

BELGIAN ERA-ROADMAP

April 2016

Table of Contents

Introduction	6
Short summary of the Belgian research and innovation system	7
Governance of ERA	9
I. Federal ERA-Roadmap	11
Context	11
Priority 1: effective national research systems	11
Overall status	11
Strategic policy aims and actions points.....	12
Priority 2 Optimal transnational cooperation and competition	13
Priority 2a: jointly addressing grand challenges	13
Overall status	14
Strategic policy aims and actions points.....	16
Priority 2b: make optimal use of public investments in research infrastructures	16
Overall status	16
Strategic policy aims and actions points.....	18
Priority 3: an open labour market for researchers	18
Overall status	18
Strategic policy aims and actions points.....	19
Priority 4: gender equality and gender mainstreaming in research	20
Overall status	20
Strategic policy aims and actions points.....	22
Priority 5 Optimal circulation and transfer of scientific knowledge	23
Priority 5a: fully implementing knowledge transfer policies at national level	23
Overall status	23
Strategic policy aims and actions points.....	24
Priority 5b: promoting open access to scientific publications	25
Overall status	25
Strategic policy aims and actions points.....	25
Priority 6: international cooperation	26
Overall status	27
Strategic policy aims and actions points.....	28
II. Flemish ERA-roadmap	29
Priority 1: effective national research systems	29
Overall status	29

Strategic policy aims	30
Action points	31
Priority 2 Optimal transnational cooperation and competition.....	32
Priority 2a: jointly addressing grand challenges	32
Overall status	32
Strategic policy aims	33
Action points	33
Priority 2b: make optimal use of public investments in research infrastructures.....	35
Overall status	35
Strategic policy aims	35
Action points	36
Priority 3: an open labour market for researchers	36
Overall status	36
Strategic policy aims	37
Action points	37
Priority 4: gender equality and gender mainstreaming in research.....	38
Overall status	38
Strategic policy aims	39
Action points	40
Priority 5 Optimal circulation and transfer of scientific knowledge	40
Priority 5a: fully implementing knowledge transfer policies at national level.....	40
Overall status	40
Strategic Policy Aims	41
Action points	41
Priority 5b: promoting open access to scientific publications.....	42
Overall status	42
Strategic policy aims	43
Action points	43
Priority 6: international cooperation.....	44
Overall status	44
Strategic policy aims	45
Action points	45
III. Common ERA Roadmap of the Wallonia-Brussels Federation and Walloon Region	47
Context	47
Priority 1: Effective national research systems.....	48

Overall status	48
Strategic policy aims and actions points.....	49
Priority 2 Optimal transnational cooperation and competition.....	50
Priority 2a: jointly addressing grand challenges	50
Overall status	50
Strategic policy aims and actions points.....	51
Priority 2b: make optimal use of public investments in research infrastructures.....	51
Overall status	51
Strategic policy aims and actions points.....	52
Priority 3: an open labour market for researchers	53
Overall status	53
Strategic policy aims and actions points.....	54
Priority 4: gender equality and gender mainstreaming in research.....	56
Overall status	56
Strategic policy aims and actions points.....	57
Priority 5 Optimal circulation and transfer of scientific knowledge	57
Priority 5a: fully implementing knowledge transfer policies at national level.....	57
Overall status	57
Strategic policy aims and actions points.....	58
Priority 5b: promoting open access to scientific publications.....	58
Overall status	58
Strategic policy aims and actions points.....	59
Priority 6: international cooperation.....	60
Overall status	60
Strategic policy aims and actions points.....	61
IV. Brussels-Capital Region ERA-Roadmap	63
Context	63
Priority 1: effective national research systems.....	63
Overall status	63
Strategic policy aims	65
Actions points	66
Priority 2 Optimal transnational cooperation and competition.....	67
Priority 2a: jointly addressing grand challenges	67
Overall status	67
Strategic policy aims	68

Action points	68
Priority 2b: make optimal use of public investments in research infrastructures.....	69
Overall status	69
Strategic policy aims	69
Action points	70
Priority 3: an open labour market for researchers	70
Overall status	70
Strategic policy aims	71
Action points	71
Priority 4: gender equality and gender mainstreaming in research.....	72
Overall status	72
Strategic policy aims	72
Action points	73
Priority 5 Optimal circulation and transfer of scientific knowledge	73
Priority 5a: fully implementing knowledge transfer policies at national level.....	73
Overall status	73
Strategic policy aims	74
Action points	75
Priority 5b: promoting open access to scientific publications.....	75
Overall status	75
Strategic policy aims	75
Action points	76
Priority 6: international cooperation.....	76
Overall status	76
Strategic policy aims	77
Action points	77
Conclusion	78

Introduction

On the initiative of the European Commission and following consultations with Member States, the Council of the European Union has asked each Member State to develop and implement an ERA roadmap at the national level by mid-2016. The Commission and the Council are encouraging Member States to make further investments in research and innovation programmes and to align and optimise their use by 2020.

The frame of the EU roadmap is divided into six priorities and its preparation and implementation are mandatory in each Member State.

Belgium is a federal country. Research and innovation (R&I) policies have been widely transferred to the Communities and the Regions during the past 30 years. Responsibilities regarding policy, instruments, means (budgets) and targets lie therefore in the first place in the hands of the different regions and communities. This roadmap acknowledges the Belgian institutional architecture and presents the ERA related activities "bottom-up".

All entities have agreed to prepare their own roadmap, and incorporate it into a national document to be sent to the ERA Committee (ERAC) Secretariat at the beginning of May 2016. The Wallonia-Brussels Federation and the Walloon Region have decided to write a common ERA-roadmap.

The following document is the ERA roadmap for Belgium. It describes the ERA related activities going on in Belgium as well as the new initiatives that are planned for the coming year 2017. On the one hand, the Belgian roadmap's objective is to produce an inventory of the actions carried out within each priority. On the other hand, the roadmap aims to identify existing "gaps" and the actions to be taken by Belgium to fill these gaps and strengthen the ERA. These actions involve programmes, legislative initiatives, cooperation agreements, awareness-raising and pursue to be carried out by single entities within their field of expertise, or by all entities if coordination and a joint policy would be useful and appropriate.

Objectives, means and targets for the ERA priorities are presented separately for each government. Each government thereby focuses on these issues that are the most relevant given their competences and policy priorities. However some horizontal chapters will deal with those ERA activities demanding some kind of cooperation or agreements among the governments¹.

This report will start with a brief introduction on the main features of the Belgian institutional landscape regarding research and innovation. The main actors will be introduced starting with the governments and their competencies. It will also deal with the cooperation and coordination mechanisms that have been elaborated between the different administrations in order to speak as one voice in international fora.

This chapter will be followed by the different roadmaps.

¹ These chapters will be elaborated in a later stage.

Short summary of the Belgian research and innovation system²

Research and innovation policies are in the hands of the Belgian Federal government, the three regional governments (the Flemish Government, the Walloon Government and the Government of the Brussels Capital Region) and the Government of the Wallonia-Brussels Federation (=the French speaking Community). The German-speaking community doesn't carry out its own R&I policy³. The government of the Flemish Region was merged with the Flemish Community since its establishment in 1980.

Belgium is different from all other EU Member States since most of the R&I policies (instruments and budgets) have been devolved towards community and regional governments, each enjoying complete autonomy of decision-making power in these matters. The federal State retains some competences as an exception to this rule.

The regions have authority on research policy for economic development purposes, thus encompassing technological development and applied research. They are also responsible for the research/knowledge institutions present on their territory and all research related to their own competencies (e.g. environment, public works, economy, mobility, employment, energy, etc.).

Regions elaborate the necessary regulatory frameworks and develop business-oriented policies on technology transfer, networking, joint industry-science research and other forms of dissemination of research, collective research, science parks, incubation centres, etc. They promote industrial research with grants, fees, fellowships, guarantees, participations and subsidies. They do support start-ups, spin-offs, risk capital, etc.

The communities are responsible for education and research at universities and higher education institutions, and all research related to their own competencies (e.g. culture, education, media, well-being, etc.). The Flemish and French Community each manage their own scientific institutes as well. They control the budgets and do develop the regulatory frameworks that govern research in the public sector. They steer basic, fundamental, cutting-edge as well as applied research; human resources policies; research infrastructure; open access policies; promotion and popularisation of STI, etc.

The Federal Government steers the federal research institutes (FRI), space research and research programs in support of the federal competencies. It is responsible for all research related to its own competencies; it produces validated data on research and innovation (in close cooperation with regional authorities). The main office is the Federal Science Policy Office (known as Belspo⁴). Intellectual property (IP) law, standardisation, nuclear research, framework conditions are in hands of the FPS Economy, SMEs, Self-Employed and Energy. Relevant for ERA are also employment policies, social security issues, international cooperation for which several other federal departments intervene.

The R&D tax credit, a major policy instrument in Belgium, is a competence of the federal state and managed in the first place by the tax authorities though with support from Belspo.

² The most recent description of the R&I system and the activities of the different governments can be found in the RIO report 2016 (forthcoming).

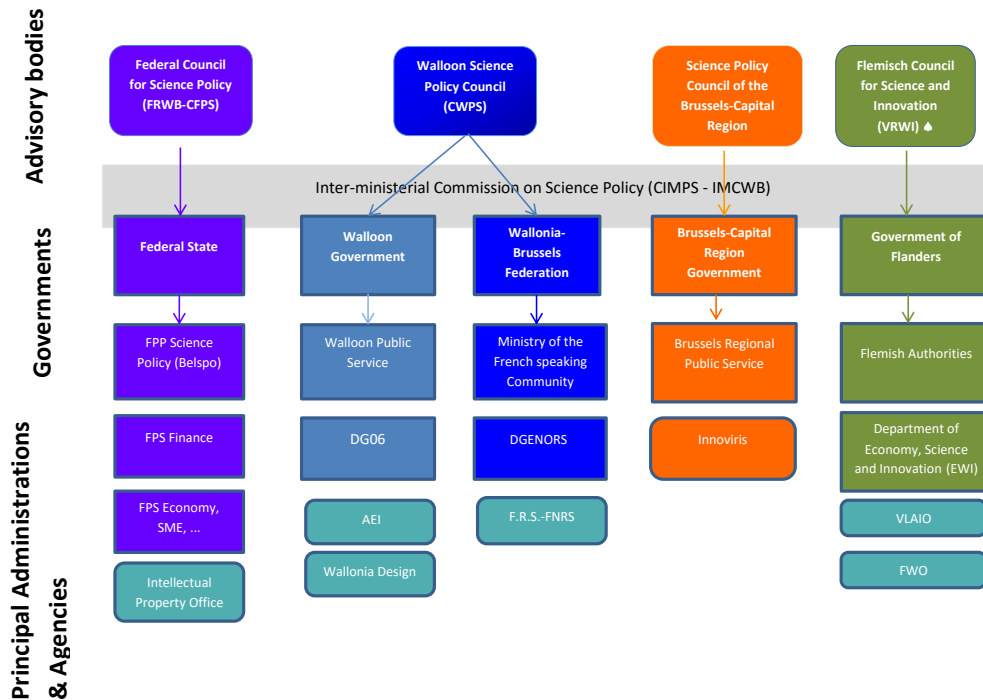
³ See figure 2 with the research budgets (GBARD) by authority.

⁴ It is important to point out that Belspo is going to be merged with other Federal Departments.

The federal level does not function as an umbrella body above regional and community levels, but is an additional layer alongside the regions and communities. At the international level, the “in foro interno, in foro externo” principle applies, hence each authority execute its competencies also at the international (including EU) governing level.

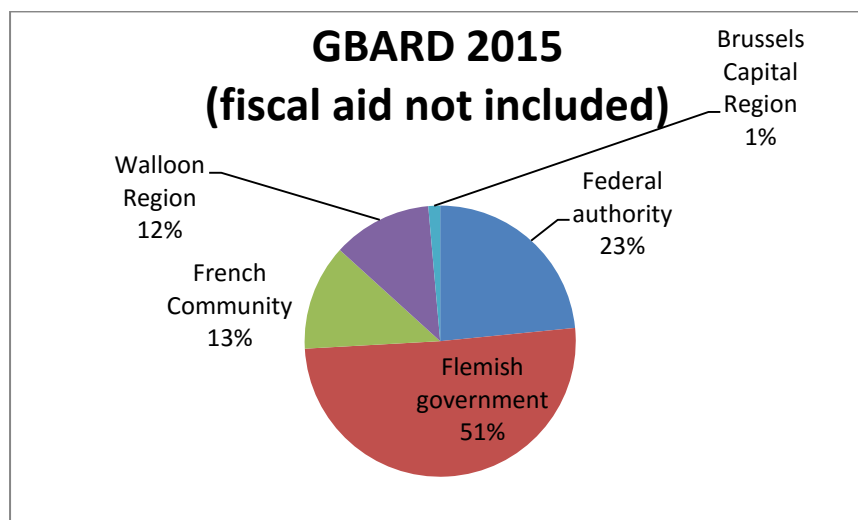
Research and innovation policies are being run by the different administrations. They might be assisted by agencies, as is the case for university research in both communities or industrial research in Brussels and Flanders. See the figure below, borrowed from the Rio country report 2016.

Figure 1 : Belgian Institutional landscape regarding Research and Innovation



Spending between the different governments is as follows:

Figure 2 : General Budget Appropriations for Research and Development (GBARD) 2015 (fiscal aid not included)



Most ERA priorities target primarily the public sector.

However, the main research and innovation actors are the firms. Close to 60 % of all research is being executed by firms. Research activities are very concentrated. Most of the research takes place in a rather small number of companies, quite often foreign controlled. Life sciences research is the most important ($\pm 50\%$) research field.

The public sector consists of the universities (and other higher education institutes) as well as a relative small number of public research institutes.

Universities are the second most important actor with more or less 20 % of all domestic R&D. The number of scientific publications in Belgium is far above the European average⁵. International links are well established when judging the high number of international co-publications and the research output is appreciated by firms, who finance more than 12 % of the university research, one of the highest figures in OECD⁶.

A remaining 8.12 % of total R&D expenses in 2013 was performed within the government sector (PROs). Some public sector research institutes are renowned internationally (e.g. the Belgian Nuclear Research Centre, the Institute for Tropical Medicine, the Flanders Interuniversity Biotechnology Institute), and the same holds for a number of semi-public research institutes (e.g. Imec (nanotechnology) which is demonstrated by the huge part of its research being financed from abroad).

Last important element is that research and innovation are high on the political agenda. All authorities commit to the target of 3% of GDP invested in R&D (2% financed from the private sector and 1% from the public sector). This is reflected in the policy documents relevant for R&D policy of all entities⁷.

In 2014 the R&D intensity was estimated to be 2.46 %, which is the highest percentage ever.

Government spending (GBARD) reached 2.57 billion €, while the fiscal support added 1.25 billion € bringing total government support very close to 1% of GDP.

Governance of ERA

Considering the architecture of the Belgian R&I system a few words are necessary in order to understand how Belgian authorities cooperate and coordinate their activities and more specifically how the Belgian ERA roadmap was elaborated.

In the early nineties, a number of bodies were being set up in order to accompany the devolution of research and innovation competencies to the regions and communities.

At the ministry level there exists the *Interministerial conference for science policy (IM CSP)*. All ministers in charge of aspects of science policy or research are part of this conference. They did decide in the first place upon the main framework for cooperation, which is the cooperation agreement that set up two permanent bodies at administrative level: CIS and CFS (see below).

⁵ See the Innovation Union Scoreboard 2015.

⁶ See OECD, MSTI, Volume 2015/2

⁷ The policy documents of all Belgian authorities are available on their websites. A summary can be found in the last RIO country report for Belgium (see footnote 1).

The ministers conclude whenever necessary new cooperation agreements in any research related field, which requires an initiative of more than one public authority. As an example one can cite the cooperation agreements regarding the participation in ESFRI.

The IM CSP meets only when needed. But CIS and CFS are permanent standing bodies and as such meet very often (either in plenary configuration or in one of its sub-committees, for example on research infrastructure).

CIS stands for *Commission for International collaboration (CIS)*. All Belgian authorities are being represented by senior officers in charge of international R&I activities. The Belgian permanent representation towards the European Union (in which all relevant Belgian authorities are represented) also participates in this meeting. The CIS deals with all matters regarding international cooperation on science and innovation. The Belgian participation in Horizon 2020 is discussed as well as the participation of Belgium to any ERA related activity.

Decisions can be taken on the Belgian point of view regarding European policies, the points of view in European bodies, representatives in European committees, divisions of labour, tasks that can be undertaken together, etc.

Recent important documents are the two position papers on Horizon 2020.

The CIS also played an important role in organising the two Belgian peer reviews (2007 and 2011) that were made possible with the financial help of ERAC.

The other body CFS stands for *Commission for federal collaboration (CFS)*. Contrary to the body above, it deals basically with overarching national issues. The best known example is the production of statistics and the monitoring of research and innovation activities in Belgium. All official statistics published by Eurostat on R&I are approved by CFS before submitting them to Eurostat.

One of its most known products is the *Belgian report on Science Technology and innovation (Bristi)*.

Since the CIS had coordinated so far the Belgian participation in Joint Programming initiatives, ESFRI, and other European activities, it was decided that the elaboration of the Belgian ERA roadmap should also be coordinated through the CIS.

At federal/regional/community level specific dedicated structures were being set up to coordinate the drafting of the ER.

I. Federal ERA-Roadmap

Context

In Belgium, the federal level accounts for roughly 25 % of all government budgets for research. The vast majority of federal support for research activities is provided by two departments: the Federal Public Planning Service Science Policy (BELSPO, 69 % of federal research funding) and the Federal Public Service (FPS⁸) Economy, SMEs, Self-Employed, and Energy (13 % of federal funding). Other funding is available at the FPS Foreign Affairs (10 %), FPS Defence (4%), and FPS Health, Food Chain Safety and Environment (4%)⁹.

The federal level is responsible for research linked to its own competencies (such as justice, health...) but has also its own research policies on issues considered of national interest: the space and nuclear areas. Last but not least, the federal level is also responsible for federal research institutions (FRI) and some specific issues of the research and innovation (R&I) framework: patent regulation, standardisation and tax credits (fiscal support of R&I). Foregone revenues of the tax credits for the state are considerably higher than the federal budgets for R&I.

Because of the complexity of the Belgian R&I landscape the federal level plays an essential role in the discussion of many issues of common interest, like for example the Belgian policy in international research organisations.

The federal level is not only funding research, it also counts a high number of research performing institutes. Their role is crucial for some of the ERA priorities, explained in the next pages.

The Federal ERA Roadmap is the result of the work carried out by BELSPO and the FPS Economy, SMEs, Self-Employed, and Energy in cooperation with other federal departments and FRI.

Many of the measures suggested in the present document are included in the "Management Agreement (MA) 2016-2018" between the State Secretary for Science policy and the administration.

Priority 1: effective national research systems

Three broad categories of support measures can be distinguished: federal research programmes (open for all Belgian research actors and to cooperation with foreign researchers), funding of a number of Federal research Institutions and fiscal measures.

Overall status

1. National Research programmes and evaluation of the programmes

BELSPO implements multi-annual research programmes (including research infrastructures, mobility programmes and R&I support activities) based on international priorities and conventions as well as on federal policy priorities. They are quite often designed to be in line with European research priorities (and the instruments used in European framework programmes).

⁸ A Federal Public Service is the common name for a department of the governmental administration at the federal level in Belgium (frequently considered as a ministry in other countries).

⁹ Source : Commission Federal Cooperation (CFS/STAT); calculations by the Federal public Planning service Science Policy (BELSPO).

The FPS Economy, S.M.E., Self-Employed, and Energy implements research programmes concerning nuclear energy and metrology. Some of its programmes (like the Inter-University Institute for Nuclear Sciences-I.I.S.N./I.I.K.W.) are implemented via the Community funding agencies (FNRS/FWO).

The Belgian Agency for Radioactive Waste and Enriched Fissile Materials (ONDRAF/NIRAS) coordinates the Belgian R&D programmes for long-term management of radioactive waste.

The implementation of most of these programmes is based on competitive calls and peer review.

BELSPO drafted, together with the depending FRI, a handbook on best practices with regard to the evaluation of research activities (2014). The document serves as a reference manual for the evaluation of research activities and contains information on peer review based evaluation types, criteria and indicators for excellent research. Through the implementation of 'best practices', evaluation procedures can be better aligned and public investments can be optimally used.

2. Federal Research Institutions (FRI)

Ten of the existing FRI fall under BELSPO's authority, the others depend of other FPS. The FRI are diverse (e.g. musea, libraries, observatories, research institutes on nuclear energy, on space aeronomy, on public health...). They offer scientific/public services and perform research activities. Research projects are performed independently or in partnership with a Belgian or with a foreign university/research organisation. Their funding is a mixture between institutional and competitive support.

A scientific peer review of the FRI depending of BELSPO is currently being conducted (started in 2014, end foreseen beginning 2017). An evaluation of the scientific, museological and public-oriented activities of the FRI depending of BELSPO will result in a global picture of the institutions' performance. It will provide guidelines and recommendations for future strategic choices of the institutions, aiming to enforce their position and competitiveness on the (inter)national scene.

3. Fiscal measures

Fiscal support of research is organised through three different specific schemes.

The most known scheme is the *partial exemption from payment of payroll tax* (art. 275-3 WIB Income Tax Code). The difference between the gross salary and the net salary of a researcher is explained by payroll taxes (around 30%) and social security contributions. Payroll taxes are immediately transferred to the treasury by the employer. However, research performers can keep up to 80 % of the payroll taxes of their employees inside the institution. The original targeted performers were universities. But gradually all research institutes and companies can claim the same exemption of payroll taxes.

The other two (less important) schemes support research investments and income from patents generated in Belgium (the so-called patent box).

Strategic policy aims and actions points

1. General measures:

The federal government decided to reorganise BELSPO. Main principles of the reform are:

- a) A separation between BELSPO's research performing organisations (the FRI) and the administration;
- b) The creation of an agency that will regroup all federal support measures for space research.

The reorganisation envisages the creation of a number of autonomous organisations (clusters of FRI depending from BELSPO and a Belgian Interfederal Space Agency - BISA) and the integration of the remaining administration as a Directorate General within another Federal Public Service.

2. National research programmes

In the coming years, the federal research programmes will be revised. The revision will take into account the organisational changes of the federal science policy (autonomy of the FRI, creation of an interfederal space agency) and will strive towards maximum complementarity and subsidiarity with the existing measures at other policy levels, thus preventing duplication of services. Specific attention will be given to measures reinforcing structural collaboration between universities and FRI. Policy support programmes will continue to be linked to international great challenges and federal policy priorities.

3. The Federal Research Institutions (FRI)

The reform of the federal science policy aims to enhance the autonomy of the FRI depending from BELSPO. An eventual clustering of FRI in a limited number of autonomous organisations will be examined. This could allow enhancing critical mass, to increase visibility and to develop shared supporting services (accountancy, P&O, facility management...).

Government grants will most probably be linked to a multi-year governance agreement, the renewal of which will be accompanied by a peer review of the achievements of the preceding period.

4. Fiscal measures

A fine tuning of the fiscal measures is envisaged. A working group of the Federal Council of Science Policy will examine the current measures and formulate recommendations for optimisation. The toolkit for users (the registration tool and the procedures for issuing binding recommendations) will be improved.

It is expected that adjusted fiscal measures will stimulate greater competitiveness and innovation and encourage participation in (inter)national research programmes.

Horizon of the above-mentioned measures is 2016-2019.

Priority 2 Optimal transnational cooperation and competition

Priority 2a: jointly addressing grand challenges

Belgium invests in joint research and participates actively in transnational joint programming and networking initiatives such as JPIs, COST, ERANET, Article 185-initiatives, ESA-programmes. This participation comprises financial support and may include representation in the Governing Boards, hosting of the secretariat ... in order to actively engage Belgian researchers in the research and innovation networks.

Initiatives have been taken at federal level to inform Belgian researchers of opportunities and to promote their participation in transnational networks. In the future, BELSPO will pursue this goal while paying special attention to the needs of the FRI; A dedicated unit (ERApr) was created inside BELSPO to help participants of European programmes to manage their projects.

Overall status

1. Joint Programming Initiatives (JPI)

Within the Joint Programming Initiatives (JPIs), Member States coordinate national research activities, combine resources, and develop common research agendas, in order to face grand societal challenges. The federal level, through BELSPO, participates in the following JPIs: Cultural Heritage and Global Change: a new challenge for Europe, Connecting Climate Knowledge for Europe (JPI Climate), More Years, Better lives (Demographic Change) and Healthy and Productive Seas and Oceans.

2. ERA-NETS

The ERA-NET scheme encourages the creation of close, long-term links between national research programmes with shared goals. The federal level - through BELSPO - participates in the thematic ERA-nets ERANID (2013-2016), HERITAGE PLUS, ERA4CS (ERAnet for Climate Services, 2016-2020), BiodivERSA3 (2015-2019), as well as in the bi-regional ERA-nets ERAfrica (2011-2015) and ERANet-LAC (see chapter 6A).

3. ESA programmes (see also P5a)

The European Space Agency (ESA) is an intergovernmental organisation whose purpose is to develop coherent European space programmes in the fields of research, technology and applications. The Belgian state participates - through BELSPO - in the majority of the ESA programmes. This participation allows to implement a Belgian strategy in the space domain which is axed on:

- the creation and/or the reinforcement of the expertise and the scientific and technology capabilities in space growing fields;
- the support of the technology developments in industry to make them able to tackle new markets and so to have a positive impact on economy;
- the provision to the public authority of the space means necessary to define and to implement her policies.

In the frame of ESA, special emphasis is given to flexible technology programmes which can help the Belgian actors in their strategic developments and to science support programmes to help scientists to develop experiments and to help them to exploit the data.

4. COST and Eureka

COST (European cooperation in science and technology), an intergovernmental European framework for transnational and international cooperation, brings together research teams in different countries by supporting networking, conferences, short-term scientific exchanges, and publications. BELSPO members represent Belgium as COST National Coordinator and as a member of the Commission of Senior Officials. The federal level is represented in several COST domains.

EUREKA is an intergovernmental organisation for market-driven industrial research, development & innovation. The EUREKA Secretariat is an international non-profit association under Belgian law, founded in 1986 and hosted by the federal level, through BELSPO.

Belgium was one of the founding members of EUREKA. BELSPO represents Belgium within EUREKA and the Belgian Regions are the funding bodies. BELSPO is represented in the General Assembly, in the Group of High-Level Representatives and in the Group of National Programme Managers.

BELSPO finances the Belgian yearly contribution to the COST FUND, as well as the yearly contribution to the A.I.S.B.L. Eureka.

5. Research in nuclear sciences

The Energy Directorate-General (DG) of the FPS Economy, SMEs, Self-Employed, and Energy coordinates the participation of research centers, universities, and the industry to European nuclear research programmes under the umbrella of the EURATOM treaty. EURATOM is moving forward to implement joint research programmes with the Member States, pooling resources and research actions in the domain of fusion and fission research (e.g. The 'EUROfusion' joint programme). The Belgian share is managed by the Belgian Fusion association which is composed of all the universities involved in these fields, under the coordination of the Belgian Military School. The Energy DG and SCK-CEN are also preparing the Belgian participation to the European Joint Programme for the Integration of Radiation Protection Research "CONCERT", in collaboration with the Belgian Federal Agency for Nuclear control and BelV. The Belgian Nuclear waste management agency (ONDRAF-NIRAS) is coordinating the Belgian R&D programme on long term management of nuclear waste.

6. EMRP and EMPIR

The European Metrology Research Programme (EMRP) is a 7 year programme started in 2009 and co-financed by the EC and 23 participating MS. It enables European metrology institutes, industrial organisations and academia to collaborate on joint research projects. The Belgian National Metrology Institute participates in 6 research projects. The Belgian designated institute for ionizing radiation metrology (SCK-CEN) also participates in 2 research projects.

The European Metrology Programme for Innovation and Research (EMPIR) is the successor of EMRP. The Belgian contribution is granted by the FPS Economy, SMEs, Self-Employed, and Energy.

7. Actions undertaken by the FRI

The FRI participate in transnational cooperation on themes related to their research. They address relevant challenges such as space weather, reference systems, planetary science, biodiversity and ecosystem science, geo-risks and geo-resources. . The FRI carry out bi- and multilateral research collaborations, participate in international organisations, in research infrastructures and in various networking initiatives.

Some institutes, such as the Royal Observatory of Belgium, have a roadmap in which the currently on-going research collaborations are mapped out. Several specific opportunities that could possibly evolve into mutually profitable (long-term) collaborations with new partners are there identified.

Likewise, the Royal Belgian Institute of Natural Sciences (RBINS) collaborates with the 6 main European National History Musea under a common vision aiming at contributing to the benefit of science

and society by sharing their collections and expertise¹⁰. The unit 'Geological Survey of Belgium' of the RBINS participates in the preparation of a cross-thematic ERA-NET on Applied Geosciences (GeoERA), a consortium of 50 organisations from 32 countries.

Strategic policy aims and actions points

1. Revise and reform, when justified, national, bilateral, transnational, intergovernmental and international research activities (2016-2019) in order to maximize complementarity with other funding entities. See also 6B.

In the same line, it is also proposed to:

2. Improve the Belgian participation in European and international space research activities through the creation of a Belgian Interfederal Space Agency (BISA).

Considering the fact that some of the available European instruments for jointly addressing grand challenges (and in particular JPIs and ERANET-Cofund) are still insufficiently known by the FRI it is also suggested to:

3. Better inform the FRI about JPIs, ERA-NETs and COST and improve BELSPO's support by the creation of a working group with the aim of increasing knowledge and avoid misunderstandings, by drafting of a paper describing the most relevant instruments (ERANETS, JPIs, Art. 185 and COST) and by sharing good practices through hands-on-meetings (2016-2017).

Priority 2b: make optimal use of public investments in research infrastructures

For a small country with limited resources, pan-European cooperation, joint programming and pooling of resources for the development, construction and operation of research infrastructures is crucial.

Belgium has a long history of participation in large intergovernmental organisation (ESA, ESO, CERN, ESRF...) and is very active in the ESFRI Forum since its creation in 2002.

Overall status

The federal level has been financing three types of investments in research infrastructures:

- Large international infrastructures: Belgium has a long history of participation in large intergovernmental organisation (ESA, ESO, CERN, ESRF...);
- Infrastructures of the ESFRI roadmap: Belgium is very active in the ESFRI Forum since its creation in 2002. At Belgian level, the consultation group CIS/INFRA (gathering representatives of Belgian R&I funding bodies and coordinated by BELSPO) follows the Belgian participation in the research

¹⁰ An example of a joint activity of this consortium is the (still to be developed) digital platform with information on key species with respect to European health, food security, ecosystems and raw material.

infrastructures of the ESFRI roadmap, proposes the Belgian priorities, makes funding arrangements and proposes the Belgian representation in the various Committees;

- Its own research infrastructures: the federal level is responsible for several Belgian research infrastructures that provide unique opportunities to train scientists and are open to external researchers.

1. Funding of the participation in large-scale research infrastructures

The participation of Belgium in large-scale international research infrastructures is financed by the federal level. Belgium is member, among others, of CERN, EMBL (European Molecular Biology Laboratory), ESO (European Organisation for Astronomical Research in the Southern Hemisphere), ESRF (European Synchrotron Radiation Facility), ILL (Institut Laue-Langevin), ECMWF (European Centre for Medium-Range Weather Forecasts), and ITER. Funding of the Belgian contribution to these infrastructures by the federal level ensures access to these facilities to all researchers in Belgium.

2. Coordination of the participation of Belgium in the ESFRI Roadmap and contribution to the funding

The participation of Belgium to the research infrastructures from the ESFRI Roadmap is discussed by all the Belgian federated entities in charge of research infrastructure policy in a specific consultation group (CIS/INFRA). In general, the participation of Belgium in an ESFRI is supported by the payment of the annual membership fee by the federal level. The financial support of the integration of Belgian research teams and laboratories/institutions (mainly through in-kind contributions) into the European research infrastructures are covered by the entities concerned. By doing so, the federal level guarantees access to the RI for all Belgian researchers and gives research institutions from all over Belgium the possibility to contribute to the construction of the RI.

In its 2010 roadmap¹¹, ESFRI identifies 48 projects to be carried out, including one "Belgian" project, MYRRHA, the research infrastructure project coordinated by the Belgian Nuclear Research Centre (SCK-CEN). Financial support to MYRRHA during the preparatory phase is ensured at Belgian level by the SPF Economy and BELSPO.

3. Management of national research infrastructures

The federal level owns and/or manages national research infrastructures like BELNET¹², BCCM (the Belgian Coordinated Collection of Microorganisms), the research vessel Belgica, the Antarctic Research Station Princes Elisabeth, the Biodiversity Platform, data centres, nuclear research reactor (BR2) ... These research infrastructures are open to all scientists in Belgium. They are often part of European networks of similar research infrastructures and/or of the facilities that will be integrated into an ESFRI.

In the nuclear area, the research infrastructure EURIDICE (European Underground Research Infrastructure for Disposal of nuclear waste in Clay Environment), although not national, is managed and operated by an economic partnership between the Belgian Agency for Radioactive Waste and Enriched Fissile Materials (ONDRAF/NIRAS) and the Belgian Nuclear Research Centre (SCK•CEN).

¹¹ The ESFRI Roadmap 2016 was launched on 10 March 2016 and includes also the research infrastructure MYRRHA.

¹² BELNET is the Belgian national research network that provides high-bandwidth internet connection and services to Belgian universities, colleges and public services.

Thanks to its underground laboratory facility HADES, EURIDICE contributes to the evaluation of the safety and feasibility of radioactive waste disposal in a deep clay layer in Belgium.

Strategic policy aims and actions points

The current management agreement of BELSPO attaches considerable importance to investments in the Belgian research infrastructures (Belgica, MYRRHA) and to Belgian participation in international research infrastructures (EMBL, ESO, ILL...).

The measures proposed below reflect the will to strength international partnerships and to share research infrastructures.

1. Development and implementation of the Belgian ESFRI roadmap.
2. Evaluation of the socio-economic impact of the participation of Belgium in large-scale research infrastructures, including the development of key performance indicators to measure and monitor scientific and socio-economic impact of participation to large-scale research infrastructures.
3. Discussion of a common mechanism at the federal level for the funding of national research infrastructures and their insertion in EU/international networks.

Priority 3: an open labour market for researchers

In Belgium, the main responsibility in terms of management of human resources lies in the hands of the Communities. They elaborate the university acts that govern academic careers and mobility of researchers in the public sector.

The federal level intervenes on three different levels:

- As the employer of researchers in the federal research performing institutes, it develops the legal acts describing their careers;
- As department in charge of research policies, it participates in European programmes and runs own mobility programmes;
- As intermediary between the research authorities on - and other federal departments (like FPS Home Affairs) builds a dialogue with both sides the aim of improving certain mobility-related issues, such as visa's.

The importance of this last role has increased in the last years, thanks to the European and national context. In Europe, barriers are built, rules are strengthened and quotas are discussed. In Belgium, family reunification became more difficult, the price of long stay visas increased. Nevertheless, researchers from all around the world still want to come to Belgium, where they are welcome and where host institutions develop their own strategy in terms of researcher's mobility.

Overall status

1. Endorsement of the Charter and Code

The principles of openness, transparency and merit-based recruitment as articulated in the Researcher's Charter and the Code of Conduct for Recruitment of Researchers- (CC) are supported at the federal level (as it is the case for both Communities and the universities).

More recently, the Human Resource Strategy for Researchers (HRS4R) has been developed as a mutual contract between the research performing (public) organisations (RPO) and the European Commission (EC). Most Belgian universities became HRS4R acknowledged institutions.

2. Euraxess

Euraxess is a portal devoted to the mobility of researchers. It provides information, services, guidelines... to researchers. Job offers from all RPO and funding organisations are published in the Jobs Section. The big publicity should be given to job offers and grants in order to attract the best researchers and enhance the visibility of the FRI. BELSPO is recognised as one of the three Belgian Bridgehead Offices by Euraxess (BHO). BELSPO develops the Belgian Euraxess Portal by producing content, reports, and guidelines aimed at mobile researchers. Practical support to the RPO and the researchers should be provided by a Service Centre. The activities' range of such a centre goes from helping with visa issues to guiding parents with schooling of children or solving housing problems. This support is often (informally) provided by BELSPO, mostly for what regards visa problems, work permits and stay permits.

3. Mobility grants

BELSPO had two mobility schemes: return grants (Back to Belgium – B2B) and inward fellowships (Postdoc Fellowship – PF). B2B run from 2002 to 2014 and the PF exists since 1991. Both schemes are in line with the development of the ERA, as they aim at bringing researchers to Belgium/Europe and developing networks and partnerships between researchers and RPO.

These two initiatives were supported by a COFUND mechanism of the EC for the Calls 2010-2013.

4. Scientific Visa Directive

Since 2007 the European Directive concerning the stay permits and the visa issues in MS (so-called "scientific visa"¹³) has been transposed into Belgian Law. The procedures to obtain a visa are now faster, simpler, and more transparent and researchers are exempted from asking a work permit. BELSPO is responsible for the agreement of the RPO (more than eighty institutions are recognised today).

Strategic policy aims and actions points

With regard to labour market, many responsibilities have been recently transferred to the Regions (e.g. work permits and the management of several allowances related to the worker and his/her relatives). The regional framework will therefore play a greater role in people's mobility, which calls for a better, personalised, follow-up of the researcher during his/her stay in Belgium. It is proposed to:

1. Formalise the creation of a EURAXESS Service Centre for FRI's by BELSPO (2017).

¹³ Scientific visas are a consequence of the European directive 2005/71 concerning the measures to be undertaken by Member states for admitting third-country nationals for the purposes of scientific research in Europe.

2. Develop a helpdesk procedure for the agreement for scientific visa (2016-2017).

At the Federal level, some positive actions in line with the principles of the Charter and the Code, fostering and developing a greater mobility of the researcher, can still be developed:

3. Support of the FRI in terms of mobility of researchers and scientific visa (horizon is 2016-2018¹⁴). For e.g., organisation of information sessions for the FRI that do not fall under BELSPO's authority;
4. To develop the HRS4R within the FRI: specific information sessions, support for the implementation of the strategy within the FRI (horizon is 2016-2018).

Furthermore, it is also proposed:

5. To raise the number of publications of the FRI on EURAXESS: organisation of information sessions about EURAXESS in the FRI's and at the federal level, creation of a profile for each FRI falling under BELSPO's authority and extension of the vacancies' publication delay;
6. To develop new actions, taking into account the needs of the FRI, in terms of mobility scheme (B2B, PF, COFUND and/or else; horizon is 2017-2020);
7. To take part at the transposition of the new Researcher and Student Directive at national level (horizon is 2016-2018).

Priority 4: gender equality and gender mainstreaming in research

Overall status

With regard to gender equality, the same observations that are made for Belgium as a country can be made at the federal level¹⁵. There are R&D fields in which women are underrepresented (for example, among the R&D staff with a doctorate degree, only 1/3 are women¹⁶). Women are also more frequently employed part-time, and women in older age categories are less present within R&D organisations in comparison to men.

In recent years, a number of important legislative initiatives were taken with regard to equality in Belgium. This legal framework is highly important. However, if it is to be effective, such framework must be followed by plans entailing actions, goals, and improvements and, above all, by a committed attitude from players and by society in general. For now, the number of actions developed along these lines remains quite limited and concentrated on certain points and institutions. The "trickle-down effect" of the actions taken in the legal sphere is, for the moment, quite limited.

1. Legal framework on gender: law of 12 January 2007 (law on "gender mainstreaming") and Royal Decree of 2 June 2012 on gender quota

The law on "gender mainstreaming" aims to foster equality between men and women by integrating the gender dimension into the content of public policies set at the Belgian federal level. That law, therefore, has implications both political (such as the obligation to integrate the goals of the Peking

¹⁴ Already included in the new management agreement of BELSPO.

¹⁵ Analysis of 26 research institutions under the authority of the federal government.

¹⁶ BELSPO data from 2012 and 2013. At the Masters and Bachelor level, women account for approximately half of degree-holders employed in the sector.

World Conference in the strategic goals of the government or the imposition on each minister of the obligation to integrate the gender dimension in all policies, measures and actions relevant to his/her own competences) and administrative (e.g.: integration of the gender dimension in the management plans). It applies to projects of BELSPO as well as to research initiatives of the various federal departments. The Law of 12 January 2007 makes "gender mainstreaming" a legal obligation, creates a structural framework for the integration of the gender dimension and provides a variety of instruments for that. However, the practical implementation of the law remains dependent on the commitment of the persons involved. The integration of the gender dimension is yet to occur spontaneously; it remains an important challenge facing numerous obstacles.

Since June 2012, affirmative action has been in place to reduce the existing gender imbalance in the administration of the federal public services. The government ordered that at least 1/3 of the top federal civil servants (holders of management functions and government officials belonging to rank A3, A4 and A5) should be women in 2013. This also applies to BELSPO and to the FRI. Since then, 36 top managers have been appointed in total, of which 15 are women, across all areas. As regards to the FRI, at the beginning of 2014 only 33% of the managers and only 20% of the officials appointed in the other classes were women.

2. Training on gender issues

Training on gender mainstreaming was provided to all federal departments. The goal of the training was to raise awareness among the participants of the topic of equality between men and women and the current challenges by providing an understanding of the "gender mainstreaming" approach. Thanks to it, participants should be capable of integrating the gender dimension into the public policies falling within the scope of their competence and of playing an active role in the implementation of all of the provisions of the law of 12 January 2007 and of the royal decree of 26 January 2010.

In 2013, the Institute for the Equality of Women and Men provided an awareness-raising session on gender and public procurements for the DG Humanisation of Work of the FPS Employment, Labour and Social Dialogue. This session explained how to take into account the differences between men and women in public tenders (including for commissioning research projects).

3. The gender dimension included in the research programme BRAIN-be (2012-2019)

Since 2012, gender has been integrated into the evaluation criteria "Potential impact of the project" and "Quality of the network" of the BRAIN.be research framework programme. Applicants are asked to be aware of the gender dimension in the content of their projects and to indicate the composition of the research teams from a gender perspective or to justify why this aspect could not be taken into account (budget, necessary expertise, etc.).

4. Obligation to consider the gender dimension in the postdoctoral fellowships granted to researchers from outside the EU (2013)

Since 2013, candidates have been formally requested to consider the gender dimension in the content of their proposals. In order to do that, they are provided with hyperlinks to information on how to incorporate this dimension into R&D. In 2015, this item was improved by the inclusion in the Application Form of the remark "Please note that this question is related to research content only, and not to equal chances or human resources management".

In 2014, considering the gender dimension in research or the capability to justify its exclusion became not only a criterion for the scientific quality, but also an eligibility criterion of post-doc fellow-

ships' applications. As a result of all this, there has been a noticeable increase in awareness of the importance of the gender dimension among the candidates and the evaluators.

5. Inventory and analysis of data and indicators on gender at the Belgian federal level

The availability of statistics broken down by gender is indispensable for the integration of the gender dimension. In 2012-2013, a study was undertaken involving the analysis of federal public statistics. That inventory offers a (non-exhaustive) picture of the available information and also indicates for which data some research work is still necessary to be able to break it down by gender.

6. Action : support from the RBINS for the non-profit organisation BeWiSe (Belgian Women in Science)

BeWiSe is an association whose goals are to support women in the scientific community and to improve the communication between Belgian and European female researchers. This association is supported financially by the Royal Belgian institute for Natural Sciences (RBINS) that also hosts it.

One of the activities of BeWiSe is a "mentoring" programme for women scientists doing graduate work or starting their post-doc, with the goal of intensifying contacts with experienced scientists (male or female) and of encouraging women scientists to pursue a career in science. Since 2010, this programme has already created over 20 pairs (mentor-mentee). An evaluation was made in 2011 and the rate of satisfaction of the mentees and mentors combined was around 80%.

Other initiatives have been taken¹⁷ and discussions of their results with various stakeholders have been organised.

Strategic policy aims and actions points

The consultation with the FRI and the federal departments resulted in many suggestions for action, based on the identified gaps. In an initial phase, it is proposed to focus on certain activities. One should take advantage of the preparation of a new research programme by BELSPO and of the recent approval of the management agreement to devote even greater attention to the gender dimension. The priority actions proposed are as follows:

1. To implement the Law of 12 January 2007 (law on "gender mainstreaming") (horizon is 2016): incorporate a "gender" target into the BELSPO management agreement and its FRI, possibly clustering the detailed actions into one or two major outlines. To plan the extension to other federal departments that offer loans for R&D projects.
2. To provide training on the gender dimension in research for R&D managers and for researchers of the FRIs (horizon is 2016). This activity should include consideration of what BELSPO is doing and could still do to contribute to the integration of the gender dimension in research and to a balanced participation of women and men in R&I.
3. To develop an action plan for all new R&I programmes (horizon is 2016-2018):
Phase 1: to set a target for the participation of women and men in R&I;

¹⁷ BeWiSe produced a documentary "Science needs you!" (<https://www.youtube.com/watch?v=-3fY6re0p4>) and is developing a pedagogical tool on the various possible careers "Go 4 Sciences!" (<http://www.go4sciences.be/>) designed for students aged 12-14 and their science teachers.

Phase 2: to identify the causes of the existing imbalance and draw up a plan of action to promote equality;

Phase 3: to make available to all the federal departments, a charter of good conduct in terms of gender perspective in research content and participation of women in R&I.

4. To develop and distribute an awareness-raising document (horizon is 2017): the Institute for the Equality of Women and Men is planning it. Therefore, this would be an action undertaken in close cooperation between two institutions overseen by the same State Secretary.

Priority 5 Optimal circulation and transfer of scientific knowledge

Priority 5a: fully implementing knowledge transfer policies at national level

Designing and implementing knowledge transfer policies is a key responsibility of the Regions and Communities. However the federal authority (Belspo) has a certain role to play through its space activities and other research initiatives. Both of these integrate knowledge transfer activities. The FPS Economy SMEs, Self-Employed and Energy develops other knowledge transfer activities through its nuclear programmes.

And finally the federal authority also supports all kinds of interaction between the Federal Scientific Institutes on one hand and the universities or other research institutes on the other hand.

Overall status

Regarding the transfer of knowledge, several actions have already been undertaken. Some examples are listed below. Space-related activities put a strong and growing emphasis on not only creating, but also distributing knowledge, both within the scientific community and beyond, all the way to the public at large. However, knowledge transfer is certainly not limited to space-related activities, as explained below.

1. Programme STEREO (since 1985 – current)

STEREO (Support to the Exploitation and Research in Earth Observation) is the Belgian programme for remote sensing research. It comprises four parts: research, development of applications, support of research and Belgian infrastructure and applications and EODesk services. The focus of the programme is on enabling high quality research. Its research results are disseminated to the industry, the research community, and the public. Concrete examples of dissemination initiatives are the BEODays, the Belgian Earth Observation Platform (BEOP <http://eo.belspo.be>), the Belgian Pléiades Archive (<http://pleiades.belspo.be>), EOedu (<http://eoedu.belspo.be>), and the creation of educative products such as CD-roms, posters, exhibitions and much more.

2. Knowledge transfer activities of the FRI

The FRI contribute to the circulation of scientific knowledge through, in the case of those which fall under the authority of BELSPO, their musea, their educational programmes, and the teaching activities of some of their researchers in universities.

3. Knowledge transfer activities within ESA

Technology Transfer Programme: BELSPO finances the Belgian broker in this network. The transfer process consists of extracting and marketing space technologies, services, and applications by analysing the needs of non-space applications and identifying suitable space technologies to meet these needs. ESA's Technology Transfer Programme Office (TTPO) provides a number of opportunities to European entrepreneurs who exploit the available technologies and expertise;

ESA Business Incubator Centres (BICs): BELSPO participates in the Business Incubator Centres programme of the European Space Agency (ESA) by financing the two Belgian Centres. ESA's Business Incubation Centres (BICs) are meant to help entrepreneurs turning space-connected business ideas into commercial companies. They provide technical expertise and business-development support.

PRODEX is the Programme for the Development of scientific Experiments (PRODEX) of ESA. It covers four scientific areas: Space Sciences, Space Exploration, Earth Observation and Life and Physical Sciences in Space (LS&PS). One of its major objectives is to foster collaboration between on the one hand scientific institutes and universities, and on the other hand industrial companies. Belgium, through the federal level, participates in PRODEX since 1988, transferring knowledge from the production side to the users' side.

The socio-economic impact of the space investments is currently being investigated in cooperation with 6 other member states of ESA. The objective of the study consists in developing a coherent methodology that could still be useful in the future and the production of results that would allow for evidence based policy making.

4. Knowledge transfer activities in the nuclear field

In the field of nuclear engineering, several initiatives have been kicked off. An example is the Belgian Nuclear higher Education Network (BNEN), a consortium of 6 Belgian universities and the Belgian Nuclear Research Centre (SCK•CEN). BNEN organises since 2002 a one-year master-after-master programme in nuclear engineering. Rad4med.be is another initiative in the nuclear field aimed at medical applications. It's a non-profit network aimed at promoting the sector and its expertise, and providing potential international partners with a catalogue of skills available in Belgium on medical uses of radiation such as nuclear medicine or radiation therapy.

Strategic policy aims and actions points

Discussions between the FRI and the administration (Belspo) brought up a number of suggestions. Many will be debated and implemented within the future Belgian Interfederal Space Agency (2017). The creation of the agency is an initiative of the present federal government.

Many knowledge transfer initiatives exist, targeting a wide set of audiences. However they are heterogeneous and lack consistency. Therefore preference should be given to:

1. Redesign the knowledge transfer mechanisms (activities and instruments) according to each target audience. This includes developing for each audience specific online tools, publications, events, exhibitions...
2. The creation of a portal of the STEREO programme with a separate access for the general public (with an emphasis on high school students) and another one for the professional community (researchers and the industry) with activities in Earth observation research. Such initiative could be

broadened to encompass all activities carried out within the yet to be established Belgian Inter-federal Space Agency.

The inventory of the existing measures brought to light clear similarities between PRODEX on one side, and STEREO on the other. However, until now the fusion of the two programmes was deemed unsuitable, but the setting up of the Federal Space Agency will provide the perfect opportunity to move forward. The following action is therefore proposed:

3. The creation of a merged programme of national research initiatives in all space fields (as opposed to Earth observation only).

Priority 5b: promoting open access to scientific publications

Overall status

All authorities in Belgium recognised in an early stage the importance of Open Access (OA) to scientific publications. All Belgian ministers of Research and Innovation subscribed to the Berlin Declaration on Open Access and act in compliance with the European Commission's Recommendation of July 17, 2012 on access to and preservation of scientific information. As a follow-up various projects were launched in this domain.

Orfeo Open Access repository and the Federal Open Access Strategy

Since 2014, an Open Access (OA) repository for BELSPO financed research has been created. Hosting for this repository has been established at the Belgian Royal Library. A mandate was drafted laying down the conditions for acceptance in the repository. Both activities (the creation of the repository and the drafting of the mandate) were carried out in consultation with the targeted research institutions and our regional partners. In April 2016, both the repository and the mandate will be operational and will be made public.

Orfeo Open Access repository: the repository contains 3000 referenced documents, 600 of which are publicly available in full text (Sept. 2015). Partners are usually eager to start working with the repository as they are aware of the stakes and the savings. Integrated Library systems of additional partner institutions are currently being analysed, exchange protocols are being established and input of new material is being delivered. Active participation has varied from partner to partner but none of the setbacks have been of a crippling nature.

Federal Open Access Strategy: the BELSPO OA Mandate Draft has been lauded by SPARC (the leading European OA advocacy organisation, <http://sparceurope.org>) and the University of Liège, which pioneered the green open access model. BELSPO directors have validated it and the mandate is now awaiting for approval by the joint management of the partner institutions.

Strategic policy aims and actions points

Taking into account the current state of the art of OA in Belgium as well as the existing needs and gaps, the following measures are proposed:

1. Creation of 'Fair' Gold Open Access Journals (2010/2011): three Journals in the field of Natural History, the European Journal of Taxonomy, the Belgian Journal of Zoology and *Geologica Belgica* exist and are available in 'Diamond' Open Access, which is a variation on Gold OA. Publications in Diamond OA are not paid by the authors but by the publishing institutions. In the case of BELSPO those institutions are the Royal Museum for Central Africa and the Royal Belgian Institute of Natural Sciences. All three Journals now boast rising Impact Factors. One development would be to establish OAI-PMH¹⁸ (Standard OA compatible interconnectability protocol) harvesting ability between the three journals and the BELSPO Repository.
2. Development of an institutional repository for two federal departments: 2.1 Creation of an Open Access compatible repository for Public Sector Information (PSI) for the FPS Economy, SMEs, Self-Employed and Energy (2017). Only later would scientific publications be made available; and 2.2 Creation of an Open Access repository for the scientific publications of the Scientific Institute of Public Health (WIV-ISP), to be integrated in a new website. As WIV-ISP is merging with the Veterinary and Agrochemical Research Centre (CODA-CERVA), Open Access and Open Data were introduced in the agenda of the working group for research support. The workgroup should produce an Open Access policy at the end of 2017.
3. Open Access at the Belgian Health Care Knowledge Centre (KCE) (2016): KCE invites its researchers to publish in journals which allow Green OA. Its library provides a list of appropriate peer reviewed journals with balanced impact factor and open archiving policy information. KCE research reports are made available in an OAI-PMH compliant institutional repository which is indexed with OpenDOAR, ROAR, OAster and OpenAIRE. Since 2016, preprint or post-print versions of scientific articles are equally being uploaded after review of the journal policy. Next developments in 2017 will be importing of full text pre/post prints, establishing the new work flow for the integration of full text pre/post prints and valorising the new offer on the institution web site.
4. Improving Orfeo: pursue interconnectability of Orfeo with existing Integrated Library Systems (ILS) of non-BELSPO institutions and establishing a link with the Belgian legal depot and also set up a Helpdesk for institutional Orfeo administrators and users.
5. Integrating the Open Access mandate in the BELSPO research contracts.
6. Extending both the repository and the mandate to Open Data and Open Science starting 2016.
7. Extending both the repository and the mandate to other federal departments.

Priority 6: international cooperation

At the Belgian federal level some initiatives were already taken to tackle this priority: development of a strategy for extra-Europe research cooperation (INCO); reinforcement of a multilateral European approach with third countries; development of a toolkit of complementary cooperation instruments and an indicator for monitoring the progress of the extra-Europe cooperation. However, there is still room for improving these initiatives. That is why continuous dialogue with the federal departments, with the regions and the communities is organised in Belgium with the aim of promoting

¹⁸ Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)

a coherent and comprehensive image of the country and of its R&I opportunities in target countries and re-enforce international cooperation in general.

Overall status

1. **Participation** in calls for proposals launched by bi-regional **ERA-NETs**

BELSPO participates in ERAfrica I, a network gathering European and African countries and ERA-LAC I, a network with members from Europe, Latin America and Caribbean countries. For ERA-LAC support of BELSPO is directed towards the thematic group 'Biodiversity /Climate', following the interests of the FRI.

2. **Establishment of a set of instruments for international S&T cooperation**

Those instruments include programmes for research, cooperation within multilateral programmes (UNESCO, IFS...), bilateral and other calls for international networking, mobility with partner countries¹⁹ but also support to the participation of Belgium in major international organisations (e.g. International Council on Archives, Intergovernmental Panel on Climate Change...) and in relevant research infrastructures (e.g. the Scientific Collection International (SciColl) from the Global science Forum of OCDE; see also priority P2).

All the above-mentioned initiatives should be part of a coherent puzzle and reply to different needs of the research community. Complementarity is sought between the various tools developed at the federal level.

3. **Development of a network of advisers /scientific attachés**

Since 2012, attachés responsible for monitoring and promoting research and innovation are based in Belgian embassies and/or consulates in the capitals of partner countries with the aim of ensuring mutual exchange of information on bilateral or European actions intended to strengthen the coordination, coherence and sustainability of R&I cooperation actions.

4. **Establishment** at the federal level, under the initiative of the FPS Foreign Affairs, **of an Interdepartmental Commission for Policy Coherence for Development**, as well as working groups about the countries in transition (such as Vietnam and South Africa). This should enable better coherence between the initiatives of the various federal departments in all domains of cooperation, including in the area of science policy.

5. **Cooperation protocol between BELSPO and the Belgian Development Cooperation (DGD)**

Following the European model, Belgium tries to strengthen the coherence and cooperation between the departments for science policy and development cooperation, particularly for activities focused on Africa. This effort towards alignment and coordination (protocol signed in April 2014) is expected to contribute to the reinforcement of Belgian participation in R&I cooperation opportunities offered by the EU.

6. In 2012, an **overview of bilateral agreements and their implementation was drawn up by BELSPO** in collaboration with the remaining federal departments. Weak points and obstacles were iden-

¹⁹ BELSPO's partner countries are the BRICS (Brazil, India, China), Vietnam and African countries.

tified and suggestions and best practices were formulated in order to strengthen international cooperation and participation in European initiatives.

7. **Creation of communication tools** for the promotion of the potential for international cooperation of Belgium in R&I.

8. **A progress indicator** with regard to cooperation with non-EU countries (INCO countries) was developed.

Strategic policy aims and actions points

Considering the current achievements in this area (e.g. solid bilateral cooperation with certain countries; successful networks projects in certain areas...) and the identified gaps, it is proposed to:

1. Application of the indicator in order to measure the evolution of INCO and enable a retrospective (3 to 5 years) and a prospective view of the INCO policy and instruments (horizon is 2016-2018).
2. Develop a federal strategy for extra-European scientific cooperation with an action plan and a progress assessment. Alignment with the multi-annual roadmaps of the EC for cooperation in R&D with other countries or regions would be sought. Multilateral cooperation would be favoured (in comparison to bilateral cooperation) (horizon is 2016-2018). See P2B.
3. Enhance the collaboration between federal departments (namely by further implementing the protocol for cooperation between BELSPO and DGD) and with the federated institutions, both for bilateral (bilateral agreements) and multilateral cooperation (at European or global levels, e.g. UNESCO etc.) (horizon is 2016-2020).
4. Enhance coherence and interoperability of the BELSPO instruments for international cooperation (research projects, bilateral networking, mobility, multilateral cooperation), in order to maximise impact (horizon 2016-2018).
5. Continue the support for FRI in the development of their strategy/roadmap for internationalisation as a contribution to their excellence and expertise (horizon is 2016-2018).

II. Flemish ERA-roadmap

Priority 1: effective national research systems

Overall status

Flanders has several Research and Development and Innovation (R&D&I) funding channels and instruments that can be classified based on the following characteristics:

- (i) type of activity: infrastructure, basic, strategic, applied research, or proof of concept (living laboratories or testing beds);
- (ii) target group: enterprises, enterprise umbrella organisations, group/networks of companies combined with knowledge institutes, universities, university colleges, scientific research institutes, strategic research centres, other knowledge institutes;
- (iii) allocator: funding agencies, universities, university colleges, strategic research centres (SRCs), scientific research institutes, other knowledge institutes, private companies;
- (iv) funding principles: non targeted vs. specific/targeted funding, inter- vs. intra-university competition, individual mandates/grants versus research projects, competitive (peer review based) vs. institutional (block) funding based on performance indicators (ex post evaluation) and involving visitations of external experts;
- (v) type of calls: bottom-up, generic vs. programmatic, top-down, thematic

The R&D&I system in Flanders consists of a quite sophisticated mix of funding instruments (covering the whole range of technology readiness levels (TRLs)). On the one hand they give the beneficiary organisations, i.e. mainly higher education institutions (HEIs) and SRCs substantial (financial) freedom to design and implement their own long term strategies, policies and instruments. On the other hand the broader legislative framework stimulates intra-organisational competition based on excellence. For the HEIs, dedicated funds using specific weighted key or parameter based allocation formulas like special research fund (BOF), industrial research fund (IOF) and Hercules Foundation (infrastructure fund) have been put in place. For SRCs, cooperation agreements, renewable on a five year basis, are concluded between the Government of Flanders and the organisation concerned following an ex-post evaluation of an organisation's performance using key performance indicators (KPIs). Research performing organisations (RPOs) act as research funding organisations (RFOs) when internally distributing funding according to their internal policies.

"Regular" RFOs, like Research Foundation-Flanders (FWO) and the Flanders Innovation & Entrepreneurship (AIO), as well as the universities apply the core principles of international peer review and have installed internal methods to monitor their performance and/or conduct self-assessments. Strategic research centres, scientific institutes, university colleges, centres for collective research and other knowledge centres organise, to a varying degree, calls for proposals with the involvement of external, international experts. All proposals are assessed by review panels. The more local and applied the project call is oriented (specifically for AIO and centres for collective research), the fewer international experts are involved. These experts should not be regarded as peers in the more re-

stricted sense of excellent peer researchers, but as peers in the broader sense of knowledgeable individuals who are active in the same topic, field or domain (e.g., as an industry representative).

The overall combination in the Flemish R&D&I system of strategic top-down choices with a bottom-up strategy, including autonomy for HEIs and SRCs, has resulted in increased international visibility as well as world leadership in certain research domains (nano-electronics, biotechnology) of Flemish RPOs. In recent years, the tendency towards applied research has evolved towards an almost perfect equilibrium between fundamental and applied research. Through bottom-up funding based on competition the RPOs specialise smartly (cf. priority 2a). At the same time bottom-up funding allows disruptive new ideas and innovations to “crop up”.

Overall, research in Flanders by HEIs and SRCs is of a very high quality (cf. success rates in Framework Programme (FP) 7, various university rankings, output measured in terms of publications, citations, co-publications...). In addition, the Flemish Research and Development (R&D) system is very efficient: compared to the Scandinavian countries with a higher R&D intensity, Flanders produces a higher number of patents (see also below).

A satisfactory balance between competitive and institutional funding seems to have been achieved, although there always remains room for improvement.

Flanders has set up the Centre for Research and Development Monitoring (ECOOM), as a dedicated research unit for policy support. Its mission is to set up a coherent set of R&D and Innovation indicators for the Flemish government. The latest data on Flanders’ R&D&I intensity clearly reveal a growing trend, viz. from 2.06% in 2009 to 2.42% in 2012 and 2.54% in 2013²⁰. A comparative study of sectorial strengths in science, technology and economy, the so-called “specialisation profiles”, was performed within the smart specialisation study of the Organisation for Economic Co-operation and Development Working Group on Technology and Innovation Policy (OECD TIP Working Group) (ECOOM & EWI Department, 2011).

Strategic policy aims

The Government of Flanders is still committed to reaching a 3% R&D intensity by 2020 (with the specific target of 1% public R&D, anchored in the 2014-2019 Coalition Agreement) and thereby strives to lever the outlays of public R&D&I resources and focus on societal and growth domains.

In its Coalition Agreement at the start of the new term of office 2014-2019, the Flemish government promised to improve the success ratio for the Flemish R&D&I funding channels for excellent projects.

Flanders, c.q. its Department of Economy, Science & Innovation (DEWI), participates in one of the new style mutual learning exercises (on Public Private Partnerships (PPP)) initiated by the European Commission.

The Flemish R&D&I funding landscape, and the EWI domain in general, is in a state of transition. The funding agency for large research infrastructure, Hercules Foundation, is integrated into the FWO,

²⁰ The calculation is done in accordance with the new ESER2010 methodology.

which is the basic research funding agency (excellence based on competition). The funding agency focussing on innovation (former IWT), on the other hand, was split into a part that supports strategic research (at HEIs and SRCs) and a part that supports applied research (enterprises in the lead, HEI and SRC potential partners). The former has been merged with the FWO while the latter has been integrated into Enterprise Flanders to become the new funding agency called Flanders Innovation & Entrepreneurship' (AIO). AIO acts as the one-stop-shop for all types of aid to companies in Flanders to support both the economy and innovation. However, these changes will not affect the use of (international) peer review panels and generally accepted evaluation practices. Furthermore, the Flemish Council for Science and Innovation (VRWI) will be transformed into a new council for Innovation and Research. All these organisational changes have become operational as of 2016, with the exception of the VRWI. In 2016, the focus lies on alignment and the redesign of various Flemish funding instruments.

A new instrument is being developed by the AIO regarding cluster policy that aims to stimulate the creation of networks of innovative companies and knowledge institutes with a clear economic focus. It is expected that the emerging clusters, and in particular spearhead clusters, will more or less correlate with the domains of the Flemish smart specialisation strategy and create powerful innovation systems in these areas.

Action points

In general, the European Research Area (ERA) roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of additional action points (including a timeline and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

- The EWI Department will perform the additional legislative work required as a result of the restructuring of the funding landscape by the end of 2016.
- An intra-Belgian interuniversity research programme (The Interuniversity Attraction Poles - IUAP) is transferred from the Belgian federal level to the level of the Flemish and French Communities. A first call for the new style IUAPs is scheduled for September 2016. The application of the core principles of international peer review in the IUAP calls will be ensured.
- An evaluation of three Flemish SRCs (imec, iMinds, Flemish Institute for Biotechnology (VIB)) is planned for the first half of 2016, followed by a negotiation phase on their respective new cooperation agreements, which is expected to be agreed upon and signed by the end of 2016.
- The most recent SRC (Flanders Make, set up at the end of 2014) will be evaluated in the first half of 2017. The evaluation of (Flemish Institute for Technological Research (VITO) will start in autumn 2017. The FWO will be evaluated in 2018.
- The cluster policy instrument will be elaborated and operationalised.

Priority 2 Optimal transnational cooperation and competition

Priority 2a: jointly addressing grand challenges

Overall status

Currently, little systematic coordination exists within the Flemish administration between the different Research and Development and Innovation (R&D&I) funding agencies and the Department of Economy, Science and Innovation (DEWI) on aligning programmes with the Strategic Research and Innovation Agendas (SRIAs) of the Joint Programming Initiatives (JPIs). Besides the strategic research agendas, which are autonomously defined by the strategic research centres (SRCs), research funding organisations (RFOs) do not manage regional thematic programmes, with the exception of a programme on agricultural research and one on translational medicine. Hence, straightforward opportunities for (top-down) alignment are scarce. Most of the funding calls of the RFOs are bottom-up and open so that in principle any relevant proposal can be “spontaneously” aligned with an SRIA.

Flemish RFOs “reserve” a certain amount for this internationalisation support as part of the overall budget of some of their regular instruments. The EWI Department funds the membership costs for Flemish participation (mainly to support the secretariat etc. of a JPI) from its R&D&I internationalisation budget, and hence in principle participates in the management board of a JPI. The research performing organisations (RPOs), in particular the SRCs (due to their thematic focus), can autonomously define their research strategy and align it with the SRIAs of JPIs, European Research Area Networks (ERA-NET)s, Joint Technology Initiatives (JTIs), Joint Undertakings (JUs), Key Enabling Technologies (KETs), etc. Each university has selected a limited number of spearhead topics for its research activities. As (some of) these topics tie in with the grand societal challenges, some HEIs intrinsically evolve towards greater alignment between their research activities and these challenges.

Both Research Foundation - Flanders (FWO) and Flanders Innovation & Entrepreneurship (AIO) have concluded agreements on Lead Agency Procedures (FWO: 4, AIO: 1), thereby recognising the evaluation procedures of the partnering funding agency abroad. Some universities, research and technology organisation (RTOs) and RFOs participate in discussions on framework conditions, common administrative terminology, simplifications of rules and procedures as well as strategic research directions through their membership in international stakeholder organisations such as League of European Research Universities (LERU), European University Association (EUA) resp. European Association of Research and Technologies Organisations (EARTO) resp. Science Europe or The European Network of Innovations and Agencies (TAFTIE), and modify their procedures if deemed appropriate.

Since 2011, the EWI Department hosts a stakeholder platform that groups representatives of the Flemish Research and Innovation (R&I) quadruple helix, including RFOs and RPOs. A working group is dedicated to coordinating intra- and extra-EU initiatives by European member states on R&D&I cooperation.

Flanders does not really have a long-standing tradition within its administration of organising foresight exercises in the broad area of science and technology, since the Flemish R&I system is mainly organised in a competitive bottom-up manner (cf. priority 1) to give (members of) RPOs maximum freedom to choose Research and Development (R&D) topics and elaborate R&D proposals. The foresight exercises organised by the Flemish Council for Science and Innovation (VRWI) in 2006 and 2014 are the only ones covering the entire Science and Technology (S&T) policy domain that have resulted

in the identification of potential priority thematic clusters and strengths of Flanders and the formulation of policy recommendations.

The Flemish stakeholders have for many years now been aware of transnational cooperation initiatives and Flanders has for a long time already had a high participation rate in European Cooperation in Science and Technology (COST), EUREKA, Framework Programme (FP) for Research and Technological Development (and demonstration) (RTD), etc. Most stakeholders use the information made available through the Flemish website with R&D&I calls (www.europrogs.be) and mailing lists (e.g., ncp_fwo) and through the stakeholder platform, as they gain more insight into the various consultation processes. RPOs have their own internal staff (e.g., EU Office) to disseminate information on transnational programmes and calls. These staff members internally organise various kinds of support activities (e.g. pre-screening of proposals, proposal writing sessions, orientation of submitters towards the most appropriate call, ...).

The question remains whether the human resources “invested” by RPO and RFO to organise the participation by RPOs in specific transnational cooperation activities are actually worthwhile compared to their (relative) importance in Flanders. RPOs also point out the frustrations of researchers whose projects are not selected due to a lack of funding committed by the RFOs in JPI and/or ERA-NET Co-Fund calls (high proposal/award overwriting ratio in Horizon 2020) as the funding comes from the regular funding channels.

Strategic policy aims

Neither the policy note of the Government of Flanders nor the latest policy brief by the Minister responsible for Science and Innovation contain any specific strategic policy aims on how to jointly address societal grand challenges, even if the grand challenges are referred to in the Flemish long term strategy document called “Vision 2050” as important challenges for Flemish society. Currently, the discussion is still on-going on how to implement the “transition trajectories”. One of the decision points is an adapted governance model to ensure better coordination between the various Flemish departments and agencies on how to tackle societal challenges within a transition trajectory.

On the level of the administration, participation in the various JPIs is mentioned under the corresponding thematic label, such as blue economy, life sciences, biotech and health. Within the EWI Department a policy note is under preparation that advocates a better coordination of the participation in joint programming instruments within a framework that reconciles a selective bottom-up alignment with an overall top-down alignment.

The very recent new cluster policy of the Flemish government could provide an additional “hook” between Flemish knowledge centres and industry spearhead clusters and grand societal challenges, albeit strongly dependent on the topics that will be addressed by the future spearhead clusters.

Action points

In general, Flanders will continue to contribute to the ERA roadmap with the cooperation of the relevant stakeholders to identify and prepare more specific action points. At the end of 2016 an additional document will be drafted with a ranked list of action points, including a timeline and targets. The subsequent paragraphs present, actions in the short and medium term.

- A formal coordination between the EWI Department and its RFOs should be implemented to come to an overall strategy, vision and decision framework with an independent selection committee using objective criteria and a qualitative analysis on how Flanders will position itself (based on its strengths) with respect to the ERA and its policies and instruments regarding the joint programming process as a result of a participatory process with the stakeholders (through the existing stakeholder platforms). An optimal balance must be struck between bottom-up and top-down initiatives that ensures sustainability and critical mass. This exercise needs to be repeated at regular intervals. The EWI Department will start to prepare proposals for such a process in 2016.
- Additional funding for joint programming and addressing grand societal challenges (JPIs, art.185, ...) is needed and is in line with the intention of the Flemish government to reach the 3% R&D intensity level by 2020. A long-term financial plan will set out the commitments of Flanders in the Joint Programming process. The EWI Department will start to prepare proposals for such a plan in 2016.
- In the immediate future the EWI Department will focus on strategy and policy related Joint Programming horizontal issues and selected agenda items of the High Level Group for Joint Programming during the meetings of the relevant working group of its stakeholder platform. A particular information item is the establishment of structural overviews of the participation of Flanders/Belgium in the Peer to Peers networks (P2Ps).
- In European Union (EU) committees and high level policy groups, Flanders will, through the Belgian delegation and on the request of the Flemish stakeholders continue to support the position
 - that long-term funding of JPIs, JTIs, ERA-NETs Co-Fund etc. is to be added to the common pot of the EU Framework Programme / Horizon 2020, as this has the advantage of being a single, transparent and open competition, instead of a multitude of programmes. An additional advantage is a single system or, alternatively, greater uniformity in submission and selection procedures and management systems.
 - not to extend the number of JPIs in “too light” a manner. On the contrary, existing ones should be evaluated and, depending on the outcome, be continued, stopped or integrated. Also, the multitude of submission and evaluation forms and procedures is to be reduced.
- When performing an analysis of the Flemish policy mix and instrument mix (cf. also priority 1), care should be taken not to block categories of research actors from participating in ERA-NET CoFund or JPI calls.

Priority 2b: make optimal use of public investments in research infrastructures

Overall status

Flanders participates in 13 European Strategy Forum on Research Infrastructures (ESFRI) projects, i.e. ICOS, PRACE, SHARE, ESS, LIFEWATCH, INSTRUMENT, EMBRC, ANAEE, DARIAH, ELIXIR and EURO-BIOIMAGING, BBMRI and ERINHA. The latter two are not funded directly by the Flemish administration but by the proper means of their participating Flemish research institution(s). Only the government funding for ICOS, PRACE, SHARE, ESS and LIFEWATCH is of a structural nature. Currently, no intermediary performance assessment procedure has been established yet. For INSTRUMENT, EMBRC, ANAEE, DARIAH, ELIXIR and EURO-BIOIMAGING the current funding cannot cover the entire budget requested by the various Flemish participations and will run out by 2017.

The long term sustainability of research infrastructures (RIs), whether ESFRIs or others, encompasses issues such as structural funding, a performance evaluation mechanism, capacity building or a selection mechanism to choose between new RIs to be funded or the continuation of established ones. This constitutes a future (but imminent) challenge. The construction of RIs inevitably also requires a long term strategy and related financing to keep the RIs operational and up-to-date.

The future Flemish decision-making process on investments and participation in RIs is a mixture of bottom-up and top-down decisions, including a specific submission and evaluation channel. Adequate balancing between both is an absolute must. A Flemish roadmap has been started, but due to circumstances, more specifically changes in the institutional landscape, the process has stalled for a while. Nevertheless, the projects figuring in the Flemish RI roadmap were selected after broad consultation with all the Flemish stakeholders. This Flemish roadmap not only contains the (future) ESFRI projects in which Flanders intends to participate but also gives an overview of (planned) RIs in Flanders in addition to the ESFRI scheme.

Flanders has developed its own strategy to give Flemish researchers access to research infrastructures. Cooperation between different Flemish research groups from universities, university colleges, research institutions and industry is encouraged.

Strategic policy aims

The high level policy aim is to provide for long term structural funding for Flemish participations in a selection of ESFRI projects, starting from 2017 onwards, as the current funding streams run dry at the end of 2016. This encompasses a selection mechanism for assessing new RI proposals as well as existing RIs that results in a “dynamic” list of RIs.

Additionally, since access to RIs and their data requires a data policy, including aspects regarding big data, a strategy is to be defined on how knowledge workers from academia, industry and society can optimally use and exploit the data available in RIs. This encompasses topics like intellectual property rights (IPR), open data and links to open access publication repositories.

Action points

In general, the European Research Area (ERA) roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

- The most important action point is to prepare political decisions for the long term (20 years), structural funding of (a selection of) ESFRI projects starting from 2017 onwards and the associated process and framework to perform a transparent and objective selection of new proposals and existing RIs. The preparatory activities are scheduled to be ready around fall 2016.
- In addition, an advisory opinion on the possibility of launching a new call for large RIs will be prepared by more or less the same period.
- The Flemish RI roadmap process is to be “fired up” again, with an eye to having it included in the Belgian RI Roadmap before the end of 2016, which, in its turn, is to be mapped on the overall European ESFRI roadmap.
- A first analysis on a new strategy regarding “access to research infrastructures, big data and open data” is expected at the end of 2016. It will take into account the European Charter for Access to Research Infrastructures.
- As a consequence of the changes to the institutional landscape, a new operational cooperation agreement between the EWI Department and the Research Foundation - Flanders (FWO) is to be drafted, since FWO is responsible for all research infrastructure funding from 2016 onwards. In particular for the ESFRI European Research Infrastructure Consortia (ERICs) and projects close cooperation is needed between both organisations. This renewed cooperation agreement is due by mid-2016.

Priority 3: an open labour market for researchers

Overall status

The Charter for Researchers (“Charter”) and the Code of Conduct for the Recruitment of Researchers (“Code”) have resulted in a higher prominence of “Human Resource Management for academics”. Consequently, existing good practices have been formally acknowledged and integrated. Flemish higher education institutions (HEIs) apply the principles of an open and merit-based recruitment system, except that they do not place the burden of proving that the recruitment procedure was open and transparent on the employer. Still, discrepancies seem to exist between theory and practice in certain cases. Merit-based recruitment and transparency is implemented as each HEI sees fit, i.e. without being coordinated at the Flemish level. All universities publish their vacancies on the Flemish Euraxess portal.

From 2011 onwards, Flanders has been investing substantially in setting up tenure tracks (€3.5 million).

The Support Programme for Young Researchers (OJO) (€ 4 million per year) supports the universities in providing (separately and jointly) training (e.g. transferable skills seminars) and career guidance (e.g. coaching, job fairs) to PhD candidates and young post-doctoral researchers and in promoting international orientation in junior careers. It covers several of the innovative doctoral training principles.

Most of the actors, in particular the ones that participate in the Human Resources Strategy for Researchers (HRS4R) project, reflect critically and regularly on their internal Human Resources (HR) procedures, instruments and policies, which sometimes results in new instruments.

A linguistic barrier exists: If a foreign researcher is expected to take up a teaching assignment, it depends on the level and course whether or not Dutch is the language to be used. The law in Flanders stipulates that Dutch is to be used to teach, although special English programmes do exist. Universities are in favour of a relaxation of this linguistic law. Although Dutch often remains the main communication language with the internal administrative support services of the research performing organisations (RPOs), most RPOs have a specific international staff office to support foreign researchers in English. It seems that there is a need for English translations of general government information, for instance on taxes.

A barrier to intersectoral mobility is the focus on high impact publications in the track record of an academic researcher. As a result, it is almost impossible for a researcher coming from industry to compete for a tenured position with a “purely” academic researcher. For the moment, recruitment and promotion decisions do not value specific industrial experience as highly as academic experience. Reversely, not all academic research topics (and hence the researchers) have “a match” in industry (little absorption capacity). Especially now that a growing number of researchers have to find their way outside academia, more measures are needed to stimulate PhD holders and PhD candidates to become better acquainted with industry. These two barriers do not apply to such an extent to university colleges as they cooperate more closely with industry on a more practical level.

Strategic policy aims

The high level policy aim is to develop a strategy for researchers and other knowledge workers that takes into account issues like career development, a flexible organisation of labour, the attraction of foreign talent, inter sectoral mobility and multidisciplinary training. Relevant career opportunities for young researchers, both inside and outside academia remain a top priority. Another important issue is the labour situation of researchers who are employed with a concatenation of multiple (sometimes short term) project based contracts, which can last for several years.

Action points

In general, the European Research Area (ERA) roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline

and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

- The new strategy on the career development of knowledge workers will take into account the recent study (March 2016) by the Flemish Council for Research and Innovation as well as the results of the continued ERA roadmap exercise (cf. above). A policy document with the new strategy is expected to be submitted for approval by the Minister in mid-2017.
- A new action plan on the mobility of researchers and teaching staff will be drawn up. Again, the results of the continued ERA roadmap exercise (cf. above) will be taken into account, complemented with the involvement of the Flemish Department of Education and Training. Part of the exercise will be to have the report reviewed (2011) by an expert group to formulate recommendations to increase mobility in academia in Flanders (“mobiliteit mobiliseren”). The consultation with the stakeholders already started last year with the ERA roadmap exercise and will be continued in the first half of 2016, leading to a plan by the end of 2016.
- The European Euraxess portal is undergoing important modifications. National Euraxess portals have to be aligned (at least regarding the user interface) and remain (visually) compatible. An adapted/updated Belgian Euraxess website, including specific information on Flemish and Walloon parts, is expected to be operational in the course of August 2016.
- The Support Programme for Young Researchers is scheduled to undergo an evaluation in 2018. In the course of 2017 the evaluation will be prepared by drawing up a specific action plan for this evaluation, which will include setting up a timeline, contacting external experts etc.. A subsequent adaptation of the programme (and legislation) may be necessary.
- The EWI Department will examine the feasibility of a suggestion made by stakeholders to arrange internships in industry for PhD holders and/or candidates and internships in an academic environment for industrial researchers.

Priority 4: gender equality and gender mainstreaming in research

Overall status

The topic of gender equality is addressed by all Flemish universities separately with many similar measures and actions and at a pace specific for their organization. Common current measures consist of: quotas in selection panels and management boards, Human Resources (HR) worklife balance, recruitment HR, change of company culture, actively addressing and training female researchers in attitude, and awareness raising of both male and female populations, which is thus basically the whole known arsenal of strategic and tactical measures. Usually these measures constitute the implementation side of a strategic vision on gender equality as written down in a gender action plan. Also, the Flemish strategic research centres have put specific measures and actions in place. All these institutions have been awarded the “HR Excellence in Research Label” and have signed the “Charter for Researchers” and the “Code of Conduct for the Recruitment of Researchers” (cf. also priority 3) that contain criteria regarding gender equality. As a result they comply with a common set of criteria laid down by the European Commission, such as equal opportunities recruitment policy, child care facilities and extension of the research mandate in case of pregnancy. Earlier Flemish legislation (2012) already imposed a quota for female representation in expert commissions, boards or steering

groups. As this legislation does not apply to private universities, they have spontaneously adopted internal rules in line with this legislation. The Flemish universities have also established an inter-university working group, i.e. the “High Level Task Force Gender” of the Flemish Interuniversity Council that has compiled a set of recommendations that all Flemish universities have adopted, translated and implemented (ongoing process).

University colleges do not require any measures or actions, as they do not experience any problems with gender inequality among their staff.

Participation by various actors in international committees, such as the Helsinki Group or the European Institute for Gender Equality (EIGE), ensures a good connection with the international practice and standards in this field.

Despite this panoply of actions and measures, the so-called “scissors graph of gender inequality”²¹ still applies to Flemish universities and a great deal of work (mainly “awareness rising” and changing the “company culture”) remains to be done, since the gender bias in academia is extremely hard to tackle (e.g. bias in recruitment and promotion). Gender is explicitly mentioned in the Support Programme for Young Researchers (see priority 3).

Only a few universities explicitly mention measures concerning gender mainstreaming in research. These measures include a chair and research group on gender studies, a centre of expertise financially supported by the university’s research department, participation in a project and collaboration in a study on gendered innovations. This aspect could be strengthened. Still, all universities participate e.g. in the joint organisation of an “Inter University Master of Arts Programme in Gender and Diversity” (about 60 students in 2014-2015 and over 100 students in 2015-2016).

Strategic policy aims

The main actors are the higher education institutions (HEIs) and the strategic research centers (SRCs), most of which have received the Label and signed the “Charter” as well as the Flemish Interuniversity Council (VLIR) Charter on Gender. Therefore, the Flemish Government has for the moment not stated any explicit policy aims in addition to the already existing legislation. Also, improving the gender balance by imposing quotas (e.g., for recruitment) is delicate because the most important criterion is (potential for) research excellence. The various gender actions at the level of the institutions have to be monitored in terms of effectiveness and impact and be adapted as seen fit by each institution. Changing national or regional legislation usually takes longer than adapting strategic visions and/or adjusting local and tailored measures. The Flemish government will consider recommendations by the actors as a result of this European Research Area (ERA) roadmap exercise.

²¹ See for instance

http://www.leru.org/files/publications/LERU_Paper_Women_universities_and_research.pdf on page 6.

Action points

In general, the ERA roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline and targets at the end of 2016). The subsequent paragraphs present actions in the short and medium term.

- With the help of HEIs the Flemish administration will examine why HEIs cannot extend research bursaries over 48 months to provide for pregnancy leave. Therefore, they will engage the other Belgian federated entities via the appropriate concertation channels to start a policy dialogue with the competent federal administration and Minister to solve this problem.
- The research funding and research performing organisations (RFOs and RPOs) will carry out qualitative assessments on the effectiveness and impact of their internal measures related to gender issues and actions and adapt/adjust them as needed.
- The RFOs and RPOs continue to organise awareness raising actions aimed at a shift in mentality and a change in organisational culture, preferably also in line with strategies on diversity, lesbian, gay, bisexual, transgender, intersex and questioning individuals (LGBTIQs), religious and other minorities.

No specific timing is given since the action points all involve organisations external to the Department of Economy, Science and Innovation.

Priority 5 Optimal circulation and transfer of scientific knowledge

Priority 5a: fully implementing knowledge transfer policies at national level

Overall status

The Flemish Government has implemented a well-balanced policy mix of instruments for the promotion of knowledge transfer. The most important are:

- Grants to individuals who want to turn their proven scientific idea into a concrete innovation or who want to obtain a so-called industrial PhD (innovation mandate, Baekeland grant)
- Subsidies to universities resp. strategic research centres (SRCs) to fund the operation of a technology transfer office (TTO) resp. incubators
- General subsidy programmes that include aspects that support, promote or stimulate technology transfer from higher education institutions (HEIs) to companies, like Tetra Fund (practice oriented research), industrial research fund (IOF), small and medium-sized enterprise (SME) programme, Research and Development (R&D) business programme, strategic basic research (SBO) or applied biomedical research (TBM)
- Measures that support networks such as innovation platforms and collective research centres
- Specific support instruments to facilitate living labs and low threshold expertise and service providers (= so-called “LEDs” that cooperate with industry and mainly SMEs to provide practical answers to their technology requests)
- Financial instruments to stimulate the creation of spin-offs and incubators and to support innovative companies (Vinnof, SOFI fund, TINA fund, Biotech Fund Flanders)

In addition, private actors (banks, telecom companies, ...) have set up private business incubators for innovative start-ups. Universities also have their own fund to support spin-offs (partly co-funded by the Archimedes Fund). Some tech transfer offices (TTOs) or SRC incubators are internationally recognised as best practices. The various incubators and funds have their own focus and proper way of organising activities, just like the various university TTOs. Each institution is thus able to adapt itself maximally to its “customers” and local eco-system. In 2013, all Belgian universities together with the most R&D intensive industrial companies in Belgium signed a charter to stimulate effective academia-industry collaboration.

However, according to the Innovation Union Scoreboard 2015²², Flemish companies are performing (with a declining trend) only moderately in terms of the delivery of innovative products or services that are new to the market and the export of medium and high tech products or knowledge intensive services. An innovation gap remains to be bridged.

Strategic Policy Aims

Therefore, exploitation or valorisation of research results in societal and industrial applications by Flemish companies is an important point of focus of the recent policy paper by the Minister responsible for Economy, Science & Innovation and the overall policy note by the Flemish Government. A stronger focus on business-oriented innovation and valorisation is needed. One of the new measures is a cluster policy to interconnect the different components of a value chain ranging from fundamental research to the introduction of innovative products or services to the market. A specific policy for valorisation and knowledge transfer should further orientate the current functioning of Flemish TTOs by reinforcing the knowledge transfer capacities of university associations and SRCs to support the Flemish smart specialisation strategy from both a societal and economic perspective. A better synergy between the various elements of the policy mix should be strived for.

It is necessary to better understand this intermediary role, in particular for university colleges which perform practice oriented Research and Innovation (R&I) activities while playing a special knowledge diffusion role towards SMEs. One of the aspects to be studied is the relation of university colleges to the LEDs. One key question is how to adapt the Flemish policy mix to make it better support university colleges in this role.

The IOF and TTOs are subject to a regular assessment cycle, which may result in adjustments to the legislation concerned.

Action points

In general, the European Research Area (ERA) roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

²² http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards/files/ius-2015_en.pdf p.45

- The Department of Economy, Science and Innovation (EWI) will examine the possibility of starting a mutual learning exercise (MLE) into the role of university colleges and/or technical or applied universities in knowledge diffusion to industry (in particular SMEs). Even if an MLE would not be organised, the EWI Department plans to draft its own analysis of the role of university colleges in the overall Flemish innovation system (and ensuing needs and opportunities for knowledge valorisation in the fall of 2016. This report is to be transformed into a policy advisory opinion to the Minister before the 2017 budgetary control (April-May).
- As a result of the institutional changes to the policy landscape, an intermediary evaluation is scheduled of the programmes for strategic basic research that have been transferred from the former Flemish agency for Innovation by Science and Technology to the Research Foundation-Flanders. As these funding instruments aim to research economic and societal implications in the medium term (including knowledge transfer to industry and societal actors), it is important to assess the performance of these instruments. This assessment is scheduled in the course of 2018.
- The assessment of the TTOs and IOF fund will take place in 2018.

Priority 5b: promoting open access to scientific publications

Overall status

According to the general regulation of the Research Foundation-Flanders (FWO), it is mandatory to make publications resulting from FWO funded research publicly available in a repository after maximum 1 year. Open Access 'Gold' is optional, for which the FWO funded researchers can make use of the consumables or bench fees that are part of their funding. The main host institutions, i.e. the Flemish universities, have repositories in place to facilitate this measure. The number of Open Access publications in university repositories is steadily increasing. This can be linked to the sustained awareness raising initiatives and training sessions organised by the universities.

Contractual obligations by the former agency for Innovation by Science and Technology (former IWT), which is now integrated into Flanders Innovation & Entrepreneurship (AIO), imply that the beneficiary will disseminate the results of the project on a broad scale. However, how this is done remains the sole responsibility of the research performing organisation (RPO). Nevertheless, unjustified refusal to publish results may lead to sanctions.

All universities have an Open Access repository, which is OpenAire compatible except one, with an Immediate Deposit/Optional Open Access (ID/OA) Mandate. They regularly organise in-house training sessions on Open Access. Some universities already have research data management strategies and plans in place.

The FWO demands that researchers ensure that all data relating to their research are stored securely and sustainably, taking into account the specific characteristics of the discipline and the nature of the research.

To stimulate exchange of good practices and expertise a working group on research data management has been established within the Flemish Interuniversity Council (VLIR).

Open Access to research data is much more challenging (also due to the different sizes of the Flemish RPOs) as it implies a substantial financial cost to be made for appropriate data repositories, sophisticated data management policies and plans (including standards), data management tools and support staff. Some actors (mainly private companies and strategic research councils (SRCs) involved in university-industry partnerships) warn about a potential loss of competitiveness if the confidentiality on project results and data is lifted.

Strategic policy aims

The previous Flemish Minister of Science & Innovation has signed the Brussels Declaration on Open Access²³ together with her counterparts of the federal government and the government of the Fédération Wallonie-Bruxelles. 18 Belgian RPOs and research funding organisations (RFOs) signed the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in 2007. The policy memorandum of the current Flemish Government as well as the policy paper on Work, Economy, Science and Innovation mention the objective to design a vision and draft a policy regarding Open Access and Open Data for the Economy, Science & Innovation (EWI) policy area, including the department itself as a provider of open (meta-)data. Such a vision and related policy should stimulate higher education institutions (HEIs) and SRCs to establish a research data governance programme and to elaborate internal policies and infrastructures to have researchers make their publications available under the open access scheme. It implies that all relevant stakeholders are involved in the process towards such a vision and strategy.

Action points

In general, the European Research Area (ERA) roadmap exercise will be carried on with the cooperation of the relevant stakeholders to continue existing actions or, where necessary, identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

- The EWI Department will organise a public policy meeting (called “EWI Focus”) in autumn 2016 to present (and validate) the results of the stakeholder consultation regarding open access to publications and publicly funded research data of digital research infrastructures (see also ERA priority 2b). It seems appropriate to extend this stakeholder consultation beyond the ERA priority 5b process.
- Together with the above-mentioned list of action points for this priority, a specific document will be drafted by the end of 2016. This will summarise the various positions of the different stakeholders on open access to publications and to publicly funded research data and will offer suggestions for a future long term policy and strategy. The report of the European Research Area Committee (ERAC) Task Force on open access to research data will be taken into account.

²³ <http://openaccess.be/open-access-in-belgium/brussels-declaration-on-open-access/>

- Actively informing researchers about research data through the most appropriate channels of all HEIs (including university colleges) , as well as clarifying broader notions, such as “open science” in the original sense versus the wider meaning given by the European Commission.
- Implement the remaining commitments of the Brussels Declaration on open access (shortened and adapted version):
 - Supporting the creation, enhancement and maintenance of open access repositories and other innovative digital infrastructures for facilitating scientific communication (e.g. by adopting Open Researcher and Contributor ID (ORCID) or encouraging Open Access Infrastructure for Research in Europe (OpenAIRE) compatibility).
 - Looking into possibilities and new opportunities in the broad open access field, such as open data and open science²⁴.
- In the future, it will be examined if researchers receiving FWO funding will have to provide an actual data research management plan.

Priority 6: international cooperation

Overall status

The Flemish authorities (specifically the Economy, Science and Innovation (EWI) domain that covers Science, Technology and Innovation (STI)) together with its research funding organisations (RFOs) still has to develop a structured and integrated strategy regarding international cooperation towards specific countries and/or regions. No overall broad comprehensive evaluation framework to prioritise certain countries or regions exists within the EWI policy area. The Research Foundation-Flanders (FWO) with its decision-making process is an exception next to some ad hoc consultations by political decision makers.

All the cooperation activities are shaped as much as possible in the existing mix of instruments (that are bottom-up and without a specific pre-determined domain) aimed at transnational and international, multi-lateral and intergovernmental cooperation, including mobility that encompasses transnational and international researcher mobility (cf. priority 3). A nice example is the FWO Marie Skłodowska-Curie actions (MSCA)-CoFund programme called “Pegasus2” that stimulates (international) mobility. Yet Flanders does support some thematic programmes (e.g. United Nations Industrial Development Organisation (UNIDO) for biotechnology) or some activities abroad that are organised by a Flemish STI actor in a specific domain. In general, Flanders spends a substantial amount of funding on international cooperation.

Also, the strategic research centres (SRCs) and universities define and implement their internationalisation strategy on an autonomous basis. Higher education institutions (HEIs) that have selected their preferred partner countries regard this an added value of their internationalisation strategy. They experience an increase in scientific cooperation fuelled by the specific cooperation with these preferred countries, regions, universities or research institutes. Some SRCs and universities have also set up (physical) establishments abroad in various continents. The Flemish scientific institutes rather cooperate on a project basis with foreign partners or institutes.

²⁴ As meant by the European Commission, hence, also including investigating pathways to societal impact

Flemish HEIs and SRCs enjoy and appreciate the autonomy to design their own internationalisation policy and to conclude bilateral cooperation agreements with foreign (or intergovernmental) research institutes in keeping with their strengths and specific interests. Most of them foresee a future expansion of the number of international cooperation agreements with foreign partners. SRCs also envisage concluding (more) partnerships with countries or regions outside the European Union. In some cases, cooperation requires an official accession request of or approval from the Flemish resp. Belgian authorities to the international or intergovernmental organisation.

Strategic policy aims

In its most recent policy memorandum 2014-2019 the Government of Flanders has expressed the importance it attaches to transnational and international cooperation in the fields of economy, science and culture. Next to economic, cultural and general diplomacy, science diplomacy is to be integrated into an overarching vision and strategy on how to promote Flanders in the world.

Action points

In general, the European Research Area (ERA) roadmap exercise will be continued with the cooperation of the relevant stakeholders to identify and prepare more specific and concrete action points. The aim is to produce an additional document with a ranked list of action points (including a timeline and targets) at the end of 2016. The subsequent paragraphs present actions in the short and medium term.

- The first aim is to lay the groundwork for an international Science and Innovation (S&I) cooperation strategy. Therefore, via its stakeholder platform, the EWI Department will deepen the current exercise by trying to identify needs, priorities (countries, instruments, topics, ...) etc. and bringing Flanders Investment & Trade, which belongs to the policy area of Flemish Foreign Affairs, as well as the Flemish Department of Foreign Affairs (also for its development cooperation activities) around the table. The most important aims are to identify common interests, establish which synergies can be achieved and examine how an efficient governance structure can be set up. Results are expected by the end of 2016.
- The above should result in a strategy for science diplomacy, in cooperation with the Flemish Department of Foreign Affairs with which a clear distribution of roles and responsibilities should be agreed upon. A better alignment of regions and countries targeted by the Flemish level with countries targeted by the European level would increase the overall impact of international cooperation, which also holds for development cooperation. An initial draft is foreseen for mid-2017.
- A cost-benefit analysis should be carried out before engaging in new international cooperation agreements. (Bilateral) cooperation in particular each time implies setting up joint procedures, selection and monitoring committees etc., although lead agency procedures can reduce this burden. This analysis is mainly to be conducted by the EWI funding agencies.
- The policy instrument analysis (cf. priority 1) may result in the need for specific, limited means for coordination, travel and mere networking costs that are not directly related to research activities which are currently not covered by the regular funding instruments of the

EWI funding agencies. This analysis is to be conducted together with the EWI funding agencies and to be subsequently complemented by stakeholders.

- Action points of other priorities can be integrated into international cooperation agreements (cf. priority 4 “gender”) or can support international cooperation (cf. priorities 2a and 2b: joint programming and large research infrastructures)

III. Common ERA Roadmap of the Wallonia-Brussels Federation and Walloon Region

Context

The following Roadmap has been prepared jointly by the Wallonia-Brussels Federation (= the French speaking Community) (Direction Générale de l'Enseignement non obligatoire et de la Recherche scientifique, DGENORS) and the Walloon Region (Direction générale opérationnelle de l'Economie, de l'Emploi & de la Recherche, DGO6), with the collaboration of the RFO of the Wallonia-Brussels Federation, the F.R.S.-FNRS, and WBI (Wallonie-Bruxelles International), the agency in charge of promoting and supporting at the international level the diversity of talents from the Wallonia-Brussels Federation and the Walloon Region, including in the fields of science and innovation. As explained indeed in the general introduction of this Belgian roadmap, the Wallonia-Brussels Federation is mostly in charge of the administration of the basic research, while the Walloon region is mainly focused on applied research and innovation. Their competencies are thus highly complementary, notwithstanding the fact that they share many of their stakeholders, including the universities in the first place. Moreover, they have created specific structures that allow them to exchange and determine common positions with regard to the European Research Area such as the recently launched GSEER (Groupe de Suivi de l'Espace européen de la recherche) (cf. infra).

As will be shown in the following pages, many ERA related initiatives have already been successfully launched and implemented in recent years. They i.a. concern the reform of different research assessment procedures (priority 1), the public support to challenge driven research at a European level (priority 2a), the stimulation of the participation of researchers – including those active in the SSH fields – into international research infrastructures (priority 2b), the adaptation at a regional level of the main European tools dedicated to the implementation of a more open research labour market (priority 3), the development of innovative procedures regarding the gender equity (priority 4) and Knowledge Transfer (priority 5a), and the pioneering role played by the universities of the Wallonia-Brussels Federation in the Open Access movement (priority 5b). Finally, major efforts have been made to develop a proper strategy for the internationalization of the research and researchers from the Wallonia-Brussels Federation and the Walloon Region (priority 6). Most of those actions and initiatives are now to be pursued and further developed after possible assessment, while new instruments and processes relating to the six ERA priorities are also to be launched.

Priority 1: Effective national research systems

Overall status

1. Various monitoring committees and groups have recently been set up that are comprised of government officials, policy makers and representatives from the world of research: GSEER (Groupe de suivi de l'Espace européen de la recherche) (2015), Women and Science Committee (2008), Support Committees of SHARE, ESSurvey and LifeWatch research infrastructures.
The GSEER in particular aims to stimulate the development of the ERA in the FWB (Fédération Wallonie-Bruxelles), by fostering the exchange of information with the various stakeholders.
2. Since 2016, the IWEPS (Walloon Institute for Evaluation, Prospective and Statistics), in collaboration with the Department of Competitiveness and Innovation of the Service Public de Wallonie (DGO6-SPW) and the Economic and Strategic Analysis Unit of the SOGEPa (Société wallonne de Gestion et de Participations), has published a "Report on the Walloon economy" that includes a section dedicated to innovation.
3. Gradual introduction of performance criteria in the public funding of CRAs (Concerted Research Actions): the Decree on "Concerted Research Actions" (CRAs) of the Wallonia-Brussels Federation (http://www.galilex.cfwb.be/document/pdf/40180_000.pdf) introduces ad hoc criteria for funding based (partially) on performance. In particular, a new criterion is based on the share of EU funding obtained.
4. Support for participation in EU research Framework Programmes. Since 2006, the Fund for Scientific Research (F.R.S.-FNRS) hosts a National Contact Point (NCP) for the EU Research Framework Programme to increase the participation and success rates of universities from the Wallonia-Brussels Federation. It also offers a subsidy to encourage researchers to submit proposals, which was modified for the new H2020 programme to better meet the needs of researchers.
5. The NCP Wallonia is currently being reorganised with the aim of nurturing closer ties with other existing structures such as Innovatech and Picarré.
6. Reform of the evaluation procedure of the Fund for Scientific Research. For both grants and mandates and for credits and research projects, in 2010 the F.R.S.-FNRS reformed its ex ante scientific evaluation procedure for proposals submitted to it. This saw it align its procedure with the international standards, modelling it mainly on those of the ERC. Applications submitted under the FNRS calls are now subject to an evaluation in two stages:
 - a first independent evaluation is performed remotely by high level peers, the overwhelming majority of whom come from institutions outside the Wallonia-Brussels Federation. The expert database is constantly growing and was comprised of more than 8000 in 2015, 90% from outside the Wallonia-Brussels Federation;
 - then a commission, 60% of whose members, including its chairman, are foreigners, establish a final ranking as a basis for funding decisions.The potential conflicts of interest are managed at each stage of the procedure.
An electronic proposal submission system has also been implemented.
Bibliometric indicators are requested since 2012, even if they are only one element among many other evaluation criteria.

7. Ex post evaluation at the F.R.S.-FNRS
The permanent researchers of the F.R.S.-FNRS must submit an annual activity report and a summary report every 5 years. Follow-up surveys of the careers pursued of the F.R.S.-FNRS research scientists and of the FRIA PhD students are also performed.
8. Reform of the design of the F.R.S.-FNRS instrument
To ensure a better balance between basic funding (research credits) and more competitive funding (research projects), in 2012 the F.R.S.-FNRS reformed the design of its Research projects and Research credits instruments.
9. DGO6 evaluation procedure
The decree of 3 July 2008 (art. 123) provides for the implementation of a systematic evaluation of the results of the grant awards. This involves having, for each project subject to funding, a number of ex ante and ex post data allowing the statistical processing needed for the production of indicators. The data to be provided relate both to the strategic objectives of the project participants and the results of the actions in themselves among the different target audiences.

Strategic policy aims and actions points

Strategic policy aim 1 (associated with OS (Overall Status) 1 and 2): Promote a better ownership by policymakers of the results of research financed by public funds with a view to "evidence based policy making"

Action points:

1. Pursue and further stimulate the work of the above support groups and committees (ES 1);
2. Support Open Science for a better flow of scientific information among non-academic stakeholders (see below Priority 5B).

Strategic policy aim 2 (associated with OS3): Gradual, concerted and principled introduction of the adequate performance criteria in public funding of research in the Wallonia-Brussels Federation

Action points:

1. The Academy of Research and Higher Education (ARES), a body established by the Decree of 7 November 2013 defining the landscape of higher education and academic organisation of studies, is currently studying the feasibility of using bibliometric criteria in the new key to the CRA. A response from the ARES is expected by the end of 2016;
2. Build on principles developed in the Oslo Manual (3rd edition) (<http://www.oecd.org/sti/inno/oslomanualguidelinesforcollectingandinterpretinginnovationdata3rdedition.htm>) for the collection and interpretation of data on innovation, and the "Manifesto of Leiden for the measurement of research" (www.leidenmanifesto.org), in the development and use of quantitative performance criteria in scientific research;
3. Draw up an inventory of the literature on bibliometric and altmetric performance indicators and their impact, taking into account the specifics of the various disciplines as well as the different types of research (from fundamental to strategic and applied). Perform a prospective study on the evaluation of research and researchers in the Wallonia-Brussels Federation (see among others the action of the COST European Network for Research Evaluation in the Social Sciences and the Humanities).

Strategic policy aim 3 (associated with OS4 and OS5): Stimulate the participation of researchers from the Wallonia-Brussels Federation in H2020

Action points:

1. Conduct a benchmark in relation to institutional support for the participation of researchers from our universities in H2020, at the national and international levels;
2. Organise more targeted information sessions (researchers, academic authorities of a university or a higher education institution) in collaboration with the NCP and the authorities in charge of university research;
3. Organise, in collaboration with the NCP, joint training courses at various universities and higher education institutions (according to the 'train the trainer' model) and explore the possibility of pooling costs among the various participating institutions;
4. Make basic information available "on line"(H2020 Starter Kit: basic documents, FAQs);
5. Discussions are ongoing between the DGO6 and the Minister in charge of Research on an overhaul of the "Horizon Europe" bonus, a bonus designed to encourage Universities, companies and research centres to submit projects to the calls for projects of the Horizon 2020 programme.

Strategic policy aim 4 (associated with OS6 and 7): After optimising the ex ante evaluation, strengthen and expand the ex post evaluation at the F.R.S.-FNRS

Priority 2 Optimal transnational cooperation and competition

Priority 2a: jointly addressing grand challenges

Overall status

1. Participation of DGENORS (MFWB) and DGO6 (Wallonia) in the European comitology, in the field of research and innovation programming (current H2020).
2. Participation of the F.R.S.-FNRS in the European calls for research projects. Since late 2013, the F.R.S.-FNRS has been participating in all calls for transnational research projects launched by the European networks ERA-Nets or JPIs in the field of basic research. Researchers from the Wallonia-Brussels Federation who are selected as part of these calls, receive F.R.S.-FNRS funding to implement a collaborative research project with other European teams. The number of calls in which the F.R.S.-FNRS has participated since 2010 amounts to 43 (closed calls and calls in progress).
3. Integration of societal challenges in some F.R.S.-FNRS funds. The F.R.S.-FNRS manages specialised funds which aim to meet certain societal challenges: FRESH for the humanities and social sciences, FRFS (Strategic Basic Research Fund) for challenges targeted by the Marshall Plan 4.0. In particular, the FRFS-WELBIO is the strategic life science focus of the FRFS. The Board of Directors of the Virtual Walloon Institute for Research Excellence in the fields of life sciences (ASBL WELBIO) is the PAVA (Animation and Dissemination Platform) of the FRFS-WELBIO, known as WELBIO. The FNRS participates in the management of the ASBL WELBIO for application selection by foreign experts.

4. The DG06 oversees the participation of Walloon research actors in European and international research programmes including the ERA-Net, the Regions of Knowledge, Joint Programming Initiatives, the EUROSTARS programme, the EUREKA initiative, the ESFRI forum (European Strategy Forum on Research Infrastructures) or the COST programme. It also manages the research projects co-funded by the European Commission under the Structural Funds. It ensures the implementation and monitoring of scientific partnership agreements concluded between Wallonia and some third countries.
5. There are a number of joint programming initiatives at European level. Participating in all of these initiatives, however, is problematic for several reasons:
 - Wide variety of rules of participation, eligibility criteria, partner regions/countries;
 - Human resources needed for daily monitoring of these initiatives, numerous meetings abroad;
 - Need to block a budget for those who plan to launch joint calls with no guarantee of seeing Walloon partners funded at the end of the day;
 - Low rate of corporate participation.

Strategic policy aims and actions points

Strategic policy aim 1 (associated with OS2): Maintain the participation of the F.R.S.-FNRS in European calls for research projects such as ERA-Net and JPIs.

Action points:

1. Establish a track record of participation (currently underway);
2. Integrate proposals by researchers from the Wallonia-Brussels Federation as part of these European networks in the electronic submission system of the F.R.S.-FNRS (rollout mid-2016);
3. Maintain the financial resources to be able to continue to meet the needs of researchers.

Strategic policy aim 2 (associated with OS3): Publish targeted calls on other societal topics

Action points:

These are currently under consideration, depending as they do on the budget of the F.R.S.-FNRS.

Strategic policy aim 3 (associated with OS4 and OS5): Target initiatives involving a joint call where the potential participation of Walloon stakeholders is substantial.

Action point:

A review of Walloon participation in joint programming initiatives is underway and will be available in late summer 2016.

Priority 2b: make optimal use of public investments in research infrastructures

Overall status

1. Financing of European infrastructures

The Wallonia-Brussels Federation, the F.R.S.-FNRS and the Region are involved in the funding of certain research infrastructures that feature on the European ESFRI roadmap. The Wallonia-Brussels Federation supports LifeWatch25, SHARE, DARIAH and ESSurvey, whose surveys are funded by the F.R.S.-FNRS. Wallonia supports PRACE, BBMRI and ICOS.

2. Setting up of intra-university support committees for the SHARE infrastructures via DGENORS, ESSurvey via F.R.S.-FNRS and LifeWatch.
3. Occasional "large equipment facilities" and "research logisticians" calls by the F.R.S.-FNRS, in line with the financial means.
4. Until 2014, a Walloon budget "EQUIP" was set aside to allow, among other purposes, the Walloon infrastructures to comply with the European requirements and thus join the ESFRI consortium.

Strategic policy aims and actions points

Strategic policy aim 1 (associated with OS1): Stimulate the use of infrastructures by researchers in the Wallonia-Brussels Federation

Action point:

A Belgian roadmap in the field of research infrastructure is currently being drawn up. The Region, the FNRS and the Wallonia-Brussels Federation are always attuned to the needs of the Walloon and Brussels players for different ESFRI infrastructures, whether in preparation or already completed.

Strategic policy aim 2 (associated with OS1 and OS2): Better integration of the Humanities and Social Sciences in the ERA by supporting dedicated research infrastructures and by stimulating the participation of researchers in the FP and H2020

Action points:

1. Continue to support the infrastructures in the humanities and social sciences, ESSurvey, DARIAH, SHARE;
2. ESSurvey and SHARE: strengthen the contribution to policy making and stimulate the collaborative and interdisciplinarity-inducing function of these infrastructures, through ad hoc support committees, while maintaining scientific excellence;
3. Use DARIAH as a way to highlight and disseminate existing work in the field of the digital humanities (inclusion of the humanities and social sciences in the European Digital Agenda), via the FNRS Contact Group "Digital Humanities" and the organisation of meetings between the National Representatives and the DARIAH-BE National (Scientific) Coordinators. Support, if required, the scientific coordination of DARIAH-BE. In this context, the DARIAH-BE scientific coordinators were invited to propose to the CIS/INFRA/SHS an opinion on the desirability of such a coordination, and on its potential planning for the next four years;
4. Organise information sessions more targeted on H2020 (researchers in the field of the humanities and social sciences, academic authorities of the universities and higher education institutions, LIEU [*Liaison Entreprises-Universités*] network) in collaboration with the NCP and the authorities in charge of research in higher education institutions.

²⁵ In the case of the pilot project which is the contribution « in kind » of the Wallonia-Brussels Federation to this European project, the "Big data" aspect can be part of Wallonia's digital agenda.

Strategic policy aim 3 (associated with OS1): Stimulate the participation of Walloon researchers in European research infrastructures

Action point:

The aim is not to remain mere users, but to actively join these infrastructures by providing facilities located in Wallonia. These participations allow researchers from Wallonia to join collaborative research projects that include the best teams.

Strategic policy aim 4 (associated with OS3 and OS4): Strengthen the scientific and technical support essential for a research that is ever more dependent on hi-tech facilities or skills

Action points:

1. Identify, if possible, funding (call for facilities) to make the "large equipment facilities" and "research logisticians" calls recurrent at the F.R.S-FNRS.
2. If possible, allocate funding (call for Facilities) to make EQUIP type calls recurrent at DGO6.

Priority 3: an open labour market for researchers

Overall status

1. Implementation of the "Partnership for Researchers", adopted by the Governments of the Wallonia-Brussels Federation and Wallonia on 26 May 2011 (http://www.cref.be/SPW_DG06_Parteneriat_FWB_FR_HD.pdf), particularly as regards the implementation of more open and transparent procedures in the recruitment of researchers (actions 1 to 4). The Partnership for Researchers is an adaptation within the Wallonia-Brussels Federation and Wallonia of the European Partnership, the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, signed by the FNRS (http://www.fnrs.be/docs/Charte_europeenne_du_chercheur.pdf).
2. Doctoral Education
The Chairman of each Graduate College within the F.R.S.-FNRS makes a specific effort to enhance inter-university activities that interest the largest possible number of doctoral students in the field and ensure international exposure. In addition, via the Decree of 7 November 2013 defining the landscape of higher education and the academic organisation of studies (articles 21, 37 and 71), the ARES is now tasked with organising, in consultation with the Graduate Colleges within the F.R.S.-FNRS, thematic Graduate Schools which are accredited by the ARES subject to the opinion of its university thematic chamber and which supervise doctoral trainings. The aim is to better match the organisation of research, to guarantee the quality of doctoral trainings as well as their transversal and intersectoral dimensions, and to award graduates a high academic as well as professional qualification. The ARES and the Graduate Colleges within the F.R.S.-FNRS also establish the regulations of the juries tasked with awarding doctoral degrees within universities.
3. Recognition of seniority
The Wallonia-Brussels Federation is in favour of an improved recognition of the seniority of academic researchers who have conducted part of their career in the private sector, particularly via the FWB Circular No. 4840 of 20.05.2014 for the recognition of the sen-

- iority of researchers gained in the private sector ([http://www.enseignement.be/hosting/circulaires/upload/docs/FWB%20%20Circulaire%204840%20\(5064_20140520_134312\).pdf](http://www.enseignement.be/hosting/circulaires/upload/docs/FWB%20%20Circulaire%204840%20(5064_20140520_134312).pdf)).
4. Establishment of a new research logistician function within universities (http://www.galilex.cfwb.be/document/pdf/38529_000.pdf).
 5. HRS4R charter, code and label (HR Strategy for Researchers)
 - 5 FWB universities hold the label "HR Excellence in Research" (UCL, ULB, ULg, UMONS, UNAMUR);
 - The F.R.S.-FNRS reiterated on 24 November 2015 its adherence to the Charter for Researchers and the Code of Conduct. This adherence is a prerequisite in the process of obtaining the HR Excellence in Research label.
 6. Support Euraxess

As a first step, as the bridgehead, the F.R.S.-FNRS has set up three inter-university working groups dedicated to the identified themes ("jobs", "services" and "rights"). At present, this breakdown into three themes does not really match the existing structure at the Commission. To optimally address the current concerns of the latter (Science for Refugees, Gender, implementing projects under Euraxess: TOP III or PIPERS, etc.), the three working groups have been replaced by an interuniversity steering committee that meets at the F.R.S.-FNRS on a regular basis. F.R.S.-FNRS participates twice a year in the European meeting of bridgeheads and at the conference of service centres. The service centres, represented on the steering committee meet in the premises of the F.R.S.-FNRS and avail themselves of the infrastructure and human resources provided by the Department of Institutional Relations and a computer scientist from the F.R.S.-FNRS .

Strategic policy aims and actions points

Strategic policy aim 1: Step up the promotion of innovative doctoral training and professional integration of young PhD graduates in and outside the university

Action points:

1. Sustainability of funding for transversal training of doctoral students;
2. Promotion and implementation of the innovative doctorate in the Wallonia-Brussels Federation and the Walloon Region.

The so-called "innovative" doctorate is based on the European principles of Innovative Doctoral Training (research excellence, quality assurance, interdisciplinary research options, international network, exposure to industry and other relevant sectors of employment, training in soft skills, attractive institutional environment) (http://ec.europa.eu/euraxess/pdf/research_policies/Principles_for_Innovative_Doctoral_Training.pdf).

In this context, the Government of the FWB is willing to reinforce the acquisition of transversal skills during the doctoral training and develop cooperation between business and universities in the training of doctoral students (http://www.federationwalloniebruxelles.be/index.php?eID=tx_nawsecuredl&u=0&g=0&hash=fa4f2fbbe606cd8abff62564b4da2e8c76a72a49&file=fileadmin/sites/portail/uploads/Illustrations_documents_images/A._A_propos_de_la_Federation/3._Gouvernement/DPC_2014-2019.pdf).

3. Via the ARES and the F.R.S.-FNRS, build and structure collective, inter-university approaches in the field of doctoral training, particularly in the field of training in cross-cutting/transferable skills (inventory of existing training and opening of the latter to doctoral students from other French-speaking universities; collaborations with the world of business, etc.);
4. Stimulate the training of the PhD candidates of the Wallonia-Brussels Federation, regardless of their discipline, in the scientific and social issues related to "Open Science" (Open Access, Open Data, scientific and technological communication, etc.);
5. Stimulate the commitment of Academics into doctoral education, whose structuring must be strengthened as recommended in the report of "ERA Steering Group Human Resources and Mobility" (ERA SGHRM) (http://ec.europa.eu/euraxess/pdf/research_policies/SGHRM_IDTP_Report_Final.pdf) and the report of the "ad hoc group on the third cycle of the BFUG" (Bologna Follow-Up Group) (http://www.suhf.se/MediaBinaryLoader.axd?MediaArchive_FileID=ba1dbb0e-09c1-4529-8d17-6ee8ae3fadad&FileName=BFUG_IT_VA_42_8_Draft+final+report+of+the+Third-cycle+ad-hoc+WG.pdf) ;
6. Question ARES about the opportunity of establishing a more binding legal framework for recognition at University of experience acquired in the private sector or in non-academic public sector and, more generally, about the need to better harmonise the rules governing the various statutes in force at the university;
7. Follow the careers of F.R.S.-FNRS fellows and researchers through studies into the careers of former grant recipients of the FRIA fund (Fonds pour la formation à la Recherche dans l'Industrie et dans l'Agriculture) and the F.R.S.-FNRS research scientists.

Strategic policy aim 2: Improve the Euraxess support of the F.R.S.-FNRS

Action point:

As part of TOP III, extremely limited resources could be made available for the redesign of the website.

Priority 4: gender equality and gender mainstreaming in research

Overall status

1. Implementation of the "Partnership for Researchers", adopted by the Governments of the Wallonia-Brussels Federation and Wallonia on 26 May 2011 (http://www.cref.be/SPW_DG06_Parteneriat_FWB_FR_HD.pdf), particularly regarding gender equality in scientific careers (actions 14-19). The Partnership for Researchers is an adaptation within FWB and Wallonia of of the European Partnership, the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, signed by the F.R.S.-FNRS (http://www.fnrs.be/docs/Charte_europeenne_du_chercheur.pdf).
2. Designation of a "gender contact person" in each university in the Wallonia-Brussels Federation and the F.R.S.-FNRS to ensure better visibility for gender issues within their institution, ensure the networking of people involved in gender issues and prepare an annual report on the gender equality situation in their university.
3. Decree establishing a "Committee on Women and Science" with the aim of promoting and improving the balanced participation of women and men in scientific and academic careers.
4. Link between compulsory and higher education on gender equality issues
The "Girls day Boys Day" project aims to fight against gender stereotypes in educational and vocational guidance and therefore counter the under-representation of women in certain fields (technical, scientific, etc.) In light of this, the equal opportunity and compulsory education services of the Wallonia-Brussels Federation are working together on the optimum dissemination of the project. Indeed, promoting science and gender equality should begin as from compulsory education.
5. Balanced participation in the advisory bodies of the Wallonia-Brussels Federation
The decree of 3 April 2014 sets out to promote the balanced participation of men and women in the advisory bodies of the Wallonia-Brussels Federation. It sets the proportionality of the representation at a minimum of 33% of each sex. Article 1 of the decree states that an advisory body is understood to mean: "the boards, commissions, committees and other bodies, whatever their denomination, which are created either by law, by decree with force of law, by Royal Decree or by ministerial decree or by decree of the Parliament of the French Community, by decree of the Government of the French Community or by a decree of one or more ministers who are responsible primarily for assisting with their opinion, initiative or on request, the Parliament of the French Community, the Government, one or more ministers, as well as structural subdivisions of an advisory body, with the exception of temporary working groups".
The advisory bodies of the ARES, whose mission is to guarantee the exercise of the various higher education, research and community service missions of the higher education institutions of the Wallonia-Brussels Federation, are also subject to this decree and must thus have a balanced composition. These quota measures are aimed at improving equality of women and men in the area of decision making, linked here to higher education and research.

6. Measures within the F.R.S.-FNRS
 - 6.1. The F.R.S.-FNRS integrates data relating to gender in the analysis of the results of its calls, which is available in the annual reports that can be downloaded from its website. After each call, it checks that there is no gender-related bias on the rates of success.
 - 6.2 The F.R.S.-FNRS has integrated a new descriptor devoted to gender studies that applicants for any of its instruments can use.

Strategic policy aims and actions points

Strategic policy aim 1: Promote the integration of gender considerations in the career management of researchers and the research content

Action points:

1. Ensure the on-going appointment of gender contact persons in universities within the Wallonia-Brussels Federation and the F.R.S.-FNRS. ;
2. Standardise on a legal basis access to circumstantial leave for all members of the academic and scientific staff of all universities. (Note on circumstantial leave drafted in 2013 by the Women & Science Committee);
3. Consideration of family friendliness in the selection process;
4. Drafting of a table of best practices common to the various universities;
5. Explore the possibility of including a diversity criterion in the Decree on "Concerted Research Action" of the Wallonia-Brussels Federation for the allocation key of the amounts granted to different universities. This diversity criterion would be in proportion to female full professors (grade A) and could correspond to 2% of the total amount.

Strategic policy aim 2: Institutionalisation of gender studies in the academic world

Action point:

Establishment of an inter-university Master in Gender Studies in Wallonia-Brussels.

Strategic policy aim 3: Improve decision-making by incorporating the gender equality dimension

Action point:

Decree relating to "Gender Mainstreaming", adopted by the Parliament of the Wallonia-Brussels Federation, to move towards real equality by systematically adopting a gender perspective in the review of each decision and regulation adopted by its governing bodies. Therefore, in the research sector, like in the other competences of the Wallonia-Brussels Federation, the gender dimension should be explicitly considered in the implementation of public policies.

Priority 5 Optimal circulation and transfer of scientific knowledge

Priority 5a: fully implementing knowledge transfer policies at national level

Overall status

The F.R.S.-FNRS has set up a search engine, via its website, to access the information present in the SPI (Science, Positions, Identities) database. This contains a summary of the new projects the F.R.S.-

FNRS finances in the context of Mandate, Credit and Project calls since 2010, and the list of its permanent researchers.

Strategic policy aims and actions points

Strategic policy aim 1: Improve the exploitation of scientific knowledge in industry

Action point:

DGO6 has launched a new programme called WALInnov, which is part of the smart specialisation strategy initiated by the Vice President and Minister of Economy, Industry, Innovation and Digital. It is specifically intended to stimulate oriented research in universities and strengthen the excellence of the best research teams. Through the WALInnov programme, Wallonia aims to support research projects with high scientific and technological potential, hinged around the needs of one or more businesses. Projects will be both interdisciplinary and inter-university. They must also correspond to the fields of chemistry and materials, health, mechanics and engineering and information and communication technology, or the fields covered by the six competitiveness clusters (aerospace, agri-business, life sciences, mechanical engineering, logistics, and green chemistry) or the cross-cutting axes of the Marshall Plan 4.0 (relating to digital, the circular economy and creativity).

Strategic policy aim 2: Optimise the use of existing resources and expertise in the Wallonia-Brussels Federation

Action point:

The Overlab project of the F.R.S.-FNRS: platform for providing/leasing facilities and expertise present in the Wallonia-Brussels Federation

Priority 5b: promoting open access to scientific publications

Overall status

1. Brussels Declaration on Open Access (2012), co-signed by the Minister in charge of scientific research in the Wallonia-Brussels Federation, to make Open Access (<https://openaccessbelgium.files.wordpress.com/2012/10/brussels-declaration-on-open-access.pdf>) the default principle of dissemination of the results of research financed by public funds in Belgium.
2. Rollout of a CIS-CFS Open Access concertation Group
3. F.R.S.-FNRS Mandate on OA
The F.R.S.-FNRS has issued a regulation on the implementation of the policy of Open Access to scientific publications resulting from research programmes supported by the F.R.S.-FNRS and Associated Funds, which is in force since 30/06/2013 (http://www.frs-fnrs.be/docs/Reglement_OPEN_ACCESS_FR.pdf).
4. F.R.S.-FNRS: participation in the European ERA-Net PASTEUR4OPENACCESS network
5. Institutional OA mandates and repositories: all universities within the Wallonia-Brussels Federation have an institutional repository to self-archive publications.

Strategic policy aims and actions points

Strategic policy aim 1: Strengthen OA Green and FAIR OA Gold

Following on from the Brussels Declaration of the Belgian Ministers in charge of Scientific Research in October 2012, the FWB supports Open Access archiving (OA Green) and publication (OA Gold). These two activities are considered complementary.

Indeed:

- Digital repositories make it possible to archive, make visible and accessible other research products and not only articles from specialist journal, including research outputs with a potential impact outside of Academia;
- The repositories allow long-term archiving of research outputs, including articles from specialist journals published in Open Access;
- The repositories potentially provide unprecedented visibility for the entire production of an institution (university) and new possibilities for the governance and management of scientific research;
- Alternative metrics (altmetrics) can be developed on the basis of the publications that are deposited in repositories, well beyond the sole impact factor of international top journals;
- However, the scholarly journals published in (Gold) OA are also important, especially for the peer reviewing process (and open peer reviewing) they allow, which remains crucial in the assessment of the scientific quality of research.

Action points:

1. Establishment of an OA repository at the level of the Ministry of the FWB. The repository will provide visibility and make accessible outside the Ministry the research outputs (reports, recommendations, data sets, etc.) coming from research projects commissioned by the MFWB. A software will eventually make it possible to use the OAI-PMH protocol, and ensure the interoperability of the portal. If necessary, an OA mandate should be drawn up.
2. Development of a portal harvesting references and metadata from the institutional repositories of universities of the Wallonia-Brussels Federation;
4. To encourage the provision of the results of research projects financed by public funds, DGO6 will participate in the Open Access, Open Science working groups, etc. in which the FNRS and/or DGENORS are already involved.
5. Drafting of an OA decree;
6. Consider initiatives related to copyright legislation:
 - 6.1. Inclusion of the secondary publication right in copyright legislation in Belgium (inspired by the German model). This implies a modification of copyright for scientific publication, preventing scientific authors from transferring all of their copyrights to publishers and guaranteeing the right to file their scientific publications in institutional or other repositories, in open access without delay or, at worst, with a possible embargo period not exceeding the European recommendation of 6 months for STEM and 12 months for SSH;
 - 6.2. Make "Text and Data Mining" for scientific purposes a copyright-related exception.

Strategic policy aim 2: Extend Open Access (to publications) to Open Science (including Open Education)

Action points:

1. Stimulate Open (Research) Data and encourage the drafting of DMP (Data Management Plans) by researchers;

2. Develop guidelines, drawing on the recommendations of the ERAC Taskforce (http://www.earto.eu/fileadmin/content/Website/ERAC_Opinion_on_Open_Research_Data.PDF) and Open Data norms and standards;
3. The F.R.S-FNRS plans to launch a study into the introduction of a mandatory DMP within the framework of some of its grants. This study will necessarily include the question of repositories and the expense associated with managing data;
4. Explore opportunities to develop Open Data repositories and/or data centres at national and/or regional level (see federal SODA project for submission of the social science data of Belgian researchers);
5. Examine the conditions of implementation of TDM (Text & Data Mining), via the participation of the F.R.S-FNRS in the GT Open Data of Science Europe;
6. Stimulate the training of the PhD candidates of the Wallonia-Brussels Federation, regardless of their discipline, in the scientific and social issues related to "Open Science" (Open Access, Open Data, scientific and technological communication, etc.) and, if applicable, of the students at the Master level (for example, in the training of future journalists in data journalism, of future teachers in the consultation of the Open Access scientific literature, etc.)
7. Promote Open Science also within bodies related to the European Higher Education Area (BFUG, DGHE, GT Modernisation Education & Training 2020, etc.), and consider the related Open Education dimensions.

Priority 6: international cooperation

Overall status

1. WBI-AWEX: hosting since 2010 the Research and Innovation Platform, a multi-stakeholders forum dedicated to the internationalisation of Science, Technology and Innovation (STI) that gathers the main actors in the Wallonia-Brussels Federation (universities, research centres, competitiveness poles and clusters, etc.). This Platform ensures the steering and institutional coordination of international cooperation actions in STI by creating synergies and joint actions between the Wallonia-Brussels' operators. It meets in its full plenary format at least twice a year and ad-hoc geographical working groups meet occasionally.
2. WBI-AWEX: supervision and administration of a network of 6 Scientific Liaison Officers (SLO) based in innovative ecosystems of excellence identified as priorities by the Platform: Scandinavia (Uppsala), Germany (Munich), Switzerland (Lausanne), Brazil (Sao Paulo), Canada (Montreal), East Coast of the United States (Boston). At the disposal of the operators of the Platform and their beneficiaries, they are responsible for facilitating and promoting international cooperation between the members and projects of the Platform and the STI actors in their area of assignment.
3. WBI: administration of doctoral and postdoctoral fellowship programmes (short and long term schemes fostering the mobility of researchers of excellence). The Jury of selection associates the F.R.S.-FNRS and the DGO6. Particular attention is given to applications related to the prioritised sectors selected in the frame of the regional strategy of smart specialisation while fairly ensuring the mobility of researchers in the humanities and social sciences.

The excellence of the research project determines the geographic destination of grants for researchers from Wallonia-Brussels.

4. WBI: negotiation and implementation of permanent joint commissions with foreign institutions of OECD countries, emerging countries and developing countries. As foreseen in the International Policy Note, an internal evaluation exercise of the international networks of Wallonia-Brussels is underway to formulate proposals on new implementations as well as a possible reshape of the geographic, thematic and sectoral priorities.
5. WBI: participation alongside the F.R.S.-FNRS, the DGO6 and DGENORS in the federal consultation meetings of the CIS-INTER, which theoretically brings together BelSPO, the FWO, EWI, (former) IWT, Innoviris and the Federal Ministry of Foreign Affairs . The mandate of this consortium touches on Belgian STI cooperation outside the EU, including preparation and monitoring of the SFIC's work (EU Strategic Forum for International Cooperation in science and technology), its working groups and geographical roadmaps as well as the coordination of several national actions and visibility measures that are organised at the bilateral and multi-lateral levels.
6. F.R.S.-FNRS: in addition to its historical bilateral mobility, the F.R.S.-FNRS recently concluded new extra-European bilateral agreements with FAPESP (Brazil) and the NRF (South Africa). It also monitors regional ERA-Nets networks (INNO INDIGO for India, ERA-Net LAC for Latin America and the Caribbean) and some thematic ERA-Nets that include third countries (e.g. WaterWorks). In 2015, it also inaugurated successfully the financing of fully-fledged bilateral research projects with the National Research Fund of Luxembourg (FNR). Four projects have been funded in this way.
7. Two "mobility of researchers" programmes, co-financed by the European Union to the tune of 14.5 million euros have been set up in Wallonia. The two projects, BEWARE Industry (December 2013-December 2018) and BEWARE Academia (February 2014-February 2019), aim to host a highly qualified researcher, regardless of nationality, for the first, in a SME or, for the second, in a research centre.

Strategic policy aims and actions points

Better meet the need for internationalisation of researchers from the FWB

Action points:

1. Implementation of an integrated strategy for internationalization in STI: application of the country roadmaps of the COM, drafting of policy notes related to STI cooperation, etc.
2. Sustainability of the scientific liaison officers mechanism: work on the status of the function, increase awareness and mobilisation by actors from the Wallonia-Brussels Federation and Wallonia, benchmarking, etc.
3. Greater participation in programmes outside the EU and international projects: greater coordination between actors from the Wallonia-Brussels Federation and Wallonia, international prospecting and sectoral networking actions, etc.

4. Enhancing the participation of Wallonia and the Wallonia-Brussels Federation in the SFIC: representation of the operators of the FWB and Wallonia in the SFIC activities, appointment of experts, participation in EU activities and European funding consortia, etc.
5. Study by the F.R.S.-FNRS into the conclusion of the new agreements and their contents: towards a reinforced bilateral cooperation with the financing of fully-fledged joint research projects (under negotiation with Switzerland and Quebec).

IV. Brussels-Capital Region ERA-Roadmap

Context

The present chapter is the ERA roadmap of the Brussels-Capital Region and it describes existing actions and measures to be carried out in the coming years in each of the ERA Priorities, within the competences of the Region. The chapter describes **the most important** actions.

Priority 1: effective national research systems

Overall status

1. The creation of a "Policy and Monitoring" (P&M) unit at Innoviris.

A P&M unit was set up in 2014 that is responsible for monitoring regional, federal and European RDI policies. It monitors internal and external indicators and carries out the ex-post evaluations of the programmes and projects funded by Innoviris. In 2015, this unit created the Regional RDI Scoreboard. This scoreboard was inspired primarily by the European Innovation Scoreboard. It includes 33 indicators split into six dimensions (inputs, businesses, collaboration, involvement in European programmes, outputs and the economic dimension). The indicators are collected periodically to ensure that the policy situation is monitored accurately. The unit carries out foresight activities during the implementation process of existing annual Innoviris programmes and new programmes. The unit has played an important role in the process of preparing the 2015-2020 Regional Innovation Plan.

2. Smart specialisation and European Regional Development Fund (ERDF) programming in the Brussels-Capital Region

At the end of 2011, the Brussels-Capital Region updated its RDI strategy. This update was realised in the perspective of the programming period for both general structural funds and the **ERDF** for 2014-2020. As a result, the updated Regional Innovation Plan was proposed. The document listed a series of concrete short-term actions (2013-2014) based on regional challenges, taking into account the specific strengths of the Brussels-Capital Region. Furthermore, it included a proper smart specialisation strategy according to the European Commission (EC) requirements. This updated Regional Innovation Plan identified four potential niches for regional specialisation: information and communication technologies applied to health (e-health), eco-construction, civil security and the creative industries.

These initial “niches” for RDI investment made it possible to detect and confirm the priority sectors on which the Region would focus its ERDF funding in 2014-2020. All stakeholders involved in the preparation process identified these sectors as drivers of regional socioeconomic development in the coming years.

The sectors (industries) identified were:

1. media, creative sectors and tourism,
2. resources and waste,
3. sustainable food and hospitality,

4. sustainable construction and renewable energies,
5. health and care.

The information and communication technology (ICT) sector was considered to be cross-sectoral, i.e. projects funded under this theme were intended to support one or more thematic industries.

The ERDF Operational Programme proposes four strategic intervention priorities:

- Priority 1: strengthen research and improve the transfer and promotion of innovation,
- Priority 2: strengthen entrepreneurship and improve the development of small and medium-sized enterprises (SMEs) in promising sectors,
- Priority 3: support the development of a circular economy through the rational use of resources in promising sectors,
- Priority 4: reduce the social, economic and environmental fragmentation of the Brussels-Capital Region.

The ERDF Brussels-Capital Region programme has a total budget of € 200m for the period 2014-2020, of which € 37m will be invested in RDI projects linked to priority 1. The ERDF call for projects has been closed in July 2014 and the selected projects were launched in January 2016. As a research funding organisation (RFO), Innoviris has co-financed RDI projects up to € 4m and is a direct beneficiary of an ERDF project worth € 0,5m in the current programme.

In 2015, the Brussels-Capital Region prepared a newly updated Regional Innovation Plan which includes an updated smart specialisation strategy in line with the ERDF and Brussels 2025 priorities and fundamentally reconsiders and elaborates the 2011 Regional Innovation Plan (see section B, “Strategic policy aims”).

3. Funding and evaluation of research projects through calls for projects

Innoviris funds research and innovation programmes for actors in the private sector, universities and non-profit sector. The majority of the programmes are realised through competitive calls for projects. Each innovation project is assessed in-house in correspondence with the technological and scientific expertise of the Innoviris advisors. Moreover, the regional research projects funded by Innoviris are assessed by external juries comprising university and industry experts from Belgium and abroad. The European projects, EUROSTARS, Ambient Assisted Living (AAL), ERA-NETs and Electronic Components and Systems for European Leadership (ECSEL), are assessed by international independent experts.

4. Structural funding for intermediary bodies to enhance the Region’s competitiveness

Innoviris provides structural funding for research centres that offer support for private companies in the Brussels-Capital Region in the implementation of their technological and strategic innovations. Innoviris currently funds two research centres that play a pivotal role in this process: Sirris specialises in ICT advisory services, and the Belgian Building Research Institute (BBRI) operates in the eco-construction domain.

Innoviris also funds the National Contact Point (NCP) for Brussels and the EU liaison offices in the regional universities whose main mission is to help SMEs and researchers to submit their Horizon 2020 (H2020) projects.

5. Supporting new forms of innovation – “CO-CREATE” programme

Since 2014 Innoviris provides funding through the “CO-CREATE” programme which aims at co-creation between RDI actors, private enterprises, the non profit sector and end users organisations by developing and testing products and service in field environments (Living Labs). In 2015 CO-CREATE was dedicated to the topic of “sustainable food”. In 2016 the new CO-CREATE action in “urban resilience” was launched.

Strategic policy aims

The Government of the Brussels-Capital Region is committed to reach 3% of gross domestic product (GDP) invested into RDI by 2020. As a consequence, in 2015, the Brussels-Capital Region prepared a new Regional Innovation Plan. The new plan fundamentally reconsiders and elaborates on the 2011 version. It contains a series of actions aimed at creating an environment that encourages the RDI activities of a broad range of different stakeholders, at fuelling socioeconomic development and at responding to the Region's challenges. The Plan's ambition aligns the vision of the Region's 2025 Strategy (which also includes related initiatives such as the Regional Circular Economy Plan) with the overall objective to make Brussels the Belgian and European capital of innovation. Furthermore, the plan is in line with the ERDF funding strategy 2014-2020.

The objectives of this plan are to:

- improve funding of the whole innovation chain for products and services,
- support new forms of innovation and new RDI stakeholders,
- improve communication and awareness of RDI,
- provide a broader, participative and efficient governance of the RDI system.

The new plan proposes a more refined smart specialisation strategy than the previous plan and primarily supports the three strategic activity areas that have been identified:

- personalised medicine and well-being,
- green economy,
- digital economy.

These activity areas confirm the priority sectors on which the Region focuses its ERDF funding in 2014-2020. Overall, the implementation of this Regional Innovation Plan will involve the extension of certain existing financial instruments and the creation of new ones. The plan is currently pending approval by the Council of Ministers of the Brussels-Capital Region.

Actions points

1. Actions 1, 2, 3, 4 and 5 will be maintained.

2. Ensure RDI governance through the Regional Innovation Plan in the Brussels-Capital Region

The achievement of the 2015-2020 action plan's objectives requires a coordinated leadership of the Regional Innovation Plan with all the Region's stakeholders: the advisory and support centre (Impulse), the financial hub (Finance.brussels), the infrastructure development centre (Citydev), universities and industry federations. Innoviris will lead, in coordination with the Government. A strategic monitoring platform will be set up to support this leadership.

3. Effective implementation of the new Regional Innovation Plan: investment in actions related to the identified smart specialisation priorities.

The Regional Innovation Plan 2015-2020 recommends to target future RDI investments at three priority areas:

○ **Personalised medicine and well-being**

The sub-areas that will drive innovation are:

- the development of an ecosystem linked to hospital care in order to offer therapies and personalised services to patients ("-omics", high-throughput sequencing, bioinformatics, clinical tests, targeted therapies for chronic and neurodegenerative illnesses, medical devices, medical imaging),
- the improvement of the chain of care from hospital to home and the creation of an environment favourable to well-being (e-health),
- prevention by improving environmental (relationship between environment and health) and nutritional (relationship between nutrients and health) quality of life.

The following actions will require funding:

- setting up a "BRIDGE" (an existing Innoviris programme) strategic platform on the subject of preclinical studies,
- elaborating the personalised medical file.

○ **Green economy**

The sub-areas of innovation identified were:

- energy efficiency of buildings and eco-construction,
- sustainable chemistry (including advanced materials),
- circular economy (with a particular focus on ICT),
- mobility.

The following actions will require funding:

- Living Labs on sustainable construction,
- circular economy clusters,
- urban mobility clusters.

○ **Digital economy**

The sub-areas of innovation identified were:

- data (prior to the development of mobile applications by businesses),

- Software as a Service (SaaS) (induced by a strong growth of software vendors, promising customer relationship management (CRM) sub-sectors),
- the Internet of Things,
- information technology (IT) security,
- image processing (including virtual/augmented reality: scientific studies expect an increased scientific attention to virtual reality from 2016 on),
- telecommunications,
- machine-to-machine.

The following actions will require funding:

- public-private digital fund (Finance.brussels)
- platform for experimentation and/or Media Park Living Lab

Because ICT is a cross-cutting sector, the sub-areas of digital economy innovation also apply to established sectors such as creative industries, smart cities, e-government, e-commerce and IT security.

The Regional Innovation Plan 2015-2020 will be approved by the Council of Ministers of the Brussels-Capital Region in the first half of 2016, while the corresponding legal framework is expected to be adopted by the Parliament of the Region by the end of the year.

Priority 2 Optimal transnational cooperation and competition

Priority 2a: jointly addressing grand challenges

Overall status

1. Joint Programming initiatives (JPIs)

Within the JPIs, Member States coordinate national research activities, pool resources, benefit from complementarities and develop common research agendas in order to face grand societal challenges. JPIs are set up on a voluntary basis. The Brussels-Capital Region participates in JPI Urban Europe (and is involved in the preparation of the Strategic Research and Innovation Agenda of this JPI) and Neurodegenerative Disease Research (JPND).

2. ERA-NET Cofund actions

Innoviris currently participates in two ERA-NET Cofund actions under H2020: ERA-NET Cofund Smart Cities and Communities (ENSCC) and ERA-NET Cofund Smart Urban Future (ENSUF). Within ENSCC, the Region has invested in 3 projects with the participation of six Brussels partners.

3. EUROSTARS, ECSEL, AAL II (art. 185)

Innoviris participates in the EUROSTARS programme as well as in ECSEL, and has joined the AAL II programme in 2014.

The programme has two main objectives:

- Foster the emergence of innovative ICT-based products, services and systems for quality ageing at home, in the community and at work. This involves increasing the quality of life,

autonomy, participation in social life, skills and employability of older people, and reducing the costs of health and social care.

- Create a critical mass of RDI at the EU level in technologies and services for quality ageing in the information society, including the establishment of a favourable environment for participation by SMEs.

So far, Innoviris has invested in three AAL projects with the participation of four Brussels-based beneficiaries.

4. CONNECT grant: preparation and submission of H2020 and other European and international RDI programmes.

Since 2012, Innoviris supports regional research organisations and private companies to prepare proposals for European and international RDI programmes. This support comprises financial grants between € 10.000 and € 25.000 per proposal. The grants cover the costs of personnel involved in project preparation, travel, meetings and professional help from specialised consultancies.

Strategic policy aims

According to the new Regional Innovation Plan, the Region will continue to invest in European and international cooperation programmes. Innoviris's objective will be to join at least one new ERA-NET each year until 2018.

Action points

1. ERA-NET Cofund actions

In 2016, Innoviris has already joined the new ERA-NET Cofund action on sustainable urbanisation. This topic has been identified as of common interest to both the Belmont Forum and the JPI Urban Europe consortium. The Belmont Forum is a group of the world's major and emerging funders of global environmental change research and international science councils. This ERA-NET Cofund action will be realised together with EU partners (JPI Urban Europe Consortium members) and the research councils of Qatar, the United States of America (USA), Mexico, Japan, Argentina, Australia and Brazil.

Additionally, Innoviris will join an ERA-NET Cofund action on clinical trials in 2018.

2. Alignment of research programmes at the national and European level

The alignment of research and innovation projects at the Belgian level remains a challenge. Each entity has its own RDI funding priorities and its own funding rules. There is no real coherent national strategy for aligning research systems between entities and no real organised cooperation between the different sector-based ministries that should be involved in joint programming.

The only national body, the Inter-Ministerial Conference on Scientific Policy (CIMPS/IMCWB), does not currently deal with the issue of joint programming in a sufficient and effective way.

Nevertheless, the BEL-SME initiative is one example of voluntary cooperation between the applied research funding agencies of the three Belgian Regions. BEL-SME encourages SMEs to form consortia

and submit their collaborative projects in the areas of applied research and innovation. The projects are assessed and funded by regional agencies.

The involvement of Innoviris in JPI initiatives and ERA-NETs and our participation at the ERAC High-Level Group for Joint Programming (GPC, at the political level) enhances the interoperability and strategic planning of research programmes in line with European standards.

The Brussels-Capital Region furthermore proposes to implement single contact points in each of the regional funding agencies for interregional collaboration, in order to allow for efficient communication and, eventually, expanded cooperation.

Priority 2b: make optimal use of public investments in research infrastructures

Overall status

The Brussels-Capital Region is not financially involved in European research infrastructure (RI) funding, including the European Strategic Forum on Research Infrastructures (ESFRI).

1. Regional RI roadmap

The Brussels Regional Innovation Plan 2015-2020 pursues the investment in regional RIs. A significant number of RIs already exist that are embedded in universities and centres for higher education. For example, the Institute of Experimental and Clinical Research (IREC, part of the Catholic University of Louvain, UCL) comprises three technological sub-platforms (imaging, flow cytometry and molecular technology) that offer their services to their members through equipment and expertise sharing. Other RIs explicitly target enterprises. For example, the Brussels non-profit Patient Recruitment Organization (ClinicoBru), founded by a group of Belgian university (i.e., teaching) hospitals, facilitates clinical trials by offering their expertise to industrial clinical trial actors.

With respect to sustainability, the 2015 preliminary study for the Brussels Regional Innovation Plan demonstrated that some RIs are in need of serious modernisation. Moreover, new RIs with a focus on scientific and socioeconomic transitions were suggested to be created. The regional RI roadmap therefore includes a financial investment strategy in RIs. Special attention is paid to up-to-date and state-of-the-art university and higher education test platforms accessible to enterprises.

Strategic policy aims

The objectives are three-fold:

- To guarantee state-of-the-art RIs that meet contemporary scientific and socioeconomic transitions.
- Enhance the innovation chain by providing enterprises better access to RIs and concomitant academic innovations.
- Forge the bond between the academic and enterprise field.

In line with the Regional Innovation Plan, these objectives involve a smart specialisation strategy, structured around three strategic domains which are in line with the challenges addressed in H2020 : personal medicine and well-being, green economy and ICT.

Action points

Innoviris will fund the initiation of new RIs and the modernisation of existing RIs. This intervention will be targeted to both research actors and enterprises. Technology transfer offices (TTOs) or, more generally, interfaces will occupy a pivotal role in assessing the current needs. The BRIDGE Strategic Platform programme call by Innoviris will serve as a step-up to create an RI architecture that builds on the three priority domains and unites a consortium of academic and industrial partners.

A main future challenge is to create the appropriate regulatory conditions to leverage such mutualised platforms. This includes fundamental reflections on access criteria, which includes opening hours, any financial compensations by the users etc. The resulting regulatory framework should, according to the plan, particularly favour SMEs and microenterprises.

Priority 3: an open labour market for researchers

Overall status

1. Endorsement of the Charter and Code of Conduct for Recruitment of Researchers, participation in the Human Resource Strategy for Researchers (HRS4R)

Both the endorsement of the Researcher's Charter and Code and participation in the HRS4R are matters for the RFOs that depend on the Communities, as well as individual research performing organisations (RPO). In order to avoid duplication, regional RFOs do not impose their own requirements in this area. Nevertheless, both Community RFOs active in Brussels²⁶, as well as all five universities that have campuses on the territory of the Brussels-Capital Region²⁷ have endorsed the Charter and Code. Furthermore FWO and three of the universities (UCL, ULB and VUB) are acknowledged with the HSR4R "Human Resources (HR) Excellence in Research" badge. In addition, the publication of job vacancies and grants on the Euraxess Jobs Portal is widely spread and accepted among institutions active in Brussels, including Innoviris.

2. Scientific visa directive

In accordance with the European Directive on organising stay permits and visa issues in Member States, researchers of 33 research institutions on the territory of the Brussels-Capital Region, listed by the Federal Science Policy Office (BELSPO), are exempted from applying for a work permit (which is a competence of the Brussels-Capital Region).

²⁶ the Fund for Scientific Research of the French Community (FRS-FNRS) and the Research Foundation Flanders (FWO)

²⁷ the Catholic University of Leuven (KUL), UCL, the Free University of Brussels (French-speaking) (ULB), Saint-Louis University Brussels (USL-B) and the Free University of Brussels (Dutch-speaking) (VUB)

3. ATTRACT programme

Innoviris runs the ATTRACT “Brains for Brussels” programme with the aim of encouraging researchers to develop scientific activities on the territory of the Brussels-Capital Region. The programme contributes to the development of the ERA in the sense that it is open to both impatriate (Belgian) and expatriate researchers in Brussels and develops networks and partnerships between researchers and RPOs. The scheme is open to Doctor of Philosophy (PhD) holders who have been working either in a post-doctoral position abroad for at least two years, or in a research and development capacity of a Belgian or foreign enterprise for at least two of the last three years. The grant covers the researcher’s salary as well as logistics, functioning and (if necessary) repatriation costs.

4. DOCTIRIS programme

The DOCTIRIS programme (by Innoviris) stimulates the mobility of PhD researchers between the academic world and industry in Brussels. The scheme funds PhD projects in applied research where the PhD candidate spends at least half the duration of the project in an enterprise in Brussels. Applicants must be PhD candidates at a research institution with at least one campus on the territory of the Brussels-Capital Region, and must cooperate with an industrial partner with at least one active plant in Brussels. DOCTIRIS is open to both Belgian and foreign researchers, and requires a stable and properly remunerated relationship between the institute and the researcher. It therefore contributes excellently to the ERA’s open labour market priority.

Strategic policy aims

The Brussels-Capital Region aims to develop a fully open labour market for researchers on its territory, allowing for a flexible, mobile, stable and attractive environment for researchers. This aim has been integrated into the Regional Innovation Plan 2015-2020, which has been drafted with the full involvement of the research and private sectors in Brussels and is currently in the process of approval.

Action points

The upcoming Regional Innovation Plan contains a number of actions that are likely to contribute to the development of the ERA’s open labour market priority, and particularly to promote inter-sectoral mobility:

- the establishment of new inter-sectoral mobility schemes to allow researchers at academic institutions and/or large enterprises to be posted temporarily into SMEs in Brussels, and to allow researchers at (non-academic) research institutes to be posted into enterprises.
- expansion of the DOCTIRIS programme to allow PhD candidates and research institutes to partner with non-profit and public-sector entities as well as enterprises.
- awareness and training activities regarding careers in the ICT sector in Brussels.

Priority 4: gender equality and gender mainstreaming in research

Overall status

The Brussels-Capital Region explicitly pursues institutional and structural change in addressing gender imbalances in the broad research area. In that respect, the strong representation of scientific institutes has a leverage potential to bring gender diversity and equality in scientific practice.

1. Gender policy: ordinance and implementing decree

The fourth World Conference on Women in Beijing in 1995 prompted the Government of the Brussels-Capital Region to initiate a gender mainstreaming policy. The Ordinance of 20th April 2006 on a gender equality policy provided the initial legal framework. Subsequently, in 2008, the Government performed a study on gender mainstreaming implementation strategies, which elaborated multiple pilot projects on regional gender mainstreaming implementation. These projects fostered the legal basis for a new Ordinance in 2012 on the integration of the gender dimension in policy, and the concomitant implementing decree in 2014.

2. Consultative committee

Since 2013, the Brussels Council for Equality between Women and Men (CBEFH/BRGVM) watches over the implementation of the gender dimension in policy in the Brussels-Capital Region and acts as an advisory body.

3. Regional plan

The current legal basis for gender mainstreaming policies is a binding structural policy that complies with the needs and expectations of all citizens and has now been integrated into the Brussels Regional Plan on gender mainstreaming 2015-2019. The plan includes a list of future actions in each of the policy domains and is followed up by the CBEFH/BRGVM. The plan is now being operationalised in consultation with gender experts. The valorisation of its actions is expected to be operational by 2017.

4. Gender in science

In 2014 Innoviris put in place the Atomia prize “Brussels Women for Science”. Simultaneously addressing the underrepresentation of women in both junior and senior positions, Innoviris awarded one female junior and one senior researcher the amount of € 10.000 and the title ‘Brussels science woman of the year 2014’. The junior category spotlights a Brussels woman under 36 years old who excels in her scientific trajectory or project with a high potential. The senior category spotlights a Brussels woman of at least 36 year old for her exemplary scientific career or trajectory, or her remarkable personal contribution to a particular innovation research domain.

Strategic policy aims

Two of the actions listed in the Brussels Regional Plan on gender mainstreaming 2015-2019 constitute a tipping point for the structural inclusion of the gender dimension in research policy. The ac-

tions' overall objective is to equal the position of men and women in scientific research and innovation in the Brussels-Capital Region. To this end, Innoviris pursues two main goals which are in line with the ERA rationale. Firstly, to overcome the gender imbalance in the Brussels research and innovation systems, Innoviris continues to reinforce the sensitising of young women for science. Secondly, to include gender dimensions in research contents, Innoviris will implement gender mainstreaming in its general funding strategy.

Action points

To promote the 'call of science' amongst young Brussels women, support actions similar to the Atomia prize 'Brussels Women for Science' will be undertaken by Innoviris.

Innoviris is developing a gender mainstreaming strategy. To measure the state of affairs, the strategy initially focuses on the monitoring of the number and share of women and men per domain in all research proposals, the number of research proposals that integrate a gender dimension in the analyses or research topics, and the number and share of public tenders that includes a gender dimension. The resulting indicators serve to adjust funding schemes and to reassess the overall funding strategy.

Priority 5 Optimal circulation and transfer of scientific knowledge

Priority 5a: fully implementing knowledge transfer policies at national level

Overall status

1. Funding for TTOs

Innoviris funds the TTOs for regional universities and UAS. Their mission is to promote cooperation between the university and its external partners (private companies, public authorities, clusters, sector-based associations, etc.) in the area of collaborative research, economic development of the research results (aid in creating spin-offs, contracts and licenses) and participation in local and regional development. The funding granted to TTOs serves to professionalise their staff employed through the provision of training and understanding of intellectual property rights (IPR) practices. A transition from technology transfer to a broader knowledge transfer focus is under way.

2. Funding for research centres to increase the competitiveness of Brussels-based private companies

SIRRIS

Innoviris funds Sirris, the collective centre for the ICT industry. Sirris carries out a range of different structural initiatives with the aim of strengthening the technological industry in Brussels. The underlying objective is two-fold:

- on one hand, the provision of professional support for private companies in the Brussels-Capital Region during the implementation of technological and strategic innovations,

- on the other hand, the development and integration of a regional skills centre for software engineering and ICT .

BBRI

BBRI offers technological guidance in eco-construction and sustainable development, a service subsidised by Innoviris and whose aim is to respond to the technological challenges faced by the private construction sector in Brussels. BBRI aims to promote the transfer of innovations in order to meet new needs, requirements and expectations in the area of eco-construction and sustainable development.

Sirris and BBRI are the major stakeholders in the preparation and management of regional RDI projects and are also major stakeholders in the programming of new actions as a result of their technological and innovation management expertise.

3. The Innoviris technology transfer programmes

DOCTIRIS

The aim of the DOCTIRIS programme is to fund doctoral thesis projects that are carried out in collaboration with private company (PhD in business). Ultimately, the funded projects must make a positive contribution to the development of the economy and employment in the Brussels-Capital Region.

BRIDGE

The BRIDGE programme aims to support projects that use "strategic platforms" and have a particular focus on industrial applications for Brussels enterprises. These projects concern collaborative and multidisciplinary research in pre-determined fields committed to the Brussels-Capital Region, with a feasible short or medium term economic valorisation within the Region. This programme is repeated every year, with a specific theme linked to the priority sector for the Brussels economy.

LAUNCH

The LAUNCH programme supports the creation of new companies (spin-offs) in the Brussels-Capital Region in order to enhance the economic value of the results of scientific research. It funds projects that aim to create a new economic activity in the Brussels-Capital Region and to finalise the development of an innovative product, innovative process or service based on the results of previous research.

Strategic policy aims

In the new Regional Innovation Plan, the Brussels-Capital Region aims to offer a coherent set of instruments covering the whole innovation chain from research to the commercialisation of innovative products and services. These will support not only technological innovation but also societal, social and organisational innovation. In concrete terms, this involves closing the existing gaps in the funding of the innovation chain, and to ensure a stronger link between academic research, project leaders and young entrepreneurs. All efforts are simultaneously devoted to developing private companies and ensuring the transfer and promotion of RDI activities to the market.

These objectives are foreseen in the Regional Innovation Plan 2015-2020.

Action points

1. Actions 1, 2 and 3 will be continued

2. New schemes for technology transfer in the Regional Innovation Plan.

New actions linked to technology transfer put forward by the Regional Innovation Plan:

- reinforce funding for applied research in regional universities by setting up Proof of Concept (POC) funding,
- ensure the funding for the innovation phase in developing SMEs and funding of the pre-seed phase,
- supporting the creation of new innovative enterprises to enhance the economic value of research results, creation of spin outs,
- ensure knowledge transfer and valorisation of RDI activities from university to enterprise by optimising the cooperation between TTOs and private enterprises, providing the Region with EU excellence centres or clusters.

Priority 5b: promoting open access to scientific publications

Overall status

1. Brussels studies

The Brussels Studies Institute (BSI) is a cooperation platform between three Brussels universities (ULB, VUB and USL-B) that aims to reinforce and coordinate research in Brussels and make it more visible. The platform is funded by Innoviris. Its Open Access e-journal "Brussels Studies" intends to disseminate scientific knowledge related to the Brussels context to a non-specialised public. The journal is interdisciplinary, peer-reviewed and open to all subject areas. Articles are published in Dutch, French and English.

2. Regional Open Data platform

The Brussels Regional Computing Centre (CIRB) has set up a Regional Open Data platform that aims to stimulate research and innovation by collecting all relevant data about the Brussels-Capital Region, including mobility, health, environment, cartography and economy, and publish them according to Open Access standards. The platform currently includes datasets held by the Region's institutions, mostly related to the Region's urban development, environment and mobility.

Strategic policy aims

Brussels aims to transform itself into an open and “smart city”, which implies the progressive adoption of Open Access practices that breed innovation and enhance the quality of life of its citizens, visitors and local entrepreneurs.

Action points

A number of actions will be taken to further the Open Access objective:

- as stated in the Brussels-Capital Region’s Smart City white paper (promoted by CIRB), the Open Data policy will be promoted and fostered.
- for research funded or co-funded by Innoviris, an Open Access policy will be investigated, where the aim is to obtain Open Access to the results of research that has been fully publicly funded, and offers a reasonable level of public availability for the results of co-funded research, while respecting beneficiaries’ intellectual property and privacy.
- the Brussels-Capital Region will continue to support Open Access practices among the research institutions present on its territory, in line with the Berlin Declaration on Open Access.

Priority 6: international cooperation

Overall status

1. Bilateral agreements and cooperation

The Brussels-Capital Region has concluded bilateral friendship and cooperation agreements with a wide range of similar entities in third countries, with a particular focus on other capital regions and cities. In total, 14 bilateral agreements have an active focus on research and development activities, which are primarily executed by the region’s universities and research institutes.

In particular, Innoviris fosters and funds the bottom-up development of bilateral partnerships at the initiative of universities and research institutes. For example, at the initiative of the VUB in Brussels, an existing research collaboration with Northwestern Polytechnical University (NWPU) in Xi’an, China, was extended into a wide-ranging bilateral partnership between the Brussels-Capital Region and the City of Xi’an. The partnership now includes exchanges of researchers and best practices as well as joint research and education programmes.

2. Participation in ERA-NETs and hosting of international establishments

The Brussels-Capital Region participates in the thematic ERA-NET Cofund actions “Smart Cities and Communities” (ENSCC) and “Smart Urban Futures” (ENSUF), both of which include partners in third countries, and is in the process of joining two further ERA-NET Cofund actions (“Sustainable Urbanisation” in 2016 and a projected action on clinical trials in 2018). Furthermore, the Brussels-Capital Region also actively encourages territorial research actors to participate in the bi-regional ERA-NETs “ERAfrica” and “ERA-LAC”, which are coordinated in Belgium by BELSPO. Additionally, the Region hosts the secretariat of the European Cooperation in Science and Technology (COST) and EUREKA.

3. Fostering projects with third-country partners

Within the framework of existing regional and European programmes, Innoviris actively seeks to fund projects including partners from third countries and encourages beneficiaries to include such partners in their consortia. In 2015, a total of 16 such projects were funded across the strategic and industrial research fields, including a total of 38 research institutes, enterprises and individuals in ten third countries.

Strategic policy aims

As one of the operational objectives of the new Regional Innovation Plan, the Brussels-Capital Region aims to reinforce international networking and collaboration for the research and industry landscape in Brussels, as well as maximise participation in international exchanges and programmes.

Action points

Even though the competences of the Brussels-Capital Region in the area of cooperation with third countries are limited, a number of improvements are still possible and desirable:

- bottom-up bilateral partnerships such as the one with Xi'an will be actively fostered in accordance with the needs and wishes of research institutions and enterprises in Brussels, and starting with possible additional partnerships with other Chinese cities and institutes.
- the research and development clauses in existing bilateral agreements with other regions in third countries will be activated, and the participation of Brussels' research institutions in them will be actively monitored. Where necessary, the possibility to set up mixed commissions will be investigated.
- possibilities to strengthen contact between Innoviris and the science liaisons in the Belgian network abroad will be investigated.

Conclusion

Even though there is always room for progress towards the "finalisation of ERA" and the implementation of the ERA priorities, all entities in Belgium concur that a lot has already been done and that most of the recommendations are in fact already part of current research and policy practices of the Belgian institutes, governments and funding bodies since many years. Together with their stakeholders, Belgian authorities plan to continue to improve their ERA roadmaps.

They also plan to build bridges between the priority actions of each Belgian authority. They aim at developing joint common plans and actions whenever there is an added value in tackling these jointly on the overall Belgian level.

Annex 1:

List of Federal Research institutes (FRI)

Federal Research Institutes depending from BELSPO:

Institute for Cultural Heritage

Institute of Natural Sciences

Institute for Space Aeronomy

Meteorological Institute

Museums for Art and History

Museum for Central Africa

Museums of Fine Arts

Observatory and Planetarium

Royal Library

State Archives | SOMA-CEGES

Federal Research institutes not depending from BELSPO:

SCK-CEN (FPS Economy, S.M.E., Self-Employed, and Energy)

National Institute of Criminalistics and Criminology (FPS Justice)

Royal Army and Military History Museum (Ministry Defence)

Scientific Institute of Public Health (FPS Health, Food chain Safety and Environment)

Veterinary and agrochemical research center (FPS Health, Food chain Safety and Environment)

Annex 2 : Glossarium

AAL	Ambient Assisted Living
AIO	Flanders Innovation & Entrepreneurship
ANAEE	Analysis and Experimentation on Ecosystems
AO	Enterprise Flanders
AWEX	Walloon Agency of Foreign Investments
BBMRI	Biobanking and Biomolecular Resources Research Infrastructure
BBRI	Belgian Building Research Institute
BNEN	Belgian Nuclear higher Education Network
BCCM	Belgian Coordinated Collection of Microorganisms
BELSPO	Federal Public Planning Service Science Policy
BFUG	Bologna Follow Up Group
BISA	Belgian Interfederal Space Agency
BOF	special research fund
BRAIN	Belgian Research Action Through Interdisciplinary Networks
BSI	Brussels Studies Institute
CBEFH/BRGVM	Brussels Council for Equality between Women and Men
CERN	European Organization for Nuclear Research
CIRB	Brussels Regional Computing Centre
CIS-CFS	Commission for International Cooperation of the IMCSP
CFS	Commission for federal Collaboration of the IMCSP
CODA-CERVA	Veterinary and Agrochemical Research Centre (Belgium)
COFUND	Co-funding of regional, national and international programmes (EU)
COST	European Cooperation in Science and Technology
CRM	Customer Relationship Management
DARIAH	Digital Research Infrastructure for the Arts and Humanities
DEWI	Department of Economy, Science and Innovation
DGENORS	Directorate General of Non-compulsory Education and Scientific Research
DGHE	Directors General of Higher Education
DGO6	Directorate General of economy, employment and research
EARTO	European Association of Research and Technologies Organisations
EC	European Commission
ECOOM	Centre for Research and Development Monitoring
ECSEL	Electronic Components and Systems for European Leadership
EIGE	European Institute for Gender Equality
ELIXIR	A distributed infrastructure for life-science information
EMBL	European Molecular Biology Laboratory
EMBRC	European Marine Biological Resource Centre
EMPIR	European Metrology Programme for Innovation and Research
EMRP	European Metrology Research Programme
ENSCC	European Research Area Network on Smart Cities and Communities
ENSUF	European Research Area Network on a Smart Urban Future
ERA	European Research Area
ERAC	European Research Area Committee
ERAfrica	European Research Area Network for the African Continent
ERA-LAC	European Research Area Network for Latin America and the Caribbean
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ERIC	European Research Infrastructure Consortium
ERINHA	European Research Infrastructure on Highly Pathogenic Agents
ESFRI	European Strategy Forum on Research Infrastructures
ESO	European Southern Observatory
ESS (RI)	European Spallation Source (Research Infrastructure)
ESSurvey	European Social Survey
EU	European Union

EUA	European University Association
EUREKA	EUREKA is a pan-European publicly-funded, intergovernmental network, involving over 40 countries for market-oriented, industrial, Research and Development (R&D)
EURIDICE	European Underground Research Infrastructure for disposal of nuclear waste in Clay Environment
EURO-BIOIMAGING	Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences
EUROSTARS	Joint programme between EUREKA and the European Commission
ESA	European Space Agency
EWI	Economy, Science and Innovation
FRI	Federal research institutes
FP	Framework Programme
FPS	Federal public service
FRS-FNRS	Fund for Scientific Research (of the French Community)
FWO	Research Foundation - Flanders
GDP	Gross Domestic Product
GPC	High-Level Group for Joint Programming
H2020	Horizon 2020
HEI	higher education institution
Hercules Foundation	former Flemish infrastructure fund
HR	Human Resources
HRS4R	Human Resources Strategy for Researchers
ICOS	Integrated Carbon Observation System
ICT	Information and Communication Technology
IFS	International Foundation for Science
IISN/IIKW	Inter-university Institute for nuclear sciences
ILL	Institute Laue-Langevin
IMCSP	Interministerial conference for science policy
Innovatech	Business Support to develop the projects of Walloon companies, to create new products and services.
INSTRUCT	Integrated Structural Biology Infrastructure for Europe
IPR	intellectual property rights
IOF	industrial research fund
IUAP	Interuniversity Attraction Poles
IWT	former agency for Innovation by Science and Technology (Flanders)
JPI	Joint Programming Initiative
JPND	Joint Programming Initiative on Neurodegenerative Disease Research
JTI	Joint Technology Initiative
JU	Joint Undertaking
KET	Key Enabling Technology
KPI	key performance indicators
KUL	Catholic University of Leuven
LED	low threshold expertise and service providers
LERU	League of European Research Universities
LIEU	Liaison Entreprises-Universités
LGBTIQ	lesbian, gay, bisexual, transgender, intersex and questioning individuals
LIFEWATCH	E-Science European Infrastructure for Biodiversity and Ecosystem Research
MSCA	Marie Skłodowska-Curie actions
MLE	Mutual Learning Exercise
MYRRHA	Multi-purpose hYbrid Research Reactor for High-tech Applications.
NCP	National Contact Point
NWPU	Northwestern Polytechnical University
OECD	The Organisation for Economic Co-operation and Development
OJO	Support Programme for Young Researchers
ONDRAF/NIRAS	National Agency for Radioactive Waste and Enriched Fissile Materials
OpenAIRE	Open Access Infrastructure for Research in Europe
ORCID	Open Researcher and Contributor ID

P&M	Policy & Monitoring
P&O	Personal & Organisation
P2P	Peer to Peer
Picarré	Walloon provider of support in matters relating to intellectual property
POC	Proof of Concept
PRACE	Partnership for Advanced Computing in Europe
PRODEX	Programme for the Development of Scientific Experiments of ESA
PPP	Public Private Partnerships
RBINS	Royal Belgian Institute of natural sciences
R&D	Research and Development
R&I	Research and Innovation
R&D&I	Research and Development and Innovation
RI	Research Infrastructure
ROB	Royal observatory of Belgium
RTD	Research and Technological Development (and demonstration)
RFO	research funding organisation
RPO	research performing organisation
RTO	research and technology organisation
SaaS	Software as a Service
SCK-CEN	Belgian Nuclear Research Centre
S&I	Science and Innovation
S&T	Science and Technology
SBO	strategic basic research
SHARE	Survey of Health, Ageing and Retirement in Europe
SME	small and medium-sized enterprise
STEREO	Support for the Exploitation and Research in Earth Observation
STI	Science, Technology and Innovation
SRIA	Strategic Research and Innovation Agenda
SRC	strategic research centres
TTO	technology transfer office
TAFTIE	The European Network of Innovations and Agencies
TIP	(OECD Working Group on) Innovation and Technology Policy
TRL	technology readiness level
UAS	University of Applied Sciences
UCL	Catholic University of Louvain
ULB	Free University of Brussels (French-speaking)
UNESCO	United Nations Educational, scientific and Cultural organization
UNIDO	United Nations Industrial Development Organization
USL-B	Saint-Louis University Brussels
VIB	Flemish Institute for Biotechnology
VITO	Flemish Institute for Technological Research
VLIR	Flemish Interuniversity Council
VRWI	Flemish Council for Science and Innovation
VUB	Free University of Brussels (Dutch-speaking)
WELBIO	Walloon Excellence in Life sciences and BIOTEchnology
WIV-ISP	Scientific Institute of Public Health (Belgium)