (RDA) is not harmonised with RISS; the preparation of the new RDS has been underway for several years. The government budget appropriations or outlays for research and development (GBAORD) dropped by approximately 20 percent between 2011 and 2013 and amounted to 175 million EUR or 0.48 percent of GDP in 2013. With Slovenia's GBAORD dropping below one percent of the total general governmental expenditure for the first time, the country joined the group of only nine MS at the tail of the scoreboard. That GBAORD per inhabitant in Slovenia is almost half the EU-28 average is telling. National and international studies[3] show many weaknesses that should be addressed in the process of establishing an effective national RDI system. These include partiality and the underdevelopment of incentives for RDI that do not systematically address the entire innovation cycle and are thematically scattered, resulting in great dispersal of public and private RDI expenditures and a gap between public and private RDI expenditures; a low success rate achieving research and innovation outcomes and thus questionable nature of investment quality; a lacking link between stable institutional funding, the obtained results and their impact; and a low level of public and private sector internationalisation.

The effectiveness and success of the national RDI system in Slovenia as an innovation follower depends on a much greater number of factors than the three emphasised by the EU, i.e. greater competitiveness in RDI project funding (based on international peer-review), the assessment of research organisations as a basis for the allocation of funds, and using the international peer-review principles in all institutions allocating public funds. The Slovenian Research Agency (SRA) started employing international peer-review principles harmonised with European standards in project assessment in 2008, but the importance of bibliometric indicators in the project proposal overview remains too big. A system comparable to the one on European level is more questionable in the field of technological innovation where the culture of assessment must be improved. Furthermore greater emphasis on programme and institutional assessment of PROs is needed, since limited institutional funding in the form of founders' obligations and research programmes, do not allow universities and institutes to

[3] S4, 2nd Policy Dialogue Report Slovenia (MIRRIS, 2015), Country Report – Slovenia (EC, 2015)

strategically manage their activities and the state to successfully and effectively implement RDI policy as is set out in the RISS.

OBJECTIVES

1. Improved RDI management aiming at the establishment of an effective and uniform national RDI system that involves all knowledge triangle stakeholders, systematically addresses the entire research and innovation chain, and takes into account the integration of the stakeholders into ERA and the broader international environment.

The national RDI system is dispersed which is reflected in a plethora of different programme documents. The consequence of an extensive number of strategic documents is the duplication of instruments and insufficient implementation of activities. Harmonising procedures of planning, implementing and assessing policies among all stakeholders in the innovation system (including support and executive institutions) requires effective inter-institutional collaboration, and a clear and unambiguous distribution of responsibilities among individual stakeholders shaping the RDI system as the basic components needed to successfully achieve of the set objectives. Additionally, the adoption of new and timely legislation and successful harmonisation of various national RDI strategies and policies is needed, with the integration in ERA being their common denominator.

2. A successful and internationalised public research sector with a clear mission and vision to implement excellent, internationally recognised, well-known and competitive research in those fields in which individual stakeholders are especially successful and/or have the opportunities for further development.

Public research organisations (PROs) are a strong player in the national research and innovation system, but will have to become more successful and follow modern PRO management trends. This is preconditioned with their greater autonomy in management and research, funding in accordance with international peer-review (both of projects resources and HR), scientific excellence of research and the participation in transnational projects. Such projects enable the transfer of knowledge and competences and provide opportunities for involvement in addressing societal challenges, contributing also to a rise in recognition and acclaim of Slovenian researchers in Europe and beyond.

3. Successful, sustainable and active RDI performance of the private sector that contributes to an increase in its innovative ability and greater international competitiveness.

Private investment in RDI has increased in the past few years, which is of great importance taking into account past reductions of budget appropriations in RDI. Private investment in RDI should be further stimulated also by strengthening the collaboration between PROs and innovative industry. Based on experience, collaboration on national level can result from cooperation in transnational projects, thus such cooperation, with other positive effects for the private sector (e.g. access to global value chains and penetration into foreign markets), should be further stimulated.

MEASURES

- **Changing RDI legislation in accordance with RISS** as the framework of the national RDI system and the base for successful implementation of RDI policies and strategies and achieving alignment between national and European RDI policy.
- **Forming a uniform advisory body of the Government of the Republic of Slovenia** – the Research and Innovation Council, that will bring together all participants of the national RDI system and will actively cooperate with the S4 national innovation platform. The Council will play a key role in establishing synergies among various strategies and policies in RDI (RISS, SIP, S4, Strategic Framework for the Development of Slovenia by 2050 (in preparation)) and put RDI policy to the forefront of development policies of the Slovenian Government.
- **Introducing stable institutional funding** based on external evaluation of institutions and thematic areas which shall, in addition to scientific excellence, take into account social relevance, collaboration with innovative industry and the integration in ERA.
- **Strengthening the innovation and technological development section** in the Public Agency of the Republic of Slovenia for Entrepreneurship, Internationalisation, Foreign Investments and Technology.
- **Optimising the RDI funding system** according to principles of flexibility and cost effectiveness.
- **Establishing** a comprehensive RDI funding system based on **complementarity and synergies among national and European RDI funds** that will enable co-funding **Slovenian researchers in excellent projects** for which sufficient funds on European level are not available (ERC grants, SME instrument, spreading scientific excellence and cooperation instruments, etc.).
- **Continuing with the introduction of improvements in selection procedures of research and development projects** that enhance the quality of assessment procedures in accordance with international peer-review principles.
- **Assuming growth of investments in accordance with RISS objectives, increased investments in transnational collaboration projects** within Horizon 2020, support programmes and other EU measures for strengthening ERA with a **clear integration of instruments in the national funding system.**
- **Establishing a project funding and evaluation system in the technological innovation field** that takes into account principles of international peer-review, stimulates collaboration between PROs and innovative industry, and further stimulates investment of the business sector in RDI.
- **Stimulating the integration of the private sector in transnational collaboration projects** within Horizon 2020, support programmes and other EU measures for strengthening ERA.

INDICATORS[4]

- Research excellence indicator ((1) highly cited publications, (2) PCT patents, (3) ERC grants, (4) MSCA grants)

[4] Selected indicators are shown with each priority, with starting values delineated in *Appendix 1*: *Chart of indicators with values* (pages 31 and 32)

- Share of gross domestic expenditures for RD in GDP (of which share of budget appropriations for RD)
- Innovation Union Scoreboard (IUS) composite indicator

3.2 Priority area 2A
JOINTLY ADDRESSING GRAND SOCIETAL CHALLENGES

BACKGROUND

International cooperation in RDI is key for resolving major global societal challenges. Societal challenges, among others climate change, preservation of biodiversity, demographic challenges involving ageing and population growth and food safety, have become the main factor stimulating research in the past few years. Strengthening cross-border cooperation and better coordination of regional and national efforts are crucial for the development of critical mass for joint examination of challenges and the search for their solutions. Transnational cooperation in RDI will significantly contribute to the realisation of the 2030 Agenda for Sustainable Development, which through the principle of universality obliges all world countries to realise the 17 sustainable development goals. The role of RDI is also indispensable in achieving successful implementation of policies on mitigation and adaptation to climate change, which countries have agreed upon with the historic Paris Agreement on Climate Change adopted in December 2015. Being complex and interlinked, global challenges need to be addressed through a comprehensive and balanced approach considering all, i.e. environmental, economic and social dimensions of sustainable development.

In accordance with the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 15 July 2008: "Towards Joint Programming in Research: Working together to tackle common challenges more effectively", Joint Programming (JP) was identified as particularly important to the Joint Programming Process (JPP). Joint Programming presents a change in European cooperation in the field of RDI. The mechanism is expected to become as significant as framework programmes and to actually change the management of research in ERA.

The High Level Group for Joint Programming (GPC) Report (2008-2010) defines JP as a "voluntary partnership between Member States (and associated countries) aimed at tackling major but common European societal challenges by coordinating and integrating national research programmes, and thereby making better use of Europe's limited public R&D resources". JP encompasses all forms of transnational cooperation including Joint programming initiatives (JPI), the ERA-NET instrument, initiatives according to Article 185 of the TFEU, Joint technology initiatives (JTI), as well as other programmes, like EUREKA and

COST, that follow the essence of the ERA message, i.e. the need to exceed traditional dispersion of research efforts in the EU through better harmonisation and cooperation.

Slovenia is active in these instruments, currently participating in five of the ten JPIs, 17 ERA-NET projects, three out of four initiatives according to Article 185 of the TFEU and in two of the 5 JTIs.

OBJECTIVES

4. Establishment of new approaches to integrate social sciences and humanities (SSH) in other scientific fields (natural, technical, biotechnical, medical sciences), since societal challenges address changes in society: even when the response is technological, the basic challenge lays in society accepting a specific technological solution. The importance of social studies and humanities is underlined in a special Horizon 2020 programme. In this aspect, appropriate measures stimulating cooperation with and inclusiveness of social sciences and humanities in other scientific disciplines should be prepared and should include stimulation of cooperation in new transdisciplinary and interdisciplinary research programmes and platforms tackling societal challenges. Special attention should be given to abandoning the widespread practice of limiting the contribution of social sciences and humanities in interdisciplinary research only to assisting natural sciences and technology.

5. Greater integration of all stakeholders of the RDI system in ERA via membership or cooperation in EU partnering instruments, as well as the promotion and stimulation of cooperation in other transnational initiatives (e.g. EUREKA), which calls for the establishment of reciprocity among responsible ministries. Furthermore the inclusion of stakeholders in Horizon 2020 calls, especially those focused on solving global societal challenges, needs to be stimulated.

6. Effective governance of EU partnering instruments on national and European level, which also calls for the development of a monitoring and assessment system for each partnering instrument.

7. Greater importance of Strategic Research and Innovation Agendas (SRIA) in forming national programmes for RDI funding and vice versa.

As JPIs are strategic initiatives in which content and structural influences exceed implementation of transnational joint calls by harmonising national resources on European level, Slovenia should more actively approach the joint development of SRIAs. On national level, SRIAs can serve as a reference in funding research programmes, but even more importantly, synergies and complementarities with existing national strategies (e.g. target research programmes and S4) should be sought.

MEASURES

- Targeted co-funding of transnational public research.
- Establishing a monitoring and assessment system for each individual partnering instrument based on which a review of benefits of cooperation in all existing (and potential new) JPI and ERA-NET initiatives and other forms of joint programming can be performed.
- Strengthening the role of JPI SRIAs in devising priorities of RDI policy.
- Integrating social sciences and humanities (SSH) in research.
- Strengthening national and better use of international/EU networking instruments for researchers and institutions.
- Joining forces in the efforts to unify standards and procedures for assessing projects in EU and joint calls, especially according to the Lead Agency principle[5].

INDICATORS

- National GBARD allocated to transnational public RDI programmes
- Cross-border ownership of patents of Slovenian innovators (according to their place of residence) with one or more EU MS and one or several non-EU countries
- Number of projects and acquired funds from Horizon 2020 – 3rd pillar (Societal Challenges)

3.3 PRIORITY AREA 2B OPTIMAL USE OF PUBLIC INVESTMENTS IN RESEARCH INFRASTRUCTURES

BACKGROUND

Various co-funding options by the Slovenian Research Agency (SRA) and through European structural funds represent the main instruments for research infrastructure development. Due to the reduction of funds for science from 2009 onwards, there had been no new national calls for research infrastructure published until 2015.

Greater direct input into national research infrastructure was made through cofounding of eight Centres of Excellence[6] from European structural funds, allowing Slovenia to establish research infrastructure in selected fields on an enviable international level. In addition to the input in research infrastructure via the Centres of Excellence, Slovenia has in accordance with

[5] The Lead Agency principle entails centralised management of a call in which researchers submit project proposals to one agency conducting the evaluation and selection of projects, this preventing unnecessary duplication in the project proposal submission process.
[6] http://goo.gl/mtKFKe

the Research Infrastructure Development Plan 2011-2020 (RIDP) also invested in the renewal of existing infrastructures through international research infrastructure projects mostly from the ESFRI Roadmap. In addition to strengthening capacities for RDI excellence development and stimulating Competence centres, especially those in European interest, the upgrade of infrastructure for RDI is one of the investment fields identified in the Partnership Agreement between Slovenia and the EC for the use of European Structural and Investment Funds (ESIF) for the 2014-2020 period.

Proper management of the established infrastructural capital through updating, maintenance and servicing is needed to provide our research community with the possibilities to conduct significantly more demanding research and tests and thus enable them to achieve breakthroughs on global level. The RIDP underlines the need to strengthen cross-border development of research infrastructures, especially in those fields where comparable research equipment in Europe or in neighbouring countries is not available.

The 2014-2015 National Reform Programme confirms that Slovenia is implementing the RIDP well. The list of research equipment in Slovenia is available through the Slovenian Current Research Information System (SICRIS), which provides a transparent overview of equipment, a quick review of its availability and the establishment of contact for its access and use.

OBJECTIVES

8. Optimal public investment in research infrastructure in compliance with ESIF rules through determining national priorities in accordance with ESFRI priorities.

9. Guaranteed access to excellent research infrastructure through improved use of existing national research equipment and infrastructure.

10. Establishment of excellent research infrastructure through upgrading and building new research infrastructure in priority areas in accordance with RIDP.

11. Strengthening international integration when accessing major research infrastructures through cooperation in those international projects determined as priority and described in RIDP, when the benefit of Slovenia's contribution to the international research infrastructure for Slovenian science is greater than having those funds invested in national infrastructure of the same type.

MEASURES

- Implementation and interim review of RIDP.
- Continuation of cooperation within ESFRI.

- Stimulating the use of ESIF and EFSI for investments in research infrastructure.
- Guaranteeing renewal of research infrastructure in accordance with national priorities.

INDICATORS

- Availability of RIDP including detailed investments in research infrastructure
- Number of research infrastructures from the list of ESFRI active projects with Slovenian participation
- Number of ESFRI projects with Slovenian participation in the implementation phase

3.4 PRIORITY AREA 3 OPEN LABOUR MARKET FOR RESEARCHERS

BACKGROUND

Europe is an important global player in the field of RDI. Today, with cooperation being funded principally in Horizon 2020 as the main programme instrument, the idea that scientific excellence and research at large contribute to the realisation of economic objectives and the development of economy through strengthened collaboration between the academic and the private sector is especially emphasised. For decades, research work in Europe has been aiming at research excellence, with a large number of highly educated and qualified people being an important factor to achieve it. As a result, and given that the development of excellent science and its collaboration with industry are the foundations of general progress of society, Europe has in the past two decades significantly invested in HR development in science. Like in Europe, Slovenian scientific policy recognises that national frameworks cannot limit science, underlying that the development of global science and innovation depend heavily on HR development.

European strategic documents have since the start of FP6 emphasised the meaning of creating beneficial working and living conditions of researchers in Europe with the aim to establish such conditions that would make the EU attractive both for domestic and foreign researchers. Current strategic documents as the basis of Horizon 2020 are an upgrade of prior documents, linking the fields of research and excellent science with innovation and economic progress, and gradually increasing the importance of institutional frameworks in HR development. In the previous programming period (FP7) one of the ERA forming processes was characterised by collaboration between the EC, MS as and the European partnership for researchers, while direct support to HR development in science and their mobility was provided by the Marie Skłodowska Curie Actions (MSCA).

Current European objectives, that build on prior efforts of EU framework programmes for research and technological development to strengthen ERA, are also relevant for the

development of research potential in Slovenia. By participating in Horizon 2020 Slovenian research organisations contribute to realising the set objectives, ensure a response to global problems and strengthen the efforts for global mobility of researchers.

Understanding the significance of HR development has a long tradition in Slovenia. Along with recognising the importance of science for general societal and economic development, strengthening HR in science has a priority in medium-term national research and development programmes. HR development in science and the development of science in general, especially to achieve technological progress and respond to societal problems, are among the development priorities in the Resolution on National Development Projects for the 2007–2023 Period. Taking into account integration processes of national, bilateral and European research, RISS includes efforts to strengthen and develop international research, and introduce open and transparent procedures in engaging researchers and initiating new programmes, both on the level of general research programmes (Competence Centres and Centres of Excellence) and doctoral studies.

Slovenia supports the realisation of national schemes that consider and promote the principles of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. Furthermore, Slovenia encourages universities to operate based on institutional strategies for HR development, which have been prepared in the past three years by individual universities in accordance with the principles of European processes developing ERA, especially the Partnership for Researchers.

In the new higher education and science legislation preparation process national interests are aligned with the objectives of European ERA strengthening processes. When it comes to HR management (new forms of fixed-term employment, transparent procedures in employing researchers), utilising various - national and European - funding sources for HR development in science, and the search for synergies between them, competent national institutions cooperate with national universities and research institutions.

OBJECTIVES

12. Increasing the number of researchers and developers in industry.

Top research personnel will be attracted to Slovenia by introducing stimulating incentives in tax, labour, migration and other legislation. A comprehensive system of stimulating mechanisms increasing the mobility of personnel between PROs and industry will be designed for the employment of researchers in private enterprises, "hiring" researchers and strengthening the research and development capacities of the business sector. Special emphasis will be given to research personnel in natural sciences and technology, including incentives for studies in these fields on tertiary level. In addition to research personnel, private enterprises will need to include a wider range of employees in their innovation processes.

13. Increasing the number of PhD holders, taking into consideration comprehensive development of all disciplines when determining the number of candidates whose doctoral studies are co-funded by the state and when selecting study fields.

14. Planned strengthening of HR qualifications based on lifelong learning. For researchers new knowledge related to acquiring skills for managing and preparing national and international research and development projects is essential, and must be complemented with knowledge of intellectual property management, as well as communication, entrepreneurial and management skills.

15. Providing effective interinstitutional, intersectoral and international mobility of researchers.

Using technological platforms and other mechanisms, such as involving top experts from private enterprises in the education and research system, Slovenia will strategically encourage collaboration and transfer of researchers between PRO and industry. Considering intellectual and work migrations in the field of science, Slovenia should open more to the EU and the world and enhance international mobility of researchers, which significantly contributes to their quality and thus the attractiveness of their research careers.

16. Increasing career opportunities for researchers, with an effective information network on the possibilities of research work in Slovenia and abroad being the basic condition for establishing career opportunities for researchers. An attractive living environment that appeals to foreigners and encourages international mobility must be established. The introduction of stimulating legal provisions warranting social security for researchers, beneficial working conditions and transparent employment procedures is also a foundation for establishing career opportunities. National efforts for research career development will be internationally comparable, in terms of both content and objectives and regardless of research field, and will be aligned with the European starting points for a joint framework for the development of scientific career.

MEASURES

- Scheme for increasing the number and share of researchers collaborating with industry.
- Elimination of administrative, technical and tax obstacles for international mobility in both directions.
- Formation of internationally compatible mechanisms to recognise researcher qualifications.

INDICATORS

- Annual number of research posts in the public sector advertised on the EURAXESS portal

3.5 PRIORITY AREA 4 GENDER EQUALITY AND GENDER MAINSTREAMING IN RESEARCH

BACKGROUND

The legislative framework implementing the gender equality principle in various spheres of life has been largely put in place in Slovenia. The key strategic document of the Government of the Republic of Slovenia, i.e. the Resolution on the National Programme for Equal Opportunities for Women and Men, stipulates objectives, measures and key institutions responsible for realising equal opportunities in individual spheres of life of women and men in the Republic of Slovenia in the 2015-2020 period. The resolution specifies general priority areas for improving the position of women and men and ensuring sustainable development of gender equality in Slovenia, identifying key challenges and problems for the 2015-2020 period. Based on the currently effective Equal Opportunities for Women and Men Act the Government has adopted the Decree regulating the criteria for implementation of the principle of balanced representation of women and men, which stipulates at least a 40% representation of one gender in governmental bodies, expert councils and public entities appointed by the government.

With regard to ensuring gender equality in research, Slovenia follows the objectives and measures from RISS and EC recommendations. Setting concrete and ambitious objectives Slovenia has committed itself to eliminating legislative and other obstacles for the improvement of career opportunities of women and men in accordance with gender equality principles, to reducing gender imbalances in the decision-making process and to strengthening the aspect of gender equality in research programmes and projects.

Following the example of the Helsinki Group the Commission for Women in Science was established in 2001 to help realise the objectives of the aforementioned Resolution. The Commission assists in supporting promotion activities enforcing the gender equality principle, overseeing that the balanced gender representation principle is applied when appointing working bodies under the authority of the ministry responsible for science, and in preparing legal acts and other strategic documents discussing gender equality and asserting the role of women in science in Slovenia. Resulting from lectures and discussions at annual meetings organised by the Commission, a monograph titled "Women in Science, Women for Science" was published in 2013, with a modified version also available in English.

Notwithstanding, progress in the realisation of the set objectives for a more balanced representation of both genders is too slow both in Slovenia and the EU. In Slovenia, inequality in the field of science is especially evident in vertical gender differentiation, i.e. in the share of women in highest academic and research positions. Although there are approximately 50% women among all PhD students, the share of women lowers with each academic rank; in 2012 there were 43% women among assistant professors, 33% women among associate professors and only 23% women reaching the highest academic rank. Furthermore, the gender structure of PhD holders shows unequal distribution between female and male PhD holders in individual scientific disciplines. Horizontal gender differentiation manifests itself in a greater number of female PhD holders in medical and health sciences and humanities. With only 17% of female PhD holders, quite the opposite applies for technical and technological sciences.

To eliminate vertical and horizontal differentiation by gender in Slovenia, it is necessary to expedite the implementation of the gender equality principle and support structural change in the institutionalisation of scientific research. Adopted programmes stimulating gender equality in organisations funding and performing scientific research must reflect this change. Only by exploiting the entire range of labour force and talent, Slovenia will be able to contribute to the diversity, excellence and quality of results, the competitiveness of ERA, economic growth and new job creation.

OBJECTIVES

17. Renewed legislative framework that will promote institutional and cultural change for gender equality in RDI.

In accordance with RISS, the renewal of legislation in research and development foresees the introduction of institutional funding based on assessment results in accordance with the fulfilment of the institution's mission and achieving the agreed objectives. PROs will be stimulated to design action plans for improving career opportunities for researches at all stages of their career and to ensure the gender equality principle.

18. Designing strategies to include the gender equality principle and plans for gender equality in all research organisations.

Designing action plans to improve career opportunities for researchers at all stages of their career and to ensure the gender equality principle at PROs will oblige them to set their long-term goals and measures to achieve gender equality and to assure their realisation. Slovenia supports the increase in the share of women assuming leading positions in PROs to at least 30%, while simultaneously also supporting their participation in industrial research and in the transfer of knowledge to industry.

19. Taking into account the gender equality principle in the allocation of funds and in thematic considerations by RDI funding organisations.

When allocating public funding Slovenia will consider the gender equality principle in relation to the content of research projects or programmes following the example of projects funded

within Horizon 2020. The equality principle will also be considered in the structure of expert bodies responsible for project evaluation in the project or programme selection process.

20. Ensuring comprehensive and transparent data, aggregated according to gender, to design policies more efficiently and to monitor the realisation of gender equality measures in research.

Taking into account the European context, which calls for close cooperation of competent institutions, Slovenia will support further monitoring of statistics and other databases to examine the problems of equal opportunities for women and men in science. Slovenia closely cooperates with the EC in the publication of "She Figures", issued once every three years, and the latest figures were published in the beginning of 2016. The collected data and reports will be systematically monitored at national level for the purpose of evaluating public research institutes and within the scope of realising Action plans to improve career opportunities for researchers at all stages of their career and to ensure the gender equality principle.

21. Cultural change in institutions and wider society through raising awareness, education, training and best practices exchange in the field of gender equality.

The Commission for Women in Science helps support promotional activities for gender equality and every year organises a national conference celebrating the International women's day on March 8. At the conference, held in different Slovenian university centres every year, results of studies in the field of gender equality are presented and promoted. Within the research community, the event stimulates discussion on possible causes and obstacles for a greater role of women in science and other questions related to equal opportunities in the field of research, while media response and promotion raises awareness regarding the issues also among a wider public.

MEASURES:

- Designing action plans to improve career opportunities for researches in all stages of their career and to ensure the enforcement of the gender equality principle at public research institutes.
- Continuous support to the operation of the expert body Commission for Women in Science and the inclusion of other stakeholders of the RDI system.
- Support to research projects in the field of gender equality and dissemination of their results.
- Implementation of the gender equality principle via public funding organisations in setting up evaluation committees and in the content of funded research programmes and projects.
- Establishment of an appropriate analytical system on national level to follow selected indicators in the field of gender equality in research based on gender.
- Consistent consideration of a balanced structure in all bodies appointed by the competent ministry in the field of science.

- Presenting the UNESCO L'Oréal awards to women in science and active encouragement of candidates and institutions to propose female candidates for other awards in science.
- Establishment of an expert body at the competent ministry to coordinate and implement measures enforcing the gender equality principle in science.

INDICATORS

- "A grade" share of women in higher education organisations
- Share of female PhD holders per year
- Share of PROs with Gender Equality Plans

3.6 PRIORITY AREA 5A SCIENTIFIC KNOWLEDGE TRANSFER

BACKGROUND

Considering initiatives such as Open innovation and the introduction of the quintuple helix concept deriving from the triple helix model, the EU strives to achieve an open and dynamic innovation ecosystem, which also involves a wider society and its environment. Responsible science, which tries to improve the quality of life for everyone by expanding new knowledge, is the key guideline. As we face global societal challenges, society does not only depend on new knowledge, but has become its co-creator.

Supporting technology transfer is one of strategic priorities set in RISS, which states that the technologies transfer offices system (TTO) will be established by 2020 together with a metrics for assessing its efficiency. RISS envisages regulation of intellectual property rights among the stakeholders in the commercialisation of research results, support to PRO patenting, a scheme stimulating entrepreneurship of young PhD holders and an active role of PROs in resolving the challenges of societal development. Based on an analytical survey of innovation indicators and policies RISS provides measures necessary for an effective transfer of knowledge in Slovenia and is thus the relevant document guiding the process of eliminating identified structural imbalances in the Slovenian innovation system. In the field of technology transfer RISS was upgraded by S4 in 2015.

Based on the RISS Realisation Report for 2014, most measures are being implemented. The transfer of knowledge in Slovenia is still not fully regulated, but significant change in collaboration and interlinkages between key research institutions and industry, can be observed, also due to numerous existing and novel instruments and mechanisms stimulating transfer and exchange of knowledge. Greater change in collaboration and exchange of knowledge within the knowledge triangle results from cofounding Centres of excellence, Competence centres and other forms of stimulation of knowledge transfer from European

structural funds that is confirmed also by the OECD. To support TTO activities, significant progress was achieved in 2013 and 2014 through funding a technology transfer consortium. Establishing a common entry point for invention application and a common system for technical support and PRO intellectual property management present an important step towards unifying the operation of all main Slovenian TTOs at most major Slovenian research institutions.

In the field of intellectual property protection on national level, the situation is improving within the scope of activities related to new directives and guidelines of the EC. The Slovenian Intellectual Property Office is intensively digitalising its services. It has so far introduced e-services that enable brand and model application, as well as changes related to the deriving rights, with plans to expand the services also to patents.

Although that in the past years progress has been made in supporting collaboration between industry and PROs, effective and successful technology transfer will only be possible when systemic incentives for the implementation of technology transfer activities are established. Taking that into account it is important to preserve stability and long-term support for other measures stimulating knowledge transfer PRO and industry collaboration. In the future, Slovenia will have to strategically focus its limited funds and other mechanisms supporting collaboration and the exchange of knowledge to narrower priority areas defined in S4, that show most potential for Slovenia's further development.

OBJECTIVES

22. Establishing an environment that will enable and stimulate effective transfer of knowledge through collaboration within the knowledge triangle, improve the flow of information between the public research sphere and industry and thus stimulate the building of mutual trust.

Based on S4 and defined priority areas, Slovenia will create an appropriate platform for networking of the public research sphere with industry and focus RDI investments into those areas in which Slovenia has critical mass of knowledge, capacities and competences as well as innovation potential. The foundations for long-term trust among all key stakeholders will be established through research and development cooperation, which will consequently enable the transfer of knowledge and information as well as major synergy effects.

23. Supporting PROs to determine the exchange of knowledge as one of their key strategic missions and actively cooperate in the resolution of current challenges of societal development.

To maximise the performance of the knowledge transfer system, PROs must be aware of its importance and determine it as a significant component in their vision and strategic documents. The change of legislative framework in RDI will stimulate PROs through financial and other mechanisms to determine knowledge exchange as one of their key strategic objectives.

24. Regulating the management of intellectual property rights in commercialising research results among all stakeholders.

Slovenia will design a national protocol (manual) for intellectual property rights management resulting from collaboration between PROs and industry. The protocol will be harmonised with EC recommendations from the Commision Recommendation on the management of IPR in knowledge transfer activities and code of practice for universities and other public research organisations. The national protocol for intellectual property rights regulation will inform companies of the conditions of collaboration, joint research or contractual cooperation with regard to the use of intellectual property rights by PROs, this allowing for a quicker and simpler transfer/access.

25. Strengthening the support environment mechanisms for a more effective transfer of knowledge.

Systemic support to TTO operation envisages the professionalization of personnel and support to their mutual national and international cooperation, as well as strategic networking within the fields in which Slovenia exhibits most potential. Thus, it is necessary to strengthen the existing good core of TTOs, to integrate them into the comprehensive support environment (e.g. university incubators and technology parks) and to ensure long-term and stable funding based on an evaluation of their success through an established system for their assessment.

26. Stimulating innovation culture among young PhD holders and other researchers.

The culture of innovative thinking must be stimulated on all levels of education, since desired long-term results can only be achieved through a holistic understanding of the importance of the field.

MEASURES

- Adoption of the National Intellectual Property Development Strategy in 2016.
- Formation of the national protocol (manual) for industry with regard to its cooperation with PROs, including basic guidelines on the management of intellectual property resulting from cooperation.
- Establishment of a common point for the intellectual property protection of inventions and innovations stemming from the public research sphere, also offering legal consultation to businesses and PROs in their cooperation.
- Establishment of a common knowledge base (“The Slovenian knowledge base”) that will provoke interest and built understanding among the business community providing a comprehensive overview of fields of activity of all PROs, and its strategic inclusion in similar knowledge bases on international level.
- Promotion of entrepreneurship among PhD holders and their integration in the support environment (e.g. university incubators, technology parks).

- Support of TTO operation through stimulating professionalization of their services, their strategic interconnection as a consortium and their collaboration with similar consulting services within the scope of other mechanisms supporting knowledge transfer (e.g. university incubators, technology parks).
- Support of collaboration between the public research sphere and industry in the form of long-term strategic partnerships in S4 areas in which Slovenia displays major potential.
- Establishment of an appropriate model to assess the efficiency of knowledge transfer.

INDICATORS

- Number of innovative companies that cooperate with universities, higher education institutions and/or public research institutes
- Share of public research funded by the private sector

3.7 PRIORITY AREA 5B OPEN ACCESS TO SCIENTIFIC PUBLICATIONS AND RESEARCH DATA

BACKGROUND

Scientific communication underwent no significant change until the beginning of the 21st century. Authors report the results of their mostly publicly funded research in peer-reviewed articles. Once the article is accepted for publication the author's material copyright is transferred to the publisher who enables access to research results against payment of journal subscription and limits the use of figures, graphs and other elements in later publications without his permission. The majority of researchers are employed by public organisations which have to enable access to the latest achievements in science to their researchers through the payment of journal subscriptions. Research data is only selectively accessible in the traditional system of scientific communication, this resulting also from the wish of its creators to increase their competitiveness on the publications market by monopolizing their data.
The Europe 2020 Strategy for smart, sustainable and inclusive economic growth sets knowledge and innovation to the forefront of growth stimulation. Modern research is based on extensive scientific dialogue and achievements of past scientific research, with open access to scientific publications and research data enabling:

- a more efficient use and upgrading of results of earlier research (greater quality of research activity),
- cooperation and avoidance of research duplication (greater efficiency),
- stimulation of innovation (accelerated transfer to the market, resulting in bigger growth),
- inclusion of citizens and society (improved transparency of scientific research).

The EC initiated activities towards the modernisation of scientific communication in 2004. In the Horizon 2020 Framework Programme for Research and Innovation it called for mandatory open access to all peer-reviewed publications from co-funded projects, implementing the open research data pilot in 2014 and 2015. Following EC recommendations MS should enforce the same provisions in national research funding, thus ensuring open access to the results of publicly funded research in the entire ERA and further developing open science.

Open science is implemented to enable researchers in various stages of the research process to cooperate with all types of openly accessible data, results and protocols. Open accessibility of scientific information in the form of peer-reviewed publications and research data is integral to open science. Slovenia supports the principles of open science, including transparency of experiment methodologies, observations and data collection, public availability and re-use of research data, public availability and transparency of scientific communication and the use of web tools supporting scientific collaboration. Slovenia approaches the enforcement of provisions regarding open access to scientific information as an important part of open science in accordance with EC recommendations and with the adopted National strategy of open access to scientific publications and research data in Slovenia 2015-2020.

Slovenia's vision is open access to scientific information from publicly funded research (in the form of scientific publications and research data) as well as their exemption from the payment system for access and re-use. Openly accessible scientific information should benefit Slovenian citizens, researchers and the economy. Web access to all available scientific information needs to be enabled without user costs and with the preservation of scientific information ensured. This will prevent duplication of research efforts, increase efficiency of scientific work and increase returns with regard to RDI public funding.

The National strategy of open access to scientific publications and research data in Slovenia 2015–2020 determines that each beneficiary has to ensure open access to all peer-reviewed scientific publications referring to results obtained in publicly funded research. Before adopting the open research data provisions the national Open Access to Research Data pilot programme intended to steer further development of the Slovenian open science policy will be carried out. The pilot programme will strive to improve and to the highest extent enable access and re-use of research data.

The strategy also requires journals issued by publishers based in Slovenia, which publish peer-reviewed articles and receive national public funding for their activities in the 2015-2020 period, to be openly accessible. Research data, discussed in articles, has to be available in open access. Publishers of scientific monographs, based in Slovenia, which receive national public funding in the 2015-2020 period, should strive to publish monographs using business

models that enable open access to full text immediately upon publication and copyright administration with open access licences.

OBJECTIVES

27. Abolition of subscription and copyright limitations for the access and re-use of scientific information.

Subscription and copyright limitations for the access to and the re-use of scientific information, generated with national public funding, will be abolished with the implementation of open access in Slovenia. Slovenia aims to implement the recommendations of the Budapest Open Access Initiative and the Hague Declaration on Knowledge Discovery in the Digital Age.

28. Greater efficiency of public research funding.

Slovenia strives to improve access to scientific information in the form of scientific publications and research data through their openness with which greater efficiency of public research funding can also be achieved. As a rule, the results of all publicly funded scientific research in the Republic of Slovenia have to be completely openly accessible.

29. Open access to scientific publications.

In 2018, 80 percent of scientific publications from nationally funded research, published in 2017 will be openly accessible, while all scientific publications (100 percent) from nationally funded research published in 2020 will be openly accessible in 2021.

30. The realization of the Open Access to Research Data in 2017-2020 pilot programme and analysis of the pilot programme results.

31. The formation of an open research data policy and provision of the conditions for its realization after 2020.

MEASURES

- Action plan for Open Access to Scientific Publications and Research Data in Slovenia 2016-2020 with all concrete measures, responsible institutions for individual measures and deadlines for their implementation will be prepared to realise the set objectives.

INDICATORS

- Share of open-access publications (Gold and Green OA only) in the country from 2008 to 2013
- Action plan for Open Access to Scientific Publications and Research Data in Slovenia 2016-2020

3.8 PRIORITY AREA 6 INTERNATIONAL COOPERATION

BACKGROUND

Increased globalisation requires the strengthening of research and innovation excellence and sustainable development. Without increasing scientific and technological cooperation on a European and global scale it is impossible to respond to the challenges that go beyond the borders of states and continents. Globalisation requires the introduction of different approaches and methods on a local, regional, national and international level. Harmonisation of RDI policies, instruments and measures has become a necessity on the global international level and binding for Slovenia. International research and development cooperation must be based on the principles of reciprocity, equality and common welfare as well as on appropriate protection of intellectual property. This cooperation is key for the development, distribution and dissemination of knowledge across the world and is the basis for stimulating the flow of researchers and "brain circulation", thus strengthening ERA and beyond.

Slovenia has been cooperating in EU Framework Programmes for research since 1999 (since the 5th Framework Programme). From the start of its collaboration until today, when it actively participates in Horizon 2020, Slovenia has progressed in the number of projects, in which Slovenian researchers participate, in the number of participants in these projects and in the amount of funds that are acquired from European programmes. Taking into account the fact that Slovenia represents only 0.4 percent of EU's population and manages to acquire a larger share of funds from the Framework Programmes, Slovenia's participation can be deemed successful. Slovenia cooperates in EU Framework Programmes for research also with non-European countries, who are mostly European strategic partners. One of the weaker point of cooperation is the relation between the number of submitted and selected projects, which results from a large number of applications from Slovenia (ranking top in EU according to the number of applications per inhabitant), and partially also due to the lack of experience in writing such applications.

Due to greater recognition of Slovenian research and development on the European level and beyond, bilateral cooperation in research and development has been on the rise since Slovenia’s independence. At the time, the objective was to accelerate Slovenia’s accession to the EU and to further strengthen cooperation with other countries (neighbouring countries, Western Balkans countries, developed non-European and regionally important countries). Slovenia is planning a new bilateral cooperation strategy, with the aim to exceed mobility within bilateral cooperation until 2020 and upgrade it with strategic project cooperation, especially with priority countries in Slovenian foreign policy. The new bilateral cooperation strategy will consider data about the possibilities for strengthening cooperation in the

scientific field as well as research and development, which the Slovenian diplomatic and consular network in priority countries can provide.

Within the ERAC working groups the Strategic Forum for International Cooperation (SFIC) aims to further develop, implement and monitor the international dimension of ERA, especially the "external dimension" of research and innovation cooperation of the EU and MS with strategically identified third countries. It oversees the exchange of information and continued consultation between MS and the EC with the goal to determine joint priorities that would lead to harmonised and joint incentives and projects. The EC and MS use more coordinated and unified standpoints to achieve higher added value in cooperation with strategic third countries and international organisations. Slovenia has been represented in SFIC since its establishment, with diplomatic and consular representations in priority countries playing an important role in the harmonisation of standpoints.

Since 2010, Slovenia is active in all OECD activities and strives to successfully cooperate in the European Space Agency (ESA) and the European Organisation for Nuclear Research (CERN). Several decades of cooperation of Slovenian researchers in the COST programme are also of strategic importance. Slovenia will further strengthen its cooperation regarding thematic and technical aspects in afore mentioned international intergovernmental organisations in the future. In order to do so, analytical capacities must be strengthened on the national level and strategic cooperation priorities must be specified in synergy with the needs of the national RDI system.

OBJECTIVES

32. Increasing international recognition and competitiveness of Slovenian science on European and global scale by improving the quality and quantity of international collaborations. Special attention must be given to establishing a project application and research results evaluation system comparable to the one at European level. The efforts to strengthen fundamental research must follow the effective model of the European Research Council (ERC). International cooperation in the field of applicative and technological research must further be strengthened as well. Slovenia must establish its interest with regard to the intensity and extension of cooperation in developing key emerging technologies (KET) and future emerging technologies (FET). The awareness that excellent research infrastructure is imperative for the competitiveness of Slovenian science and research, and must constantly adapt to world trends and thus be appropriately funded, is of key importance.

33. Increasing the extent of international multilateral cooperation by supporting the opening of Slovenian RDI space to EU MS and associated countries in EU framework programmes. When developing and joining new instruments, Slovenia will strive for simplicity, transparency and prevention of duplication to make the system maximally useful for researchers and the private sector. Slovenia will use financial and other incentives to support the inclusion of

Slovenian researchers in European research programmes and networks in a way that will also include to the greatest extent possible private enterprises developing and/or commercialising new knowledge. Additionally, cooperation with strategic non-European countries in these actions will be stimulated. The quality of services of the almost entirely intertwined national networks, i.e. the Horizon 2020 NCP network and network of Horizon 2020 Programme Committee members, will be improved with best practice exchanges in and outside the EU and an array of education and training opportunities. Continued and strategic cooperation with successful national networks of other MS will be established and cooperation with the EEN network and other stakeholders in the support environment will be strengthened. Using a more qualitative approach and enhancing access to applicants, Slovenia aims to improve the level of success of Slovenian applications in EU framework programmes, with additional funds for international cooperation being of key importance especially when taking into account increased cooperation partly also depends on national funding invested.
Slovenia will determine its strategic priorities for scientific and technological cooperation also within the scope of OECD, ESA, CERN, UNESCO, COST and other important international organisations.

34. Increasing the scope and establishing a new strategic form of international bilateral cooperation.

Bilateral cooperation will focus on neighbouring countries and regions, the Western Balkans, BRIC countries (Brazil, Russia, India, China) as emerging global centres for research and development, and other countries performing complementary research. Slovenia will further advance bilateral cooperation with the most developed countries of the world, e.g. the USA, Korea and Japan, while support for cooperation with other countries will follow scientific interests and foreign policy guidelines. Through bilateral research projects and other diverse forms of cooperation with SE Europe and especially countries of the Western Balkans, Slovenia must become an attractive country for top researchers and private enterprises. Therefore, special emphasis will be given to cross-border research and development cooperation that has the most direct effect on knowledge transfer to the local economy. Gradually shifting from mostly mobility funding, Slovenia will stimulate bilateral cooperation through research projects, with the agreement on cooperation within the Lead Agency scheme playing a prominent role. New guidelines will be written in the Strategy of Advancing Bilateral Cooperation of Slovenia in Research and Development 2016-2020.

MEASURES

- Increased funding for international cooperation, increasing participation and success rate of Slovenian partners in international research projects.
- Preparation of the Slovenian Strategy for Bilateral Cooperation Development in Research and Development 2016-2020 and the formation of new strategic partnerships.

- Preparation of the Strategy for the Internationalisation of Slovenian Science defining strategic goals.

INDICATORS

The number of international scientific co-publications per million citizens[7].

[7] The number of scientific publications together with at least one co-author with head office abroad, i.e. outside the EU28 area.

4 CONCLUSION

The Slovenian strategy for strengthening the European Research Area 2016-2020 (Slovenian ERA Roadmap) is based on four national strategic documents:

- the Resolution on the Development and Innovation Strategy of Slovenia 2011-2020, from which it draws certain objectives and measures for all priorities and complements them with new ones;
- the National strategy for open access to scientific publications and research data in Slovenia 2015-2020;
- the Research Infrastructure Development Plan for 2011–2020;
- the Slovenian Smart Specialisation Strategy (S4).

To ensure the Slovenian strategy for strengthening the European Research Area 2016-2020 does not exist only on paper, **34 objectives** with **43 measures** reflected in **18 indicators** were identified. Based on the indicators monitoring of the implementation of measures will be ensured, as well as the assessment of their efficiency. An independent group of experts will evaluate the strategy every other year and report to the competent advisory bodies of the Government of the Republic of Slovenia in the field of science. Additionally, they will also provide potential proposals for supplements and additional measures for a more effective implementation of the strategy.

The establishment of a responsive and excellent research and innovation system until 2020 is possible but requires commitment of all stakeholders in the research and innovation process. Only with a joint realisation of set measures and objectives will Slovenia be able to realise the vision written in the introduction and enter the innovation leaders club by 2030.

Appendix 1: CHART OF INDICATORS WITH VALUES

Priority area 1: Effective national research and innovation system			
	Situation	**Situation in 2018**	**Situation in 2020**
Research excellence indicator: (1) highly cited publications (2) PCT patents (3) ERC grants (4) MSCA grants	28.8 (EU-28: 47.8) data for 2012 45.6 (EU-28: 55.4) 27.3 (EU-28: 37.9) 55.2 (EU-28: 81.8) No data available		
Share of gross domestic expenditure for RD in GDP (of which the share of budget appropriations for RD)	2.39% (0.43%), data for 2014		
Innovation Union Scoreboard (IUS) composite indicator	0.5339 (EU: 0.5551)		

Priority area 2a: Jointly addressing grand societal challenges			
	Situation in 2012	**Situation in 2018**	**Situation in 2020**
National GBARD allocated to transnational public RDI programmes	2.23%		
The number of cross-border ownership of patents of the Slovenian (considering the place of residence) innovator with one or more EU MS and one or several non-EU countries.	0.25 (EU-28: 9.89)		
The number of projects and the amount of acquired funds from Horizon 2020 – 3rd pillar (societal challenges)	2016: (2014-2015)[8]	2018: (2016-2017)	2020: (2018-2019)

Horizon 2020 – 3rd pillar: Societal challenges	The number of selected applicants	The amount of co-funding by the EU (€)
Health, demographic change and well-being	24	5,865,204.00
Food security, sustainable agriculture and forestry, marine and maritime and inland water research and the bioeconomy	12	1,298,146.00
Secure, clean and efficient energy	40	13,081,639.00
Smart, green and integrated transport	22	6,773,383.00
Climate action, environment, resource efficiency and raw materials	28	8,311,154.00
Europe in a changing world – inclusive, innovative and reflective societies	13	1,917,992.00
Secure societies – protecting freedom and security of Europe and its citizens	7	1,796,706.00

[8] Data from the eCORDA database until 23 February 2016. The eCORDA is an external COmmon Research DAtawarehouse, a reporting tool used by the EC to report on the implementation of framework programmes for research and innovation generating data three times a year (February, June, October)

Priority area 2b: Optimal use of public investments in research infrastructures			
	Situation in 2012	Situation in 2018	Situation in 2020
Availability of RIDP with detailed investments in research infrastructure	✓	✓	✓
Number of research infrastructures from the list of ESFRI active projects where Slovenia is participating	14/48		
The number of ESFRI projects in the implementation phase where Slovenia is participating	5/14		

Priority area 3: Open labour market for researchers			
	Situation in 2015	Situation in 2018	Situation in 2020
Research posts advertised through EURAXESS jobs portal in the public sector per year	91		

Priority area 4: Gender equality and Gender mainstreaming in research			
	Situation in 2014	Situation in 2018	Situation in 2020
Proportion of “A grade" women in higher education	22.5		
Share of women with PhD per year	50		
The share of PRO with an action plan for equal opportunities	16 (3/19)		

Priority area 5a: Scientific knowledge transfer			
	Situation in 2012	Situation in 2018	Situation in 2020
Share of innovative companies that cooperate with universities, higher education institutions and/or public research institutes	25.4		
Share of public research funded by the entrepreneurial sector	12.64		

Priority area 5b: Open access to scientific publications and research data			
	Situation in 2016	Situation in 2018	Situation in 2020
Share of open-access publications available in the country from 2008 to 2013	No data available		
Action plan for open access to scientific publications and research data in Slovenia 2016-2020	NO		

Priority area 6: International Cooperation			
	Situation in 2014	2018	2020
Number of international scientific co-publications per million citizens	1042		